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B07NF9-TMA-354

354

TMA
Thermo Analytical Inc.

START

0045422

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

RECORD COPY

March 20, 1993

MAR 1993 RECEIVED OGM DMC

Ref: TMA/Norcal Report N2-12-017-7136

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

Dear Ms. Colley:

Enclosed is the data report for gross alpha, gross beta, ^{90}Sr, isotopic uranium, isotopic plutonium, ^{241}Am and gamma scan on soil samples received December 2, 1992 from location 100 Area, Columbia River, Hanford Reach. The Summary Data Section is numbered pages 1 to 56, and the appendices are numbered pages 57 to 489.

Please call if you have any questions concerning this data.

Sincerely,

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

DPK/jw

Enclosures: Sections 1 and 2
Appendices

OCT 1996 RECEIVED EDMC

SDG: 7136
Contact: Dinkar Kharkar

TMA NORCAL

REPORTING GROUP 7136

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7136 is comprised of the 14 soil samples from location 100 Area, Columbia River, Hanford Reach, listed on the chain-of-custody document below.

1.1 Chains-of-Custody

This report includes data from the 14 samples delivered under Chain-of-Custody document Field Logbook No. 199806.226.

1.2 Sample Volume Shortages

1 x 1000 mL bottles containing samples were received for analysis. The nominal aliquot for a gamma scan is 750 grams. The laboratory received only enough sample to analyze 469-733 gram aliquots.

1.3 Missing Samples

All samples were accounted for.

1.4 Leaking Samples

There were no leaking or damaged samples.

1.5 Holding Times

Collections were made between November 22, 1992 and November 24, 1992. Sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control, consisted of 10% replicates and 5% each of laboratory control samples and blanks.

The QC samples were prepared and labelled by the Quality Control Officer. Copies of the QC Notebook pages are included in the data package.

The blanks and laboratory control samples were created using the 1989 ASTM formula for moderately hard water, listed in Table 8010: *Recommended Composition for Reconstituted Fresh Water*. This consisted of the following:

$NaHCO_3$	96 mg/L
$CaSO_4.2H_2O$	60 mg/L
$MgSO_4$	60 mg/L

KCl at 4.0 mg/L was specified in the table but not added as KCl contains natural ^{40}K which raises the background considerably.

The QC samples were analyzed using the same volume of water as the corresponding sample analysis.

2.1 Laboratory Control Samples

Spike recoveries were satisfactory for all nuclides. The MDA's of the ^{241}Am, $^{233/234}U$ and ^{238}Pu analyses for Lab Control Sample 7136-015 were higher than their respective RDL's. This was due to abnormally high counter backgrounds in the regions of interest, and in the case of ^{241}Am, a relatively low chemical yield. Given that these were Laboratory Control Samples containing activity at seventeen to thirty-four times the RDL, the relatively high MDA's are not of particular concern.

2.2 Reagent Blanks

Results were satisfactory for all reagent blank analyses.

2.3 Replicates

Results were satisfactory for all replicate analyses.

3.0 ANALYSIS NOTES

3.1 Gross Alpha Analyses

The average MDA for 17 gross alpha samples was 5 $\pm$ 1 pCi/g. Gross alpha activity above the RDL was found in sample B07NH2.

3.2 Gross Beta Analyses

The average MDA for 17 gross beta samples was 5 $\pm$ 0.9 pCi/g. Gross beta activity above the RDL was found in all of the samples analyzed except B07NG6.

3.3 Plutonium 238 and 239/240 Analyses

The average yield for 17 samples was 56 ± 21% (2σ). The lowest yield was 41% and the highest was 76%. ^{238}Pu and $^{239/240}$Pu activity above the RDL was not found in any of the samples analyzed.

The MDA's of the ^{238}Pu results for several of the samples were higher than the RDL. This was due to unusually high counter backgrounds in the region of interest. $^{239/240}$Pu MDA's met the RDL in each case.

3.4 Americium 241 Analyses

The average yield for 19 samples was 69 ± 31% (2σ). The lowest yield was 24% and the highest was 83% ^{241}Am activity above the RDL was not found in any of the samples analyzed.

Samples B07NH5 and B07NF9 Replicate had low initial yields (6% and 17%). It was suspected that there was difficulty in the Americium plating step, so the samples were reanalyzed with QC samples 7136-018 and 7136-019. Satisfactory yields were obtained after reanalysis.

The MDA of the result for sample B07NH6 was higher than the RDL. This was due to the combination of an abnormally high counter background in the region of interest and the relatively low chemical yield.

3.5 Uranium 233/234, 235, and 238 Analyses

The average yield for 17 samples was 50 ± 27% (2σ). The lowest yield was 21% and the highest was 68%. $^{233/234}$U and ^{238}U activity above the RDL was found in all the samples analyzed except B07NG8.

The chemical yields for samples B07NG3 and B07NG4 were slightly below the 30-105% limits. Because the MDA met RDL requirements in each case, the samples were not reanalyzed.

3.6 Strontium 90 Analyses

The average yield for 17 samples was 73 ± 14% (2σ). The lowest yield was 61% and the highest was 89%. ^{90}Sr activity above the RDL was not found in any of the samples analyzed.

3.7 Gamma Scan Analyses

The average MDA for 17 samples was 0.4 ± 0.3 pCi/g. The nominal aliquot for a gamma scan is 750 grams. The laboratory received only enough sample to analyze 469-733 gram aliquots. MDA's exceeded the RDL's in each case due to the smaller aliquots.

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N212017-01

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NF9

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-01	Client sample id	B07NF9
Dept sample id	7136-001	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	37.8	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.4	3.9	4	10	J	80A
Gross Beta	Beta	12	4.1	6	10		80B
Uranium 233/234		0.77	0.26	0.1	0.3		U
Uranium 235	15117-96-1	0.042	0.042	0.2	0.3	U	U
Uranium 238	7440-61-1	0.96	0.27	0.1	0.3		U
Plutonium 238	13981-16-3	0.004	0.013	0.03	0.05	U	PU
Plutonium 239/240		0.004	0.008	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.004	0.012	0.02	0.05	U	AM
Strontium 90	10098-97-2	-0.15	0.23	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.1				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	U		0.07	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.08		U	GAM
Cesium 137	10045-97-3	0.45	0.073		0.05		GAM
Europium 152	14683-23-9	0.32	0.17		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.90	0.15				GAM
Thorium 228	14274-82-9	1.4	0.11				GAM
Thorium 232	7440-29-1	0.91	0.26				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-02

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG3

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-02	Client sample id	B07NG3
Dept sample id	7136-002	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	34.2	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	3.5	4.4	6	10	U	80A
Gross Beta	Beta	14	4.5	6	10		80B
Uranium 233/234		0.45	0.23	0.2	0.3		U
Uranium 235	15117-96-1	0.14	0.14	0.3	0.3	U	U
Uranium 238	7440-61-1	0.75	0.30	0.2	0.3		U
Plutonium 238	13981-16-3	-0.016	0.013	0.04	0.05	U	PU
Plutonium 239/240		0.013	0.013	0.02	0.05	U	PU
Americium 241	14596-10-2	0.006	0.017	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.009	1.7	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.3				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.38	0.083		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.76	0.093		0.05		GAM
Europium 152	14683-23-9	0.50	0.12		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.64	0.14				GAM
Thorium 228	14274-82-9	0.85	0.079				GAM
Thorium 232	7440-29-1	0.84	0.29				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-03

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG4

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-03	Client sample id	B07NG4
Dept sample id	7136-003	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	25.5	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	4.3	4.2	5	10	U	80A
Gross Beta	Beta	15	4.0	5	10		80B
Uranium 233/234		0.35	0.22	0.3	0.3		U
Uranium 235	15117-96-1	0.17	0.17	0.3	0.3	U	U
Uranium 238	7440-61-1	0.53	0.30	0.3	0.3		U
Plutonium 238	13981-16-3	-0.008	0.011	0.03	0.05	U	PU
Plutonium 239/240		0.005	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	0.002	0.022	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.091	2.1	0.9	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.2				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	U		0.07	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.19	0.076		0.05		GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.09	0.1	U	GAM
Radium 226	13982-67-7	0.90	0.12				GAM
Thorium 228	14274-82-9	1.3	0.087				GAM
Thorium 232	7440-29-1	1.2	0.24				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-04

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG5

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-04	Client sample id	B07NG5
Dept sample id	7136-004	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	31.3	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	2.6	3.5	5	10	U	80A
Gross Beta	Beta	13	3.9	5	10		80B
Uranium 233/234		0.49	0.20	0.2	0.3		U
Uranium 235	15117-96-1	0.019	0.039	0.1	0.3	U	U
Uranium 238	7440-61-1	0.41	0.17	0.1	0.3		U
Plutonium 238	13981-16-3	-0.009	0.019	0.04	0.05	U	PU
Plutonium 239/240		0.016	0.014	0.02	0.05	U	PU
Americium 241	14596-10-2	0.016	0.023	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.13	0.25	0.9	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.1				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.12	0.064		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	1.5	0.11		0.05		GAM
Europium 152	14683-23-9	1.5	0.17		0.1		GAM
Europium 154	15585-10-1	0.21	0.17		0.1		GAM
Radium 226	13982-67-7	0.65	0.11				GAM
Thorium 228	14274-82-9	0.88	0.094				GAM
Thorium 232	7440-29-1	0.93	0.22				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-05

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG6

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-05	Client sample id	B07NG6
Dept sample id	7136-005	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	34.1	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	2.6	3.8	5	10	U	80A
Gross Beta	Beta	9.3	3.7	5	10	J	80B
Uranium 233/234		0.85	0.30	0.2	0.3		U
Uranium 235	15117-96-1	0.024	0.048	0.2	0.3	U	U
Uranium 238	7440-61-1	0.71	0.26	0.2	0.3		U
Plutonium 238	13981-16-3	0.002	0.021	0.04	0.05	U	PU
Plutonium 239/240		0.002	0.009	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.002	0.019	0.04	0.05	U	AM
Strontium 90	10098-97-2	0.009	0.17	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.3				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	0.37	0.084		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.08		U	GAM
Cesium 137	10045-97-3	0.79	0.097		0.05		GAM
Europium 152	14683-23-9	0.56	0.13		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.66	0.14				GAM
Thorium 228	14274-82-9	0.90	0.082				GAM
Thorium 232	7440-29-1	0.94	0.30				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-06

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG8

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-06	Client sample id	B07NG8
Dept sample id	7136-006	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	0.2	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	2.1	3.0	4	10	U	80A
Gross Beta	Beta	30	4.7	5	10		80B
Uranium 233/234		0.22	0.15	0.2	0.3	J	U
Uranium 235	15117-96-1	0.030	0.060	0.2	0.3	U	U
Uranium 238	7440-61-1	0.20	0.15	0.2	0.3	J	U
Plutonium 238	13981-16-3	0.013	0.026	0.05	0.05	U	PU
Plutonium 239/240		-0.003	0.013	0.03	0.05	U	PU
Americium 241	14596-10-2	0.009	0.017	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.41	0.72	0.9	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	23	1.3				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM
Europium 152	14683-23-9	U		0.07	0.1	U	GAM
Europium 154	15585-10-1	U		0.05	0.1	U	GAM
Radium 226	13982-67-7	0.24	0.079				GAM
Thorium 228	14274-82-9	0.46	0.077				GAM
Thorium 232	7440-29-1	0.34	0.20				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-07

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG9

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-07	Client sample id	B07NG9
Dept sample id	7136-007	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	21.7	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	4.7	3.5	4	10	J	80A
Gross Beta	Beta	10	4.2	6	10		80B
Uranium 233/234		0.77	0.24	0.1	0.3		U
Uranium 235	15117-96-1	0.045	0.046	0.2	0.3	U	U
Uranium 238	7440-61-1	0.49	0.20	0.1	0.3		U
Plutonium 238	13981-16-3	-0.012	0.031	0.07	0.05	U	PU
Plutonium 239/240		0.019	0.023	0.04	0.05	U	PU
Americium 241	14596-10-2	0.009	0.023	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.094	1.9	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.1				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.36	0.078		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.83	0.095		0.05		GAM
Europium 152	14683-23-9	0.92	0.17		0.1		GAM
Europium 154	15585-10-1	0.16	0.16		0.1		GAM
Radium 226	13982-67-7	0.69	0.12				GAM
Thorium 228	14274-82-9	1.1	0.097				GAM
Thorium 232	7440-29-1	0.98	0.27				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8547

N212017-08

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH0

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-08	Client sample id	B07NH0
Dept sample id	7136-008	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	29.0	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	2.9	4.0	5	10	U	80A
Gross Beta	Beta	18	4.2	5	10		80B
Uranium 233/234		0.88	0.27	0.1	0.3		U
Uranium 235	15117-96-1	0.065	0.087	0.2	0.3	U	U
Uranium 238	7440-61-1	0.70	0.23	0.1	0.3		U
Plutonium 238	13981-16-3	0.006	0.023	0.05	0.05	U	PU
Plutonium 239/240		0.011	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	0.016	0.026	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.035	0.28	1	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.2				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.076	0.058		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.16	0.058		0.05		GAM
Europium 152	14683-23-9	0.30	0.096		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.67	0.11				GAM
Thorium 228	14274-82-9	0.99	0.074				GAM
Thorium 232	7440-29-1	0.92	0.22				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8548

N212017-09

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH1

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-09	Client sample id	B07NH1
Dept sample id	7136-009	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	16.7	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	7.7	4.5	4	10	J	80A
Gross Beta	Beta	14	4.2	6	10		80B
Uranium 233/234		0.90	0.31	0.2	0.3		U
Uranium 235	15117-96-1	0.15	0.10	0.2	0.3	U	U
Uranium 238	7440-61-1	0.98	0.32	0.2	0.3		U
Plutonium 238	13981-16-3	-0.006	0.017	0.04	0.05	U	PU
Plutonium 239/240		0.014	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	0.013	0.022	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.001	2.3	1	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.3				GAM
Iron 59		U		0.6	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	0.10	0.072		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.7		U	GAM
Cesium 134	17967-70-9	0.089	0.078				GAM
Cesium 137	10045-97-3	0.91	0.098		0.05		GAM
Europium 152	14683-23-9	0.79	0.14		0.1		GAM
Europium 154	15585-10-1	U		0.3	0.1	U	GAM
Radium 226	13982-67-7	0.98	0.17				GAM
Thorium 228	14274-82-9	1.5	0.10				GAM
Thorium 232	7440-29-1	1.2	0.36				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8549

N212017-10

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH2

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-10	Client sample id	B07NH2
Dept sample id	7136-010	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	4.2	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	11	5.5	6	10		80A
Gross Beta	Beta	22	4.4	5	10		80B
Uranium 233/234		2.6	0.50	0.1	0.3		U
Uranium 235	15117-96-1	0.080	0.081	0.2	0.3	U	U
Uranium 238	7440-61-1	2.0	0.43	0.1	0.3		U
Plutonium 238	13981-16-3	0.009	0.031	0.05	0.05	U	PU
Plutonium 239/240		0.012	0.012	0.02	0.05	U	PU
Americium 241	14596-10-2	0.002	0.023	0.04	0.05	U	AM
Strontium 90	10098-97-2	0.17	0.32	1	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.2				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.7		U	GAM
Cesium 134	17967-70-9	U		0.09		U	GAM
Cesium 137	10045-97-3	U		0.07	0.05	U	GAM
Europium 152	14683-23-9	U		0.2	0.1	U	GAM
Europium 154	15585-10-1	U		0.1	0.1	U	GAM
Radium 226	13982-67-7	1.3	0.14				GAM
Thorium 228	14274-82-9	2.5	0.12				GAM
Thorium 232	7440-29-1	2.3	0.35				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8550

N212017-11

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH3

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-11	Client sample id	B07NH3
Dept sample id	7136-011	Matrix	SOIL
Received	12/02/92	Collected	11/24/92
% moisture	20.7	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	7.4	4.2	4	10	J	80A
Gross Beta	Beta	12	3.8	5	10		80B
Uranium 233/234		0.51	0.22	0.2	0.3		U
Uranium 235	15117-96-1	0.15	0.13	0.2	0.3	U	U
Uranium 238	7440-61-1	0.75	0.26	0.2	0.3		U
Plutonium 238	13981-16-3	-0.018	0.025	0.06	0.05	U	PU
Plutonium 239/240		0	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.009	0.02	0.05	U	AM
Strontium 90	10098-97-2	-0.23	0.24	0.9	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.1				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Radium 226	13982-67-7	0.67	0.10				GAM
Thorium 228	14274-82-9	0.94	0.064				GAM
Thorium 232	7440-29-1	0.83	0.17				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8551

N212017-12

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH4

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-12	Client sample id	B07NH4
Dept sample id	7136-012	Matrix	SOIL
Received	12/02/92	Collected	11/24/92
% moisture	31.9	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	3.3	4.0	5	10	U	80A
Gross Beta	Beta	19	4.2	5	10		80B
Uranium 233/234		0.80	0.24	0.1	0.3		U
Uranium 235	15117-96-1	0.019	0.038	0.1	0.3	U	U
Uranium 238	7440-61-1	0.69	0.23	0.1	0.3		U
Plutonium 238	13981-16-3	0	0.023	0.05	0.05	U	PU
Plutonium 239/240		0.009	0.012	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.015	0.03	0.05	U	AM
Strontium 90	10098-97-2	0	1.5	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	17	1.3				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	U		0.07	0.05	U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Radium 226	13982-67-7	0.82	0.12				GAM
Thorium 228	14274-82-9	1.1	0.076				GAM
Thorium 232	7440-29-1	1.0	0.24				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8552

N212017-13

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH5

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-13	Client sample id	B07NH5
Dept sample id	7136-013	Matrix	SOIL
Received	12/02/92	Collected	11/24/92
% moisture	25.4	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.3	4.4	5	10	J	80A
Gross Beta	Beta	17	4.6	6	10		80B
Uranium 233/234		0.49	0.21	0.1	0.3		U
Uranium 235	15117-96-1	0.020	0.041	0.2	0.3	U	U
Uranium 238	7440-61-1	0.30	0.14	0.1	0.3		U
Plutonium 238	13981-16-3	-0.012	0.023	0.05	0.05	U	PU
Plutonium 239/240		0	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0.011	0.018	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.087	0.60	0.7	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.96				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.25	0.057		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.50	0.068		0.05		GAM
Europium 152	14683-23-9	0.32	0.099		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.59	0.10				GAM
Thorium 228	14274-82-9	0.78	0.11				GAM
Thorium 232	7440-29-1	0.51	0.22				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8553

N212017-14

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH6

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-14	Client sample id	B07NH6
Dept sample id	7136-014	Matrix	SOIL
Received	12/02/92	Collected	11/24/92
% moisture	23.6	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	1.6	3.4	5	10	U	80A
Gross Beta	Beta	16	4.0	5	10		80B
Uranium 233/234		0.44	0.22	0.2	0.3		U
Uranium 235	15117-96-1	0	0.063	0.2	0.3	U	U
Uranium 238	7440-61-1	0.36	0.21	0.2	0.3		U
Plutonium 238	13981-16-3	-0.011	0.029	0.07	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Americium 241	14596-10-2	0.010	0.030	0.06	0.05	U	AM
Strontium 90	10098-97-2	0.069	0.19	0.7	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.1				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.20	0.062		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.54	0.071		0.05		GAM
Europium 152	14683-23-9	0.32	0.086		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.54	0.10				GAM
Thorium 228	14274-82-9	0.59	0.061				GAM
Thorium 232	7440-29-1	0.60	0.21				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8554

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: BRIAN MATTINGLY

OSM Project No. 92-374

Company Contact: Steve Weiss, Ron Mitchell

Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: 100 AREA, COLUMBIA RIVER, HANFORD REACH

Collection Date: 11/22/92

Ice Chest No.: IT #45

Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 725 T

Offsite Property No.: WP3-0-0122 #15 JBL

Method of Shipment: EMERY

Shipped to: TMA/NORCAL 2030 WRIGHT AVE., RICHMOND CA 94804-0040

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07NG0 1x1000ML, 2x250ML, 1x125ML COLUMBIA RIVER SEDIMENT

B07NG1

B07NG2

B07NF9

N/A

N/A

☐ Field Transfer of Custody	CHAIN OF POSSESSION	(Sign and Print Names)
Relinquished by: [signature]	Received by:	Date/Time: 12/1/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 12-2-92 1130
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

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

058

A-6000-407 (12/90)

9613492.8555

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHOOD, MATTINGLY, GLAMAN Date 11/21/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07N6C	SE	11/21/92	1005	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Be Gamma Spec, ^{90}Sr
	~~SE~~			
	SE			1 x 250ml-Glass: Mercury
	SE			1 x 250 ml-Glass: Lead
	SE			1 x 125 ml-Glass: ICP and AA Metals
B07N79	SE	11/21/92	1030	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta Gamma Spec, ^{90}Sr
	~~SE~~			
	SE			1 x 250 ml-Glass: Lead
	SE			1 x 250 ml-Glass: Mercury
	SE			1 x 125 ml-Glass: ICP and AA Metals
B07N61	SE	11/21/92	1255	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma S Sr-90
	SE			1x250ml-Glass: Lead
	SE			1x250 ml Glass: Mercury
	SE			1x 125ml Glass: ICP and AA Metals
B07N62	SE	11/21/92	1436	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta Gamma Spec, ^{90}Sr
	~~SE~~			1x 250ml-Glass: Lead
	SE			1x 250 ml-Glass: Mercury
	SE			1x 125 ml-Glass: ICP & AA metals
	~~SE~~			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

055

A-6000-406 (06/

9613492.8556

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: BRIAN MATTINGLY

OSM Project No. 92-374

Company Contact: Steve Weiss, Ron Mitchell

Telephone: 376-1683, 376-512

Project Designation/Sampling Locations: 100 AREA, COLUMBIA RIVER, HANFORD REACH

Collection Date: 11/22/92

Ice Chest No.: IT # 23

Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 725T

Offsite Property No.: W93-0-022 #15 JB

Method of Shipment: EMORY

Shipped to: TMA/NORCAL 2030 WRIGHT AVE, RICHMOND CA 94804-0040

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07NG3	1x1000ML, 2x250ML,	1x125ML	COLUMBIA RIVER SEDIMENT
B07NG4	↓	↓	↓
B07NG5	↓	↓	↓
B07NG6	↓	↓	↓

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
Brian Mattingly		12/1/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 12-2-92 1130
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)

9613492.8557

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHOOD, MATTINGLY, GLAMAN Date 11/22/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07NG3	SE	11/22/92	1325	✓ 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			✓ 1 x 250ml - Glass : Mercury
	SE			✓ 1 x 250 ml - Glass : Lead
	SE			✓ 1 x 125 ml - Glass : ICP and AA Metals
B07NG4	SE	11/22/92	1105	✓ 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			✓ 1 x 250 ml - Glass : Lead
	SE			✓ 1 x 250 ml - Glass : Mercury
	SE			✓ 1 x 125 ml - Glass : ICP and AA Metals
B07NG5	SE	11/22/92	1400	✓ 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma S. Sr-90
	SE			✓ 1x250ml-Glass : Lead
	SE			✓ 1x250 ml Glass : Mercury
	SE			✓ 1x 125ml Glass : ICP and AA Metals
B07NG6	SE	11/22/92	1400	✓ 1x1000ml-Plastic : Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			✓ 1x 250ml - Glass : Lead
	SE			✓ 1x 250 ml - Glass : Mercury
	SE			✓ 1x 125 ml - Glass : ICP & AA metals
	SE			

*Type of Sample

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

061

A-6000-406 (08/

9613492.8558

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: BRIAN MATTINGLY — OSM Project No. 92-374

Company Contact: Steve Weiss, Ron Mitchell — Telephone: 376-1683, 376-512

Project Designation/Sampling Locations: 100 AREA, COLUMBIA RIVER, HANFORD REACH — Collection Date: 11/23/92

Ice Chest No.: IT #26 — Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 725T — Offsite Property No.: W93-0-0122 #15 ~~#14~~ JB

Method of Shipment: EMORY

Shipped to: JMA/NORCAL 2030 WRIGHT AVE RICHMOND CA 94804-0046

Possible Sample Hazards/Remarks: NONE

Sample Identification

BC7NG8 1x1000 ML, 2x250ML, 1x125 ML COLUMBIA RIVER SEDIMENT

BC7NG9 1x1000 ML, 2x250ML, 1x125 ML COLUMBIA RIVER SEDIMENT

BC7NH0

BC7NH1

BC7NH2

N A

N A

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

Relinquished by:	Received by:	Date/Time:
Brian Mattingly		12/1/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 12-2-92 1130
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time: CB2

Comments:

A-6000-407 (12/90)

9613492.8559

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHOOD, MATTINGLY, GLAMAN Date 11/23/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B7N68	SE	11/23/92	0830	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Be
↓	SE	↓	↓	Gamma Spec, ^{90}Sr
	SE			1 x 250ml-Glass: Mercury
	SE			1 x 250 ml-Glass: Lead
↓	SE	↓	↓	1 x 125 ml-Glass: ICP and AA Metals
B7N69	SE	11/23/92	1015	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta,
↓	~~SE~~	↓	↓	Gamma Spec, ^{90}Sr
	SE			1 x 250 ml-Glass: Lead
	SE			1 x 250 ml-Glass: Mercury
↓	SE	↓	↓	1 x 125 ml-Glass: ICP and AA Metals
B7N40	SE	11/23/92	1030	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma S Sr-90
↓	SE	↓	↓	1x250ml-Glass: Lead
	SE			1x250 ml Glass: Mercury
↓	SE	↓	↓	1x 125ml Glass: ICP and AA Metals
B7N41	SE	11/23/92	1130	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta
↓		↓	↓	Gamma Spec, ^{90}Sr
	SE			1x 250ml - Glass: Lead
	SE			1x 250 ml - Glass: Mercury
↓	SE	↓	↓	1x 125 ml - Glass: ICP & AA metals
	~~SE~~			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

063

A-6000-406 (06/

9613492.8560

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHOOD, MATTINGLY, GLAMAN Date 11/23/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07NH2	SE	11/23/92	1200	4 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross B
	SE			Gamma Spec, ^{90}Sr
	SE			1 x 250ml-Glass: (Mercury)
	SE			1 x 250 ml-Glass: Lead
	SE			1 x 125 ml-Glass: ICP and AA Metals

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

P.6.1

A-6000-406 (0

9613492.8561

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: BRIAN MATTINGLY

OSM Project No. 92-374

Company Contact: Steve Weiss, Ron Mitchell

Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: 100 AREA, COLUMBIA RIVER, HANFORD BEACH

Collection Date: 11/24/92

Ice Chest No.: JT # 46

Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 7:25 T

Offsite Property No.: 6193-0-01 #15

Method of Shipment: EMORY

Shipped to: TMA/NORCAL 2030 WRIGHT AVE., RICHMOND CA 94804-0040

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07N H3 1x1000ml, 2x250ml, 1x125ml COLUMBIA RIVER SEDIMENT

B07N H4

B07N H5

B07N H6

N A

N A

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
Brian Mattingly		12/1/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 12-2-92 1130
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

065

A-6000-407 (12/90)

9613492.8562

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHOOD, MATTINGLY, GLAMAN Date 11/24/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07NH3	SE	11/23/92	1350 ✓	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Bet
	~~SE~~			Gamma Spec, ^{90}Sr
	SE			1 x 250ml-Glass: Mercury
	SE		✓	1 x 250 ml-Glass: Lead
	SE		✓	1 x 125 ml-Glass: ICP and AA Metals
B07NH4	SE	11/23/92	1411 ✓	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta,
	~~SE~~			Gamma Spec, ^{90}Sr
	SE		✓	1 x 250 ml-Glass: Lead
	SE			1 x 250ml-Glass: Mercury
	SE		✓	1 x 125 ml-Glass: ICP and AA Metals
B07NH5	SE	11/24/92	1100 ✓	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Sp Sr-90
	SE		✓	1x250ml-Glass: Lead
	SE			1x250 ml Glass: Mercury
	SE		✓	1x 125ml Glass: ICP and AA Metals
B07NH6	SE	11/24/92	1100 ✓	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta
				Gamma Spec, ^{90}Sr
	~~SE~~		✓	1x 250ml - Glass: Lead
	SE			1x 250 ml - Glass: Mercury
	SE		✓	1x 125 ml - Glass: ICP & AA metals
	~~SE~~			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

066

A-6000-406 (06/9

9613492.8563

SAMPLE ANALYSIS REQUEST

100 AREAS FACILITIES HEALTH & SAFETY

373-1436

FAX: 373-4030

REQUESTER: Rich Mahood

PHONE: 376-1683

DATE: 11-23-92

SAMPLE NUMBER	SAMPLE DATE/TIME	SAMPLE DESCRIPTION	**HEALTH PHYSICS USE ONLY** ANALYSIS DATE/TIME	LAB NUMBER	BETA/GAMMA/ALPHA RESULTS (pCi/gm)	ALPHA RESULTS (pCi/gm)
B07NG0	11-21-92 1050	Sediment	11-23-92 2049	G92-1275	16.1	1.3
B07NG1	11-21-92 1245	Sediment	11-23-92 2059	G92-1276	14.9	1.7
B07NG2	11-22-92 1345	Sediment	11-23-92 2109	G92-1277	14.2	1.5
B07NG3	11-22-92 1315	Sediment	11-23-92 2120	G92-1278	13.6	<MDA
B07NG4	11-22-92 1105	Sediment	11-23-92 2130	G92-1279	14.0	1.3
B07NG5	11-22-92 1330	Sediment	11-23-92 2140	G92-1280	16.4	2.0
B07NG6	11-22-92 1340	Sediment	11-23-92 2150	G92-1281	15.9	1.8
B07NG7	11-22-92 1350	Sediment	11-23-92 2228	G92-1282	16.3	1.7
B07NG8	11-23-92 0820	Sand	11-23-92 2305	G92-1283	19.6	<MDA
B07NG9	11-23-92 1015	Sediment	11-24-92 0926	G92-1284	29.5	1.5
B07NH0	11-23-92 1030	Sediment	11-24-92 0920	G92-1285	24.6	<MDA
B07NH1	11-23-92 1150	Sediment	11-24-92 1404	G92-1286	15.2	1.1
B07NH2	11-23-92 1215	Sediment	11-24-92 1215	G92-1287	23.4	2.0
B07NH3	11-23-92 1345	Sediment	11-24-92 1535	G92-1288	19.0	1.8

ANALYSIS BY: J. Miller

DATE: 11-24-92

9613492.8564

SAMPLE ANALYSIS REQUEST

100 AREAS FACILITIES HEALTH & SAFETY

373-1436

FAX: 373-4030

REQUESTER: Rich Mahood

PHONE: 376-1683

DATE: 11-23-92

SAMPLE NUMBER	SAMPLE DATE/TIME	SAMPLE DESCRIPTION	**HEALTH PHYSICS USE ONLY** ANALYSIS DATE/TIME	LAB NUMBER	BETA/GAMMA/ALPHA RESULTS (pCi/gm)	ALPHA RESULTS (pCi/gm)
B07NH4	11-23-92 1410	Sediment	11-24-92 1618	G92-1289	17.8	1.5
B07NF9	11-21-92 1030	Sediment	11-24-92 1655	G92-1290	17.0	2.2
B07NH5	11-24-92 1100	Sediment	11-24-92 1730	G92-1292	17.4	1.7
B07NH6	11-24-92 1100	Sediment	11-24-92 1812	G92-1293	15.3	1.3
B07NH7	11-24-92 1100	Sediment	11-24-92 1850	G92-1294	14.8	1.7

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ANALYSIS BY: J. Mitt

DATE: 11-24-92

068

9613492.8565

SAMPLE ANALYSIS REQUEST

100 AREAS FACILITIES HEALTH & SAFETY

373-1436

FAX: 373-4030

REQUESTER: Rich Mahood

PHONE: 376-1683

DATE: 11-23-92

HEALTH PHYSICS USE ONLY

SAMPLE NUMBER	SAMPLE DATE/TIME	SAMPLE DESCRIPTION	ANALYSIS DATE/TIME	LAB NUMBER	BETA/GAMMA/ALPHA RESULTS (pCi/gm)	ALPHA RESULTS (pCi/gm)
B07NG0	11-21-92 1050	Sediment	11-23-92 2049	G92-1275	16.1	1.3
B07NG1	11-21-92 1245	Sediment	11-23-92 2059	G92-1276	14.9	1.7
B07NG2	11-22-92 1345	Sediment	11-23-92 2109	G92-1277	14.2	1.5
B07NG3	11-22-92 1315	Sediment	11-23-92 2120	G92-1278	13.6	<MDA
B07NG4	11-22-92 1105	Sediment	11-23-92 2130	G92-1279	14.0	1.3
B07NG5	11-22-92 1330	Sediment	11-23-92 2140	G92-1280	16.4	2.0
B07NG6	11-22-92 1340	Sediment	11-23-92 2150	G92-1281	15.9	1.8
B07NG7	11-22-92 1350	Sediment	11-23-92 2228	G92-1282	16.3	1.7
B07NG8	11-23-92 0820	Sand	11-23-92 2305	G92-1283	19.6	<MDA
B07NG9	11-23-92 1015	Sediment	11-24-92 0926	G92-1284	29.5	1.5
B07NH0	11-23-92 1030	Sediment	11-24-92 0920	G92-1285	24.6	<MDA
B07NH1	11-23-92 1150	Sediment	11-24-92 1404	G92-1286	15.2	1.1
B07NH2	11-23-92 1215	Sediment	11-24-92 1215	G92-1287	23.4	2.0
B07NH3	11-23-92 1345	Sediment	11-24-92 1535	G92-1288	19.0	1.8

ANALYSIS BY: J. Miller

DATE: 11-24-92

069

9613492.8566

SAMPLE ANALYSIS REQUEST

100 AREAS FACILITIES HEALTH & SAFETY

373-1436

FAX: 373-4030

REQUESTER: Rich Mahood

PHONE: 376-1683

DATE: 11-23-92

HEALTH PHYSICS USE ONLY

SAMPLE NUMBER	SAMPLE DATE/TIME	SAMPLE DESCRIPTION	ANALYSIS DATE/TIME	LAB NUMBER	BETA/GAMMA/ALPHA RESULTS (pCi/gm)	ALPHA RESULTS (pCi/gm)
B07NH4	11-23-92 1410	Sediment	11-24-92 1618	G92-1289	17.8	1.5
B07NF9	11-21-92 1030	Sediment	11-24-92 1655	G92-1290	17.0	2.2
B07NH5	11-24-92 1100	Sediment	11-24-92 1730	G92-1292	17.4	1.7
B07NH6	11-24-92 1100	Sediment	11-24-92 1812	G92-1293	15.3	1.3
B07NH7	11-24-92 1100	Sediment	11-24-92 1850	G92-1294	14.8	1.7

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ANALYSIS BY: J. Mitt

DATE: 11-24-92

070

9613492.8567

SAMPLE ANALYSIS REQUEST

100 AREAS FACILITIES HEALTH & SAFETY

373-1436

FAX: 373-4030

REQUESTER: Rich Mahood

PHONE: 376-1683

DATE: 11-23-92

SAMPLE NUMBER	SAMPLE DATE/TIME	SAMPLE DESCRIPTION	**HEALTH PHYSICS USE ONLY** ANALYSIS DATE/TIME	LAB NUMBER	BETA/GAMMA/ALPHA RESULTS (pCi/gm)	ALPHA RESULTS (pCi/gm)
B07NG0	11-21-92 1050	Sediment	11-23-92 2049	G92-1275	16.1	1.3
B07NG1	11-21-92 1245	Sediment	11-23-92 2059	G92-1276	14.9	1.7
B07NG2	11-22-92 1345	Sediment	11-23-92 2109	G92-1277	14.2	1.5
B07NG3	11-22-92 1315	Sediment	11-23-92 2120	G92-1278	13.6	<MDA
B07NG4	11-22-92 1105	Sediment	11-23-92 2130	G92-1279	14.0	1.3
B07NG5	11-22-92 1330	Sediment	11-23-92 2140	G92-1280	16.4	2.0
B07NG6	11-22-92 1340	Sediment	11-23-92 2150	G92-1281	15.9	1.8
B07NG7	11-22-92 1350	Sediment	11-23-92 2228	G92-1282	16.3	1.7
B07NG8	11-23-92 0820	Sand	11-23-92 2305	G92-1283	19.6	<MDA
B07NG9	11-23-92 1015	Sediment	11-24-92 0926	G92-1284	29.5	1.5
B07NH0	11-23-92 1030	Sediment	11-24-92 0920	G92-1285	24.6	<MDA
B07NH1	11-23-92 1150	Sediment	11-24-92 1404	G92-1286	15.2	1.1
B07NH2	11-23-92 1215	Sediment	11-24-92 1215	G92-1287	23.4	2.0
B07NH3	11-23-92 1345	Sediment	11-24-92 1535	G92-1288	19.0	1.8

ANALYSIS BY: J. Miller

DATE: 11-24-92

9613492.8569

SAMPLE ANALYSIS REQUEST

100 AREAS FACILITIES HEALTH & SAFETY

373-1436

FAX: 373-4030

REQUESTER: Rich Mahood

PHONE: 376-1693

DATE: 11-23-92

SAMPLE NUMBER	SAMPLE DATE/TIME	SAMPLE DESCRIPTION	**HEALTH PHYSICS USE ONLY** ANALYSIS DATE/TIME	LAB NUMBER	BETA/GAMMA/ALPHA RESULTS (pCi/gm)	ALPHA RESULTS (pCi/gm)
B07NG0	11-21-92 1050	Sediment	11-23-92 2049	G92-1275	16.1	1.3
B07NG1	11-21-92 1245	Sediment	11-23-92 2059	G92-1276	14.9	1.7
B07NG2	11-22-92 1345	Sediment	11-23-92 2109	G92-1277	14.2	1.5
B07NG3	11-22-92 1315	Sediment	11-23-92 2120	G92-1278	13.6	<MDA
B07NG4	11-22-92 1105	Sediment	11-23-92 2130	G92-1279	14.0	1.3
B07NG5	11-22-92 1330	Sediment	11-23-92 2140	G92-1280	16.4	2.0
B07NG6	11-22-92 1340	Sediment	11-23-92 2150	G92-1281	15.9	1.8
B07NG7	11-22-92 1350	Sediment	11-23-92 2228	G92-1282	16.3	1.7
B07NG8	11-23-92 0820	Sand	11-23-92 2305	G92-1283	19.6	<MDA
B07NG9	11-23-92 1015	Sediment	11-24-92 0926	G92-1284	29.5	1.5
B07NH0	11-23-92 1030	Sediment	11-24-92 0920	G92-1285	24.6	<MDA
B07NH1	11-23-92 1150	Sediment	11-24-92 1404	G92-1286	15.2	1.1
B07NH2	11-23-92 1215	Sediment	11-24-92 1215	G92-1287	23.4	2.0
B07NH3	11-23-92 1345	Sediment	11-24-92 1535	G92-1288	19.0	1.8

ANALYSIS BY: J. Miller

DATE: 11-24-92

072

0723

FORM OF PAYMENT

Check ☐ GBL ☐ FCCOD ☐

Bill to Shipper [X] Bill to Consignee ☐ Third Party Billing ☐

EMERY WORLDWIDE — A CF Company

A-0

SERVICES **

UNITED STATES / CANADA: Same Day (Extra Charges) ☐ AM [X] PM ☐ Second Day ☐ Saturday Delivery

INTERNATIONAL: Express ☐ Standard Plus ☐ Preferred ☐ Standard ☐

Business Documents ☐ Customs Clearance ☐ Delivery ☐

E Shipper's Account Number: 850281585

Date: 12-01-92 Origin: PSC Shipment Number: 251900725 T

From:
WESTINGHOUSE SHIPPING DEPT. (509) 376-6665
U.S. DEPARTMENT OF ENERGY C/O
WESTINGHOUSE HANFORD
BLDG 1163
2355 STEVENS DRIVE
RICHLAND WA
Canada ☐

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

Tariff Dest. | Gateway

Check to Shipper $

EMERY WORLDWIDE will accept Consignee check with all duties being assumed by Shipper, whether but [illegible] and misrepresentation

Customer's Reference Numbers: P26A3, A1225 W93-0-0122 #15 99352

E Consignee's Account Number: 94804

Description	Pcs.	L	W	H	Total Pieces	Total Weight (In Lbs)
4 ICE CHESTS IT-45 53#; IT-26 56#; IT-46 54#; IT-23 53# SOIL SAMPLES	4	24	16	17	4	216

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

Declared Value $

251900725T

Remarks: OVERNIGHT DELIVERY SIGNATURE SECURITY SERVICE

Shipper's Signature: J. Dermaut 12/1/92

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 ☐

International Shipments: Free Domicile ☐ Commodity Code

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

International Customs Value | International Insurance

Base Charge | Total Transportation Charges | Other Charges/Advance at Origin OGAD $

1-OAK-A

Terms and Conditions on Back

9613492.8569

Next Day Service Signature Service

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
Westinghouse Hanford Co.		W93-0-122 2/5

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
Environmental Engineering	Remedial Action	

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

Routing ☐ Contractor ☐ Vendor

Shipped to	Off-site Custodian
TMA / Nowatt 2030 Wright AV. Richmond, CA 94804	Robert Fox
	Full Title Sample Receipt

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
4	Poly Chests: poly and glass jars of soil, packed in vermiculite and wet Ice	
53 lbs	Ice Chest IT-45: sample #s B07NF9, B07NG0, B07NG1, B07NG2	
56 lbs	Ice Chest IT-26: sample #s B07NG8, B07NG9, B07NH0, B07NH1, B07NH2	
54 lbs	Ice Chest IT-46: sample #s B07NH3, B07NH4, B07NH5, B07NH6	
53 lbs	Ice Chest IT-23: sample #s B07NG3, B07NG4, B07NG5, B07NG6	

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

Necessity for the Off-Site Use of this Property

Program not available on-site

A/B# 257900 725T

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
Linda R Hamond Linda L Gilman	Free of contamination	12/1/92

Location of Property (Area & Bldg.)	Contact	Phone
Columbia River Sediments	Steve Weiss	(509) 376-1736

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
11/1/92	P2643/A1225	N/A

Originated By	Date	Authorized By	Date
Linda L Gilman IT Corp	12/1/92	[signature]	11/30/92

Signature and Name of Property Control	Custodian Date	Property Management Approval	Date
			12/1/92

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Gilman				
Date 12-1-92				

DISTRIBUTION

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

54-3000-479 (09/89)

9613492.8571

TMA

WESTINGHOUSE HANFORD COMPANY

JAN 1993
RE
OSM

Results of Analyses For:

METALS
Case No. N2-12-009
(TMA/Skinner & Sherman W.O. # S2-12-032)

January 12, 1993

TMA Master Work Order N2-12-009

9613492.8572

TMA
Thermo Analytical Inc.

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

January 11, 1993

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

Quality Control Narrative

Scope
Seventeen (17) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on December 03, 1992 from TMA/Norcal. The samples were analyzed for the USEPA CLP TAL metals. The analysis were performed under TMA/Skinner and Sherman work order S212032.

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

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

The antimony, and manganese digestion spike recovery exceeded the control limit requirements.

The ICP serial dilution for barium exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

David N. Peterson
Assistant Laboratory Manager

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NF9

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-15S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 63.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9850			P
7440-36-0	Antimony	4.9	U	N	P
7440-38-2	Arsenic	6.2			F
7440-39-3	Barium	87.5		E	P
7440-41-7	Beryllium	0.12	U		P
7440-43-9	Cadmium	5.6			P
7440-70-2	Calcium	5040			P
7440-47-3	Chromium	64.1			P
7440-48-4	Cobalt	10.1	B		P
7440-50-8	Copper	42.7			P
7439-89-6	Iron	17600			P
7439-92-1	Lead	59.3			F
7439-95-4	Magnesium	5520			P
7439-96-5	Manganese	173		N	P
7439-97-6	Mercury	0.09	B		CV
7440-02-0	Nickel	19.1			P
7440-09-7	Potassium	1650			P
7782-49-2	Selenium	1.1	U	W	F
7440-22-4	Silver	1.4	B		P
7440-23-5	Sodium	213	B		P
7440-28-0	Thallium	1.1	U		F
7440-62-2	Vanadium	41.7			P
7440-66-6	Zinc	454			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

002

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG0

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-01S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 65.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7250			P
7440-36-0	Antimony	5.1	U	N	P
7440-38-2	Arsenic	5.1		S	F
7440-39-3	Barium	61.3		E	P
7440-41-7	Beryllium	0.12	U		P
7440-43-9	Cadmium	1.5			P
7440-70-2	Calcium	4070			P
7440-47-3	Chromium	25.8			P
7440-48-4	Cobalt	7.3	B		P
7440-50-8	Copper	20.5			P
7439-89-6	Iron	15300			P
7439-92-1	Lead	40.2			F
7439-95-4	Magnesium	4320			P
7439-96-5	Manganese	203		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	13.7			P
7440-09-7	Potassium	1010	B		P
7782-49-2	Selenium	1.1	U		F
7440-22-4	Silver	0.92	B		P
7440-23-5	Sodium	232	B		P
7440-28-0	Thallium	1.1	U		F
7440-62-2	Vanadium	30.8			P
7440-66-6	Zinc	378			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG1

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-02S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 68.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6040			P
7440-36-0	Antimony	4.8	U	N	P
7440-38-2	Arsenic	6.0			F
7440-39-3	Barium	58.0		E	P
7440-41-7	Beryllium	0.11	U		P
7440-43-9	Cadmium	0.65	B		P
7440-70-2	Calcium	3580			P
7440-47-3	Chromium	24.3			P
7440-48-4	Cobalt	6.7	B		P
7440-50-8	Copper	23.2			P
7439-89-6	Iron	14900			P
7439-92-1	Lead	30.5		W	F
7439-95-4	Magnesium	3870			P
7439-96-5	Manganese	231		N	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	12.3			P
7440-09-7	Potassium	831	B		P
7782-49-2	Selenium	1.0	U	W	F
7440-22-4	Silver	0.89	B		P
7440-23-5	Sodium	237	B		P
7440-28-0	Thallium	1.1	U		F
7440-62-2	Vanadium	31.8			P
7440-66-6	Zinc	209			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG2

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-03S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 80.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7550			P
7440-36-0	Antimony	3.7	U	N	P
7440-38-2	Arsenic	2.9			F
7440-39-3	Barium	55.1		E	P
7440-41-7	Beryllium	0.09	U		P
7440-43-9	Cadmium	0.22	U		P
7440-70-2	Calcium	3760			P
7440-47-3	Chromium	18.8			P
7440-48-4	Cobalt	6.7	B		P
7440-50-8	Copper	17.7			P
7439-89-6	Iron	15400			P
7439-92-1	Lead	10.6			F
7439-95-4	Magnesium	4640			P
7439-96-5	Manganese	222		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	15.2			P
7440-09-7	Potassium	877	B		P
7782-49-2	Selenium	0.83	U	W	F
7440-22-4	Silver	0.55	U		P
7440-23-5	Sodium	168	B		P
7440-28-0	Thallium	0.88	U		F
7440-62-2	Vanadium	30.5			P
7440-66-6	Zinc	94.8			P
	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: B07NG3

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-04S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 68.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7640			P
7440-36-0	Antimony	4.4	U	N	P
7440-38-2	Arsenic	4.5		S	F
7440-39-3	Barium	58.4		E	P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	2.0			P
7440-70-2	Calcium	3720			P
7440-47-3	Chromium	22.8			P
7440-48-4	Cobalt	8.5	B		P
7440-50-8	Copper	18.9			P
7439-89-6	Iron	15500			P
7439-92-1	Lead	32.7		W	F
7439-95-4	Magnesium	4450			P
7439-96-5	Manganese	193		N	P
7439-97-6	Mercury	0.07	B		CV
7440-02-0	Nickel	13.8			P
7440-09-7	Potassium	1040	B		P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	0.65	U		P
7440-23-5	Sodium	205	B		P
7440-28-0	Thallium	1.1	U	W	F
7440-62-2	Vanadium	29.9			P
7440-66-6	Zinc	397			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

006

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG4

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-05S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 72.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5110			P
7440-36-0	Antimony	4.5	U	N	P
7440-38-2	Arsenic	10.7		S	F
7440-39-3	Barium	60.5		E	P
7440-41-7	Beryllium	0.11	U		P
7440-43-9	Cadmium	0.27	U		P
7440-70-2	Calcium	3310			P
7440-47-3	Chromium	56.4			P
7440-48-4	Cobalt	6.7	B		P
7440-50-8	Copper	14.9			P
7439-89-6	Iron	15800			P
7439-92-1	Lead	23.9			F
7439-95-4	Magnesium	3310			P
7439-96-5	Manganese	305		N	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	10.9			P
7440-09-7	Potassium	630	B		P
7782-49-2	Selenium	0.92	U	W	F
7440-22-4	Silver	0.66	U		P
7440-23-5	Sodium	166	B		P
7440-28-0	Thallium	0.97	U		F
7440-62-2	Vanadium	32.7			P
7440-66-6	Zinc	152			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES.

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NG5

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-06S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 76.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8620			P
7440-36-0	Antimony	4.0	U	N	P
7440-38-2	Arsenic	4.8		S	F
7440-39-3	Barium	88.5		E	P
7440-41-7	Beryllium	0.09	U		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	3970			P
7440-47-3	Chromium	20.8			P
7440-48-4	Cobalt	8.6	B		P
7440-50-8	Copper	21.5			P
7439-89-6	Iron	16700			P
7439-92-1	Lead	27.8			F
7439-95-4	Magnesium	4990			P
7439-96-5	Manganese	182		N	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	15.1			P
7440-09-7	Potassium	1420			P
7782-49-2	Selenium	0.89	U	M	F
7440-22-4	Silver	1.0	B		P
7440-23-5	Sodium	194	B		P
7440-28-0	Thallium	0.94	U	W	F
7440-62-2	Vanadium	33.9			P
7440-66-6	Zinc	253			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

008

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG6

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-07S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 67.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7430			P
7440-36-0	Antimony	4.6	U	N	P
7440-38-2	Arsenic	3.9		S	F
7440-39-3	Barium	58.5		E	P
7440-41-7	Beryllium	0.11	U		P
7440-43-9	Cadmium	1.7			P
7440-70-2	Calcium	3520			P
7440-47-3	Chromium	21.7			P
7440-48-4	Cobalt	7.8	B		P
7440-50-8	Copper	18.4			P
7439-89-6	Iron	15000			P
7439-92-1	Lead	31.3			F
7439-95-4	Magnesium	4350			P
7439-96-5	Manganese	193		N	P
7439-97-6	Mercury	0.08	B		CV
7440-02-0	Nickel	14.5			P
7440-09-7	Potassium	1050	B		P
7782-49-2	Selenium	0.97	U	W	F
7440-22-4	Silver	0.68	U		P
7440-23-5	Sodium	209	B		P
7440-28-0	Thallium	1.0	U	W	F
7440-62-2	Vanadium	28.7			P
7440-66-6	Zinc	369			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

009

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NG8

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-08S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 74.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	572			P
7440-36-0	Antimony	4.4	U	N	P
7440-38-2	Arsenic	0.70	B		F
7440-39-3	Barium	13.6	B	E	P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.26	U		P
7440-70-2	Calcium	162	B		P
7440-47-3	Chromium	1.2	B		P
7440-48-4	Cobalt	0.81	B		P
7440-50-8	Copper	0.91	U		P
7439-89-6	Iron	1940			P
7439-92-1	Lead	2.8			F
7439-95-4	Magnesium	88.6	B		P
7439-96-5	Manganese	58.6		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	1.4	U		P
7440-09-7	Potassium	147	B		P
7782-49-2	Selenium	0.92	U		F
7440-22-4	Silver	0.86	B		P
7440-23-5	Sodium	51.6	B		P
7440-28-0	Thallium	0.97	U		F
7440-62-2	Vanadium	1.8	B		P
7440-66-6	Zinc	8.3			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

010

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG9

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-09S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 77.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6700			P
7440-36-0	Antimony	4.0	U	N	P
7440-38-2	Arsenic	4.9		S	F
7440-39-3	Barium	48.7		E	P
7440-41-7	Beryllium	0.09	U		P
7440-43-9	Cadmium	0.53	B		P
7440-70-2	Calcium	4060			P
7440-47-3	Chromium	15.4			P
7440-48-4	Cobalt	6.6	B		P
7440-50-8	Copper	29.3			P
7439-89-6	Iron	14700			P
7439-92-1	Lead	49.7		S	F
7439-95-4	Magnesium	4190			P
7439-96-5	Manganese	156		N	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	11.7			P
7440-09-7	Potassium	855	B		P
7782-49-2	Selenium	0.88	U	W	F
7440-22-4	Silver	1.3	B		P
7440-23-5	Sodium	291	B		P
7440-28-0	Thallium	0.93	U		F
7440-62-2	Vanadium	29.8			P
7440-66-6	Zinc	296			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH0

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-10S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 78.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5040			P
7440-36-0	Antimony	4.2	U	N	P
7440-38-2	Arsenic	4.9		S	F
7440-39-3	Barium	48.1	B	E	P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.38	B		P
7440-70-2	Calcium	2300			P
7440-47-3	Chromium	12.5			P
7440-48-4	Cobalt	4.8	B		P
7440-50-8	Copper	12.8			P
7439-89-6	Iron	11700			P
7439-92-1	Lead	11.1			F
7439-95-4	Magnesium	3760			P
7439-96-5	Manganese	170		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	13.9			P
7440-09-7	Potassium	570	B		P
7782-49-2	Selenium	0.83	U		F
7440-22-4	Silver	0.62	U		P
7440-23-5	Sodium	147	B		P
7440-28-0	Thallium	0.88	U		F
7440-62-2	Vanadium	21.1			P
7440-66-6	Zinc	97.3			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH1

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-11S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 76.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8030			P
7440-36-0	Antimony	4.2	U	N	P
7440-38-2	Arsenic	6.1			F
7440-39-3	Barium	73.2		E	P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	1.6			P
7440-70-2	Calcium	4260			P
7440-47-3	Chromium	22.3			P
7440-48-4	Cobalt	7.7	B		P
7440-50-8	Copper	23.8			P
7439-89-6	Iron	16700			P
7439-92-1	Lead	59.8			F
7439-95-4	Magnesium	4640			P
7439-96-5	Manganese	202		N	P
7439-97-6	Mercury	0.07	B		CV
7440-02-0	Nickel	14.3			P
7440-09-7	Potassium	993	B		P
7782-49-2	Selenium	0.86	U		F
7440-22-4	Silver	1.4	B		P
7440-23-5	Sodium	224	B		P
7440-28-0	Thallium	0.91	U		F
7440-62-2	Vanadium	35.4			P
7440-66-6	Zinc	294			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B07NH2

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-12S

Level (low/med): LOW Date Received: 12/03/92

% 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	11100			P
7440-36-0	Antimony	4.7	B	N	P
7440-38-2	Arsenic	6.0		S	F
7440-39-3	Barium	111		E	P
7440-41-7	Beryllium	0.54	B		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	2830			P
7440-47-3	Chromium	31.9			P
7440-48-4	Cobalt	9.7	B		P
7440-50-8	Copper	31.1			P
7439-89-6	Iron	31100			P
7439-92-1	Lead	11.4			F
7439-95-4	Magnesium	3880			P
7439-96-5	Manganese	168		N	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	21.6			P
7440-09-7	Potassium	619	B		P
7782-49-2	Selenium	0.74	U	W	F
7440-22-4	Silver	0.94	B		P
7440-23-5	Sodium	113	B		P
7440-28-0	Thallium	0.78	U	W	F
7440-62-2	Vanadium	86.2			P
7440-66-6	Zinc	85.1			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS AND STONES

014

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B07NH3

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-13S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 82.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6410			P
7440-36-0	Antimony	4.1	U	N	P
7440-38-2	Arsenic	4.5		S	F
7440-39-3	Barium	100		E	P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.24	U		P
7440-70-2	Calcium	5450			P
7440-47-3	Chromium	10.1			P
7440-48-4	Cobalt	8.0	B		P
7440-50-8	Copper	13.4			P
7439-89-6	Iron	12800			P
7439-92-1	Lead	22.6		S	F
7439-95-4	Magnesium	3940			P
7439-96-5	Manganese	344		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	10.4			P
7440-09-7	Potassium	952	B		P
7782-49-2	Selenium	0.85	U	W	F
7440-22-4	Silver	0.77	B		P
7440-23-5	Sodium	144	B		P
7440-28-0	Thallium	0.89	U		F
7440-62-2	Vanadium	25.4			P
7440-66-6	Zinc	82.0			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH4

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-14S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 76.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7700			P
7440-36-0	Antimony	4.2	U	N	P
7440-38-2	Arsenic	3.5			F
7440-39-3	Barium	97.1		E	P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.25	U		P
7440-70-2	Calcium	6210			P
7440-47-3	Chromium	12.5			P
7440-48-4	Cobalt	7.2	B		P
7440-50-8	Copper	16.5			P
7439-89-6	Iron	13400			P
7439-92-1	Lead	12.1			F
7439-95-4	Magnesium	4420			P
7439-96-5	Manganese	286		N	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	9.9	B		P
7440-09-7	Potassium	1210	B		P
7782-49-2	Selenium	0.87	U	M	F
7440-22-4	Silver	0.63	U		P
7440-23-5	Sodium	141	B		P
7440-28-0	Thallium	0.92	U		F
7440-62-2	Vanadium	25.9			P
7440-66-6	Zinc	96.0			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH5

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-16S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 78.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4400			P
7440-36-0	Antimony	3.9	U	N	P
7440-38-2	Arsenic	3.0			F
7440-39-3	Barium	42.3	B	E	P
7440-41-7	Beryllium	0.09	U		P
7440-43-9	Cadmium	0.23	U		P
7440-70-2	Calcium	2770			P
7440-47-3	Chromium	9.1			P
7440-48-4	Cobalt	4.2	B		P
7440-50-8	Copper	18.2			P
7439-89-6	Iron	10200			P
7439-92-1	Lead	24.1			F
7439-95-4	Magnesium	3010			P
7439-96-5	Manganese	206		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	8.4	B		P
7440-09-7	Potassium	560	B		P
7782-49-2	Selenium	0.81	U	W	F
7440-22-4	Silver	0.61	B		P
7440-23-5	Sodium	199	B		P
7440-28-0	Thallium	0.85	U		F
7440-62-2	Vanadium	18.3			P
7440-66-6	Zinc	185			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH6

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-17S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 78.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5630			P
7440-36-0	Antimony	4.2	U	N	P
7440-38-2	Arsenic	2.8			F
7440-39-3	Barium	53.3		E	P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.25	U		P
7440-70-2	Calcium	3460			P
7440-47-3	Chromium	11.3			P
7440-48-4	Cobalt	5.9	B		P
7440-50-8	Copper	23.7			P
7439-89-6	Iron	12500			P
7439-92-1	Lead	24.8			F
7439-95-4	Magnesium	3830			P
7439-96-5	Manganese	234		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	11.2			P
7440-09-7	Potassium	726	B		P
7782-49-2	Selenium	0.89	U	M	F
7440-22-4	Silver	0.89	B		P
7440-23-5	Sodium	272	B		P
7440-28-0	Thallium	0.94	U		F
7440-62-2	Vanadium	23.6			P
7440-66-6	Zinc	209			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

9613492.8590

TMA/Skinner & Sherman Labs SAMPLE LOG-IN
WORKORDER S212032 CLIENT Hanford Nor No. SAMPLES:
PROTCL CLP TURNARND 33 Days 17 (Soil) (Water) (Specify Other
COOLER TEMP: 5 oC, or NA
CUSTODIAN B Powell SDG/BATCH N/A
CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N212009
SHIPER & # Fed Ex PO/CONTRACT# -
TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT
CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # N/A COMMENTS: none

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO
SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)
CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES /NO (COMMENT)

SHIPMENT DATES 12-3-92
LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME U
1	B07NG0	Soil	12-3-92	N/A	TM	
2	B07NG1	↓	↓	↓	↓	
3	B07NG2					
4	B07NG3					
5	B07NG4					
6	B07NG5					
7	B07NG6					
8	B07NG8					
9	B07NG9					
10	B07NH0					
11	B07NH1					
12	B07NH2					
13	B07NH3					
14	B07NH4					
15	B07NF9					
16	B07NH5					
17	B07NH6	✓	✓	✓	DS ✓	
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

Samples are from site known to have Rad-Contamination: YES ✓ NO
Samples have detectable amounts of Radioactive Material: YES NO ✓

SUBCONTRACT: YES/NO, TO: DATE:

240 REVIEWED

computer BP 12/4/92

* EPA/CLP required Rev 1.6 PAGE:

9613492.8591

PAGE 1 TMA/Norcal CHAIN OF CUSTODY ORD # N2-12-009

RCVD: 12/02/92 DUE: 01/01/93 12/03/92 10:22:06 KEEP: 04/01/93 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS		
01A-S	B07NG0	S&S	WH001	WH002	WH004
02A-S	B07NG1	S&S	WH001	WH002	WH004
03A-S	B07NG2	S&S	WH001	WH002	WH004
04A-S	B07NG3	S&S	WH001	WH002	WH004
05A-S	B07NG4	S&S	WH001	WH002	WH004
06A-S	B07NG5	S&S	WH001	WH002	WH004
07A-S	B07NG6	S&S	WH001	WH002	WH004
08A-S	B07NG8	S&S	WH001	WH002	WH004
09A-S	B07NG9	S&S	WH001	WH002	WH004
10A-S	B07NH0	S&S	WH001	WH002	WH004
11A-S	B07NH1	S&S	WH001	WH002	WH004
12A-S	B07NH2	S&S	WH001	WH002	WH004
13A-S	B07NH3	S&S	WH001	WH002	WH004
14A-S	B07NH4	S&S	WH001	WH002	WH004
15A-S	B07NF9	S&S	WH001	WH002	WH004
16A-S	B07NH5	S&S	WH001	WH002	WH004
17A-S	B07NH6	S&S	WH001	WH002	WH004
17B-S	B07NH6 MS	S&S	WH001	WH002	WH004
17C-S	B07NH6 DUP	S&S	WH001	WH002	WH004
17D-S	L C S	S&S	WH001	WH002	WH004

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
eyamamoto	12-2-92	skinner		[illegible]	12/3/92

Revised

Revision # B04NG7 (#8) = cancelled (NOT LISTED ON WES-HANFORD C.O.C)

Date 12-3-92

Initial eyamamoto

9613492.8592

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: BRIAN MATTINGLY

OSM Project No. 92-374

Company Contact: Steve Weiss, Ron Mitchell

Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: 100 AREA, COLUMBIA RIVER, HANFORD REACH

Collection Date: 11/22/92

Ice Chest No.: IT #45

Field Logbook No.: 199806226

Bill of Lading/Airbill No.: 251 900 725 T

Offsite Property No.: WP3-0-0122 #15 ~~#7~~ JBL

Method of Shipment: EMORY

Shipped to: TMA/NORCAL 2030 WRIGHT AVE., RICHMOND CA 94804-0040

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07NG0 1x1000ML, 2x250ML, 1x125ML COLUMBIA RIVER SEDIMENT

B07NG1

B07NG2

B07NF9

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)		
Relinquished by: [signature]	Received by:	Date/Time: 12/1/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 12-2-92 1130
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

241A

9613492.8593

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHOOD, MATTINGLY, GLAMAN Date 11/21/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07N60	SE	11/21/92	1005	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			1 x 250ml-Glass: Mercury
	SE			1 x 250 ml-Glass: Lead
	SE			1 x 125 ml-Glass: ICP and AA Metals
B07N59	SE	11/21/92	1030	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			1 x 250 ml-Glass: Lead
	SE			1 x 250 ml-Glass: Mercury
	SE			1 x 125 ml-Glass: ICP and AA Metals
B07N61	SE	11/21/92	1255	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec Sr-90
	SE			1x250ml-Glass: Lead
	SE			1x250 ml Glass: Mercury
	SE			1x125ml Glass: ICP and AA Metals
B07N62	SE	11/21/92	1436	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			1x 250ml - Glass: Lead
	SE			1x 250 ml - Glass: Mercury
	SE			1x 125 ml - Glass: ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

241B

9613492.8594

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: BRIAN MARTINGLY

OSM Project No. 92-374

Company Contact: Steve Weiss, Ron Mitchell

Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: 100 AREA, COLUMBIA RIVER, HANFORD REACH

Collection Date: 11/22/92

Ice Chest No.: IT # 23

Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 725T

Offsite Property No.: W93-0-022 #15 JBM

Method of Shipment: EMORY

Shipped to: TMA/NORCAL 2030 WRIGHT AVE, RICHMOND CA 94804-0040

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07NG3 1x1000ML, 2x250ML, 1x125ML COLUMBIA RIVER SEDIMENT

B07NG4

B07NG5

B07NG6

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
Brian Martingly		12/1/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 12-2-92 1130
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

241C

9613492.8595

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHOOD, MATTINGLY, GLAMAN

Date 11/22/92

Company Contact Steve Weiss or Ron Mitchell

Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07N63	SE	11/22/92	1325	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			1 x 250ml - Glass : Mercury
	SE			1 x 250 ml - Glass : Lead
	SE			1 x 125 ml - Glass : ICP and AA Metals
B07N64	SE	11/22/92	1105	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			1 x 250 ml - Glass : Lead
	SE			1 x 250ml - Glass : Mercury
	SE			1 x 125 ml - Glass : ICP and AA Metals
B07N65	SE	11/22/92	1400	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec Sr-90
	SE			1x250ml-Glass : Lead
	SE			1x250 ml Glass : Mercury
	SE			1x125ml Glass : ICP and AA Metals
B07N66	SE	11/22/92	1400	1x1000ml-Plastic : Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			1x 250ml - Glass : Lead
	SE			1x 250 ml - Glass : Mercury
	SE			1x 125 ml - Glass : ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

241D

9613492.8596

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: BRIAN MATTINGLY

OSM Project No. 92-374

Company Contact: Steve Weiss, Ron Mitchell

Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: 100 AREA, COLUMBIA RIVER, HANFORD REACH

Collection Date: 11/23/92

Ice Chest No.: IT #26

Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 725T

Offsite Property No.: W93-0-022 #15 ~~#14~~ JBM

Method of Shipment: EMORY

Shipped to: TMA/NORCAL 2030 WRIGHT AVE RICHMOND CA 94804-0040

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07NG8 1x1000 ML, 2x250ML, 1x125 ML COLUMBIA RIVER SEDIMENT

B07NG9 1x1000 ML, 2x250ML, 1x125 ML COLUMBIA RIVER SEDIMENT

B07NH0

B07NH1

B07NH2

N A

N A

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
Brian Mattingly		12/1/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 12-2-92 1130
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

241E

9613492.8597

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHROOD, MATTINGLY, GLAMAN Date 11/23/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07NG8	SE	11/23/92	0830	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			1 x 250ml - Glass : Mercury
	SE			1 x 250 ml - Glass : Lead
	SE			1 x 125 ml - Glass : ICP and AA Metals
B07NG9	SE	11/23/92	1015	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			1 x 250 ml - Glass : Lead
	SE			1 x 250 ml - Glass : Mercury
	SE			1 x 125 ml - Glass : ICP and AA Metals
B07NH0	SE	11/23/92	1030	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Sp. Sr-90
	SE			1x250ml-Glass : Lead
	SE			1x250 ml Glass : Mercury
	SE			1x 125ml Glass : ICP and AA Metals
B07NH1	SE	11/23/92	1130	1x1000ml-Plastic : Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			1x 250ml - Glass : Lead
	SE			1x 250 ml - Glass : Mercury
	SE			1x 125 ml - Glass : ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

241F

9613492.8598

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHOOD, MATTINGLY, GILMAN

Date 11/23/92

Company Contact Steve Weiss or Ron Mitchell

Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07NH2	SE	11/23/92	1200	4 x 1000 ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta
	SE			Gamma Spec, ^{90}Sr
	SE			1 x 250 ml-Glass: (Mercury)
	SE			1 x 250 ml-Glass: Lead
	SE			1 x 125 ml-Glass: ICP and AA Metals

*Type of Sample

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

A-6000-406 (06/

2416

9613492.8599

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: BRIAN MATTINGLY — OSM Project No. 92-374

Company Contact: Steve Weiss, Ron Mitchell — Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: 100 AREA, COLUMBIA RIVER, HANFORD REACH — Collection Date: 11/24/92

Ice Chest No.: IT # 46 — Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 725 T — Offsite Property No.: W193-G-0122 #15

Method of Shipment: EMORY

Shipped to: TMA/NORCAL 2030 WRIGHT AVE., RICHMOND CA 94804-0040

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07N H3 1x1000ML, 2x250ML, 1x125ML COLUMBIA RIVER SEDIMENT

B07N H4

B07N H5

B07N H6

N/A

N/A

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

Relinquished by:	Received by:	Date/Time:
Brian Mattingly		12/1/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 12-2-92 1130
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

241H

9613492.8600

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector MAHROOD, MATTINGLY, GLAMAN Date 11/24/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683, 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07NH3	SE	11/23/92	1350 ✓	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	~~SE~~			
	SE			1 x 250ml-Glass: Mercury
	SE		✓	1 x 250 ml-Glass: Lead
	SE		✓	1 x 125 ml-Glass: ICP and AA Metals
B07NH4	SE	11/23/92	1411 ✓	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	~~SE~~			
	SE		✓	1 x 250 ml-Glass: Lead
	SE			1 x 250ml-Glass: Mercury
	SE		✓	1 x 125 ml-Glass: ICP and AA Metals
B07NH5	SE	11/24/92	1100 ✓	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec Sr-90
	SE		✓	1x250ml-Glass: Lead
	SE			1x250 ml Glass: Mercury
	SE		✓	1x 125ml Glass: ICP and AA Metals.
B07NH6	SE	11/24/92	1100 ✓	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	~~SE~~		✓	1x 250ml-Glass: Lead
	SE			1x 250 ml-Glass: Mercury
	SE		✓	1x 125 ml-Glass: ICP & AA Metals
	~~SE~~			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

241I

9613192.8601

B07NF9-TMA-354
~~B07NC8-TMA-355~~
TMA

WESTINGHOUSE HANFORD COMPANY

JAN 1993
RECEIVED
OSM DMO

Results of Analyses For:

METALS
Case No. N2-11-183
(TMA/Skinner & Sherman W.O. # S2-11-332)

January 12, 1993

TMA Master Work Order N2-11-183

9613492.8602

TMA
Thermo Analytical Inc.

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

January 8, 1993

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

Quality Control Narrative

Scope
Eight (8) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on November 25, 1992 from TMA/Norcal. The samples were analyzed for the USEPA CLP TAL metals. The analysis were performed under TMA/Skinner and Sherman work order S211332.

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

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

The antimony digestion spike recovery exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

David N. Peterson
Assistant Laboratory Manager

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B07ND4

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-01S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 76.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5290			P
7440-36-0	Antimony	4.1	U	N	P
7440-38-2	Arsenic	2.9	B		F
7440-39-3	Barium	45.5	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.33	B		P
7440-70-2	Calcium	3650			P
7440-47-3	Chromium	10.3			P
7440-48-4	Cobalt	5.4	B		P
7440-50-8	Copper	26.0			P
7439-89-6	Iron	13100			P
7439-92-1	Lead	18.0		S	F
7439-95-4	Magnesium	3800			P
7439-96-5	Manganese	193			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	10.0			P
7440-09-7	Potassium	716	B		P
7782-49-2	Selenium	3.4	U		F
7440-22-4	Silver	0.61	U		P
7440-23-5	Sodium	279	B		P
7440-28-0	Thallium	0.30	U		F
7440-62-2	Vanadium	27.9			P
7440-66-6	Zinc	192			P
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND5

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-02S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 79.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5740			P
7440-36-0	Antimony	4.0	U	N	P
7440-38-2	Arsenic	3.5			F
7440-39-3	Barium	50.9			P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.45	B		P
7440-70-2	Calcium	4020			P
7440-47-3	Chromium	9.4			P
7440-48-4	Cobalt	5.4	B		P
7440-50-8	Copper	34.2			P
7439-89-6	Iron	13100			P
7439-92-1	Lead	21.6			F
7439-95-4	Magnesium	3870			P
7439-96-5	Manganese	251			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	8.9	B		P
7440-09-7	Potassium	736	B		P
7782-49-2	Selenium	0.72	U		F
7440-22-4	Silver	0.59	U		P
7440-23-5	Sodium	339	B		P
7440-28-0	Thallium	0.32	U		F
7440-62-2	Vanadium	26.4			P
7440-66-6	Zinc	216			P
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND6

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-03S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 96.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5580			P
7440-36-0	Antimony	3.3	U	N	P
7440-38-2	Arsenic	2.7			F
7440-39-3	Barium	51.9			P
7440-41-7	Beryllium	0.08	U		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	9120			P
7440-47-3	Chromium	10.6			P
7440-48-4	Cobalt	5.1	B		P
7440-50-8	Copper	20.7			P
7439-89-6	Iron	13400			P
7439-92-1	Lead	23.6			F
7439-95-4	Magnesium	3840			P
7439-96-5	Manganese	195			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	10.5			P
7440-09-7	Potassium	653	B		P
7782-49-2	Selenium	0.58	U		F
7440-22-4	Silver	0.49	U		P
7440-23-5	Sodium	224	B		P
7440-28-0	Thallium	0.26	U		F
7440-62-2	Vanadium	26.9			P
7440-66-6	Zinc	144			P
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts: YES

Comments:
SHELLS

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND7

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-04S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 78.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6020			P
7440-36-0	Antimony	4.2	U	N	P
7440-38-2	Arsenic	3.1			F
7440-39-3	Barium	53.1			P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.39	B		P
7440-70-2	Calcium	3880			P
7440-47-3	Chromium	12.9			P
7440-48-4	Cobalt	6.0	B		P
7440-50-8	Copper	27.5			P
7439-89-6	Iron	14200			P
7439-92-1	Lead	20.6		S	F
7439-95-4	Magnesium	4230			P
7439-96-5	Manganese	250			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	12.6			P
7440-09-7	Potassium	797	B		P
7782-49-2	Selenium	0.66	U	W	F
7440-22-4	Silver	0.63	U		P
7440-23-5	Sodium	299	B		P
7440-28-0	Thallium	0.39	B		F
7440-62-2	Vanadium	30.0			P
7440-66-6	Zinc	203			P
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND8

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-05S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 97.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5260			P
7440-36-0	Antimony	3.4	U	N	P
7440-38-2	Arsenic	2.2			F
7440-39-3	Barium	40.0	B		P
7440-41-7	Beryllium	0.08	U		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	2140			P
7440-47-3	Chromium	9.2			P
7440-48-4	Cobalt	4.0	B		P
7440-50-8	Copper	6.9			P
7439-89-6	Iron	11400			P
7439-92-1	Lead	3.4			F
7439-95-4	Magnesium	3690			P
7439-96-5	Manganese	164			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	10.7			P
7440-09-7	Potassium	563	B		P
7782-49-2	Selenium	0.58	U		F
7440-22-4	Silver	0.50	U		P
7440-23-5	Sodium	103	B		P
7440-28-0	Thallium	0.26	U		F
7440-62-2	Vanadium	23.2			P
7440-66-6	Zinc	26.8			P
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF0

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-06S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 43.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7400			P
7440-36-0	Antimony	7.5	U	N	P
7440-38-2	Arsenic	1.9	B		F
7440-39-3	Barium	55.2	B		P
7440-41-7	Beryllium	0.18	U		P
7440-43-9	Cadmium	3.4			P
7440-70-2	Calcium	5070			P
7440-47-3	Chromium	14.1			P
7440-48-4	Cobalt	5.7	B		P
7440-50-8	Copper	23.1			P
7439-89-6	Iron	13900			P
7439-92-1	Lead	32.0			F
7439-95-4	Magnesium	3870			P
7439-96-5	Manganese	181			P
7439-97-6	Mercury	0.10	B		CV
7440-02-0	Nickel	11.2	B		P
7440-09-7	Potassium	962	B		P
7782-49-2	Selenium	1.2	U		F
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	364	B		P
7440-28-0	Thallium	0.82	B		F
7440-62-2	Vanadium	35.9			P
7440-66-6	Zinc	377			P
	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: B07NF1

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-07S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 78.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5220			P
7440-36-0	Antimony	3.8	U	N	P
7440-38-2	Arsenic	2.0	B		F
7440-39-3	Barium	52.8			P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	1.1			P
7440-70-2	Calcium	3990			P
7440-47-3	Chromium	47.0			P
7440-48-4	Cobalt	8.8	B		P
7440-50-8	Copper	15.9			P
7439-89-6	Iron	17800			P
7439-92-1	Lead	18.6			F
7439-95-4	Magnesium	3700			P
7439-96-5	Manganese	207			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	7.9	B		P
7440-09-7	Potassium	661	B		P
7782-49-2	Selenium	0.69	U		F
7440-22-4	Silver	0.81	B		P
7440-23-5	Sodium	213	B		P
7440-28-0	Thallium	0.61	B	W	F
7440-62-2	Vanadium	44.4			P
7440-66-6	Zinc	221			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NF2

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-08S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 70.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9680			P
7440-36-0	Antimony	4.3	U	N	P
7440-38-2	Arsenic	4.4			F
7440-39-3	Barium	89.3			P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	1.7			P
7440-70-2	Calcium	4470			P
7440-47-3	Chromium	21.9			P
7440-48-4	Cobalt	8.8	B		P
7440-50-8	Copper	21.3			P
7439-89-6	Iron	18500			P
7439-92-1	Lead	27.3			F
7439-95-4	Magnesium	5230			P
7439-96-5	Manganese	209			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	16.2			P
7440-09-7	Potassium	1500			P
7782-49-2	Selenium	0.78	U		F
7440-22-4	Silver	0.64	U		P
7440-23-5	Sodium	237	B		P
7440-28-0	Thallium	0.46	B		F
7440-62-2	Vanadium	40.6			P
7440-66-6	Zinc	257			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
WOOD

9613492.8611

TMA/Skinner & Sherman Labs SAMPLE LOG-IN

WORKORDER S211332 CLIENT Hanford Nor No. SAMPLES:

PROTCL CLP TURNARND 33 Day 8 (Soil) (Water) (Specify Other

COOLER TEMP: 5 oC, or NA

CUSTODIAN B Prunel SDG/BATCH N/A

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N211183

SHIPER & # Fed Ex PO/CONTRACT# 1

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

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

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

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

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

SHIPMENT DATES 11-25-92

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

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME U
1	B07ND4	Soil	11-25-92	N/A	Tm	
2	B07ND5	↓	↓	↓	↓	
3	B07ND6					
4	B07ND7					
5	B07ND8					
6	B07NF0					
7	B07NF1					
8	B07NF2	↓	↓	↓	D.S ↓	
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

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

Samples have detectable amounts of Radioactive Material: YES ___ NO ✓

2

SUBCONTRACT: YES/NO, TO: DATE:

REVIEWED comp LLR 11/25/92

* EPA/CLP required Rev 1.6 PAGE: 80

9613492.8612

PAGE 1 TMA/Norcal CHAIN OF CUSTODY ORD # N2-11-183

RCVD: 11/24/92 DUE: 12/24/92 11/24/92 15:38:52 KEEP: 03/24/93 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY		
01A-S	B07ND4	S&S	WH001	WH002	WH004
02A-S	B07ND5	S&S	WH001	WH002	WH004
03A-S	B07ND6	S&S	WH001	WH002	WH004
04A-S	B07ND7	S&S	WH001	WH002	WH004
05A-S	B07ND8	S&S	WH001	WH002	WH004
06A-S	B07NF0	S&S	WH001	WH002	WH004
07A-S	B07NF1	S&S	WH001	WH002	WH004
08A-S	B07NF2	S&S	WH001	WH002	WH004
08B-S	B07NF2 MS	S&S	WH001	WH002	WH004
08C-S	B07NF2 DUP	S&S	WH001	WH002	WH004
08D-S	L C S	S&S	WH001	WH002	WH004

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
[illegible]	11/24/92	Skinner	11/24/92	[illegible]	11/25/92

9613492.8613

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: DAVID A MYERS — OSM PROJECT NO 92-374

Company Contact: STEVE WEISS — Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: 100 AREA COLUMBIA RIV HANFORD REACH, 100-D AREA — Collection Date: 11/19/92

Ice Chest No.: — Field Logbook No.: 199806, 226

Bill of Lading/Airbill No.: 251900 7282 — Offsite Property No.: W93-0-122 #11

Method of Shipment: EMORY AIR FREIGHT

Shipped to: TMA NORCAL, 2030 WRIGHT AVE, RICHMOND CA 94804

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07ND4	1x1000ml, 2x250ml, 1x125ml COLUMBIA RIVER SEDIMENT
B07ND5	〃 〃 〃 〃 〃 〃
B07ND6	〃 〃 〃 〃 〃 〃
B07ND7	〃 〃 〃 〃 〃 〃
B07ND8	1x1000ml, 2x250ml, 1x125ml COLUMBIA RIVER SEDIMENT

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

Relinquished by:	Received by:	Date/Time:
RICHARD MAHOOD	DAVID A MYERS	11/23/92 7:02 AM
Relinquished by:	Received by:	Date/Time:
	Kermit Blum	11-24-92 1150
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: SUBSET OF ORIGINAL COC 11/23/92

213A

9613492.8614

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector R. Mahood, Brian Marringly, L. Glaman Date 11/19/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07ND4	SE	11/19/92	09:30	✓ 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Be
—	SE	—	—	Gamma Spec, ^{90}Sr
B07ND4	SE	11/19/92	09:30	✓ 1 x 250ml - Glass : Mercury
↓	SE	↓	↓	✓ 1 x 250 ml - Glass : Lead
↓	SE	↓	↓	✓ 1 x 125 ml - Glass : ICP and AA Metals
B07ND5	SE	11/19/92	09:45	✓ 1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta
—	SE	—	—	Gamma Spec, ^{90}Sr
B07ND5	SE	11/19/92	09:45	✓ 1 x 250 ml - Glass : Lead
↓	SE	↓	↓	✓ 1 x 250 ml - Glass : Mercury
↓	SE	↓	↓	✓ 1 x 125 ml - Glass : ICP and AA Metals
B07ND6	SE	11/19/92	10:30	✓ 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma S Sr-90
↓	SE	↓	↓	✓ 1x250ml-Glass : Lead
↓	SE	↓	↓	✓ 1x250 ml Glass : Mercury
↓	SE	↓	↓	✓ 1x 125ml Glass : ICP and AA Metals
B07ND7	SE	11/19/92	09:30	✓ 1x1000ml-Plastic : Alpha Spec (Am, Pu, U), Gross Bet
—	—	—	—	Gamma Spec, ^{90}Sr
B07ND7	SE	11/19/92	09:30	✓ 1x 250ml - Glass : Lead
↓	SE	↓	↓	✓ 1x 250 ml - Glass : Mercury
↓	SE	↓	↓	✓ 1x 125 ml - Glass : ICP & AA Metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

A-6000-406 (06)

213B

9613492.8615

Figure 7 CHAIN OF CUSTODY FORM

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: DAVID A MYERS

OSM PROJECT NO 92-374

Company Contact: STEVE WEISS

Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: COLUMBIA RIVER ~~HANFORD REACH~~ 100-D AREA

Collection Date: 11/19/92

Ice Chest No.:

Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 7282

Offsite Property No.: W93-0-0122 #11

Method of Shipment: EMORY AIR FREIGHT

Shipped to: TMA NORCAL, 2030 WRIGHT AVE, RICHMOND, CA 94804

Possible Sample Hazards/Remarks:

Sample Identification

B07NF0	1x1000ml, 2x250ml, 1x125ml	COLUMBIA RIVER SEDIMENT
B07NF1	" " "	" " "
B07NF2	1x1000ml, 2x250ml, 1x125ml	COLUMBIA RIVER SEDIMENT

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
RICHARD MALLOOD 11/23/92	DAVID A MYERS	11/23/92 702 AM
Relinquished by:	Received by: Kermit Blum	Date/Time: 11-24-92 1150
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: SUBSET OF ORIGINAL COC

213C

9613492.8616

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector R. Mahood, B. Mattingly, L. Glaman Date 11/19/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
~~B07ND8~~	SE	11/19/92	10:45	~~1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Be~~
—	~~SE~~	—	—	~~Gamma Spec, 90Sr~~
~~B07ND8~~	~~SE~~	~~11/19/92~~	~~10:45~~	~~1 x 250ml-Glass: Mercury~~
↓	SE	↓	↓	~~1 x 250 ml-Glass: Lead~~
↓	SE	↓	↓	~~1 x 125 ml-Glass: ICP and AA Metals~~
B07NF0	SE	11/19/92	13:30	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta,
—	~~SE~~	—	—	Gamma Spec, 90Sr
B07NF0	SE	11/19/92	13:30	1 x 250 ml-Glass: Lead
↓	SE	↓	↓	1 x 250ml-Glass: Mercury
↓	SE	↓	↓	1 x 125 ml-Glass: ICP and AA Metals
B07NF1	SE	11/19/92	14:30	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Sp Sr-90
↓	SE	↓	↓	1x250ml-Glass: Lead
↓	SE	↓	↓	1x250 ml Glass: Mercury
↓	SE	↓	↓	1x125ml Glass: ICP and AA Metals
B07NF2	SE	11/19/92	14:40	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta
—	—	—	—	Gamma Spec, 90Sr
B07NF2	SE	11/19/92	14:40	1x 250ml-Glass: Lead
↓	SE	↓	↓	1x 250 ml-Glass: Mercury
↓	SE	↓	↓	1x 125 ml-Glass: ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

A-6000-406 (06/9)

213D

9613492.9617

B07NF9-TMA-354
~~B07ND4-TMA-353~~
TMA

WESTINGHOUSE HANFORD COMPANY

JAN 1993
RECEIVED
OSM DMO

Results of Analyses For:

METALS
Case No. N2-11-191
(TMA/Skinner & Sherman W.O. # S2-12-020)

January 12, 1993

TMA Master Work Order N2-11-191

9613492.8618

TMA
Thermo Analytical Inc.

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

January 8, 1993

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

Quality Control Narrative

Scope
Nine (9) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on December 01, 1992 from TMA/Norcal. The samples were analyzed for the USEPA CLP TAL metals. The analysis were performed under TMA/Skinner and Sherman work order S212020.

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

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

The antimony, arsenic, and manganese digestion spike recovery exceeded the control limit requirements.

The ICP serial dilution for zinc exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

David N. Peterson
Assistant Laboratory Manager

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NC8

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-01S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	387			P
7440-36-0	Antimony	3.2	U	N	P
7440-38-2	Arsenic	0.57	B	N	F
7440-39-3	Barium	8.0	B		P
7440-41-7	Beryllium	0.08	U		P
7440-43-9	Cadmium	0.19	U		P
7440-70-2	Calcium	127	B		P
7440-47-3	Chromium	0.85	U		P
7440-48-4	Cobalt	0.60	B		P
7440-50-8	Copper	1.3	B		P
7439-89-6	Iron	1940			P
7439-92-1	Lead	1.7		W	F
7439-95-4	Magnesium	61.8	B		P
7439-96-5	Manganese	42.1		N	P
7439-97-6	Mercury	0.04	U		CV
7440-02-0	Nickel	1.0	U		P
7440-09-7	Potassium	76.6	B		P
7782-49-2	Selenium	0.58	U		F
7440-22-4	Silver	0.47	U		P
7440-23-5	Sodium	22.4	B		P
7440-28-0	Thallium	0.26	U	W	F
7440-62-2	Vanadium	1.8	B		P
7440-66-6	Zinc	7.1		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND1

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-02S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 67.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4720			P
7440-36-0	Antimony	4.7	U	N	P
7440-38-2	Arsenic	0.54	U	+N	F
7440-39-3	Barium	58.3			P
7440-41-7	Beryllium	0.11	U		P
7440-43-9	Cadmium	0.28	U		P
7440-70-2	Calcium	2140			P
7440-47-3	Chromium	47.6			P
7440-48-4	Cobalt	6.4	B		P
7440-50-8	Copper	10.2			P
7439-89-6	Iron	9700			P
7439-92-1	Lead	9.0			F
7439-95-4	Magnesium	2630			P
7439-96-5	Manganese	220		N	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	12.6			P
7440-09-7	Potassium	819	B		P
7782-49-2	Selenium	0.82	U		F
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	114	B		P
7440-28-0	Thallium	0.37	U	W	F
7440-62-2	Vanadium	23.4			P
7440-66-6	Zinc	83.1		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS AND WOOD

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND9

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-03S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 81.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3650			P
7440-36-0	Antimony	3.8	U	N	P
7440-38-2	Arsenic	1.6	B	N	F
7440-39-3	Barium	45.8			P
7440-41-7	Beryllium	0.09	U		P
7440-43-9	Cadmium	0.22	U		P
7440-70-2	Calcium	1850			P
7440-47-3	Chromium	50.6			P
7440-48-4	Cobalt	4.6	B		P
7440-50-8	Copper	7.0			P
7439-89-6	Iron	8690			P
7439-92-1	Lead	7.3			F
7439-95-4	Magnesium	2210			P
7439-96-5	Manganese	100		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	9.3			P
7440-09-7	Potassium	640	B		P
7782-49-2	Selenium	0.67	U	W	F
7440-22-4	Silver	0.78	B		P
7440-23-5	Sodium	96.6	B		P
7440-28-0	Thallium	0.30	U	W	F
7440-62-2	Vanadium	19.1			P
7440-66-6	Zinc	73.1		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS AND WOOD

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF3

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-04S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 67.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5670			P
7440-36-0	Antimony	4.8	U	N	P
7440-38-2	Arsenic	1.2	B	N	F
7440-39-3	Barium	50.4	B		P
7440-41-7	Beryllium	0.11	U		P
7440-43-9	Cadmium	0.28	U		P
7440-70-2	Calcium	2960			P
7440-47-3	Chromium	65.2			P
7440-48-4	Cobalt	5.4	B		P
7440-50-8	Copper	11.5			P
7439-89-6	Iron	10900			P
7439-92-1	Lead	19.3			F
7439-95-4	Magnesium	3400			P
7439-96-5	Manganese	110		N	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	11.2	B		P
7440-09-7	Potassium	789	B		P
7782-49-2	Selenium	0.82	U		F
7440-22-4	Silver	0.71	U		P
7440-23-5	Sodium	167	B		P
7440-28-0	Thallium	0.37	U	W	F
7440-62-2	Vanadium	28.2			P
7440-66-6	Zinc	159		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF4

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-05S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 85.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7460			P
7440-36-0	Antimony	3.9	U	N	P
7440-38-2	Arsenic	1.2	B	N	F
7440-39-3	Barium	71.8			P
7440-41-7	Beryllium	0.09	U		P
7440-43-9	Cadmium	0.23	U		P
7440-70-2	Calcium	3110			P
7440-47-3	Chromium	131			P
7440-48-4	Cobalt	7.3	B		P
7440-50-8	Copper	19.2			P
7439-89-6	Iron	14100			P
7439-92-1	Lead	39.2			F
7439-95-4	Magnesium	3950			P
7439-96-5	Manganese	140		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	15.2			P
7440-09-7	Potassium	1150			P
7782-49-2	Selenium	0.63	U		F
7440-22-4	Silver	0.57	U		P
7440-23-5	Sodium	145	B		P
7440-28-0	Thallium	0.28	U	W	F
7440-62-2	Vanadium	34.8			P
7440-66-6	Zinc	192		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF5

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-06S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 80.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7470			P
7440-36-0	Antimony	4.2	U	N	P
7440-38-2	Arsenic	9.4		N	F
7440-39-3	Barium	70.9			P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	B		P
7440-70-2	Calcium	3480			P
7440-47-3	Chromium	15.0			P
7440-48-4	Cobalt	7.2	B		P
7440-50-8	Copper	24.7			P
7439-89-6	Iron	15400			P
7439-92-1	Lead	57.7		S	F
7439-95-4	Magnesium	4540			P
7439-96-5	Manganese	189		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	15.6			P
7440-09-7	Potassium	1100	B		P
7782-49-2	Selenium	0.70	U		F
7440-22-4	Silver	0.62	U		P
7440-23-5	Sodium	138	B		P
7440-28-0	Thallium	0.31	U	W	F
7440-62-2	Vanadium	28.9			P
7440-66-6	Zinc	226		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF6

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-07S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 77.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5990			P
7440-36-0	Antimony	4.2	U	N	P
7440-38-2	Arsenic	1.9	B	N	F
7440-39-3	Barium	57.0			P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.25	U		P
7440-70-2	Calcium	2760			P
7440-47-3	Chromium	13.2			P
7440-48-4	Cobalt	6.4	B		P
7440-50-8	Copper	9.9			P
7439-89-6	Iron	12600			P
7439-92-1	Lead	5.8			F
7439-95-4	Magnesium	4060			P
7439-96-5	Manganese	160		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	13.1			P
7440-09-7	Potassium	836	B		P
7782-49-2	Selenium	0.72	U		F
7440-22-4	Silver	0.63	U		P
7440-23-5	Sodium	102	B		P
7440-28-0	Thallium	0.32	U	W	F
7440-62-2	Vanadium	23.8			P
7440-66-6	Zinc	43.7		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

9613492.8626

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B07NF7

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-08S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 77.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4790			P
7440-36-0	Antimony	4.0	U	N	P
7440-38-2	Arsenic	2.4		N	F
7440-39-3	Barium	33.1	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.65	B		P
7440-70-2	Calcium	3640			P
7440-47-3	Chromium	14.8			P
7440-48-4	Cobalt	6.3	B		P
7440-50-8	Copper	20.4			P
7439-89-6	Iron	14900			P
7439-92-1	Lead	15.3			F
7439-95-4	Magnesium	3440			P
7439-96-5	Manganese	160		N	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	12.4			P
7440-09-7	Potassium	565	B		P
7782-49-2	Selenium	0.69	U		F
7440-22-4	Silver	0.59	U		P
7440-23-5	Sodium	208	B		P
7440-28-0	Thallium	0.35	B	W	F
7440-62-2	Vanadium	40.3			P
7440-66-6	Zinc	151		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

C-00

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF8

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-09S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 82.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5040			P
7440-36-0	Antimony	4.0	U	N	P
7440-38-2	Arsenic	5.8		+N	F
7440-39-3	Barium	51.0			P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.62	B		P
7440-70-2	Calcium	3300			P
7440-47-3	Chromium	11.2			P
7440-48-4	Cobalt	6.3	B		P
7440-50-8	Copper	20.6			P
7439-89-6	Iron	13200			P
7439-92-1	Lead	27.0			F
7439-95-4	Magnesium	3290			P
7439-96-5	Manganese	263		N	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	11.0			P
7440-09-7	Potassium	659	B		P
7782-49-2	Selenium	0.69	U		F
7440-22-4	Silver	0.59	U		P
7440-23-5	Sodium	213	B		P
7440-28-0	Thallium	0.56	B	W	F
7440-62-2	Vanadium	27.6			P
7440-66-6	Zinc	205		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

9613492.8628

TMA/Skinner & Sherman Labs SAMPLE LOG-IN
WORKORDER S212020 CLIENT HANFORD NOR No. SAMPLES:
PROTCL CLP TURNARND 33 Day 9
COOLER TEMP: 5 oC, or NA (Soil) (Water) (Specify Other
CUSTODIAN B Prowl SDG/BATCH N/A
CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N211191
SHIPER & # Fed Ex PO/CONTRACT# ✓
TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT D SANCHEZ
CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # N/A COMMENTS: none

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO
SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)
CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES /NO (COMMENT)

SHIPMENT DATES 12-1-92
LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME U
1	B07NC8	Soil	12-1-92	N/A	TM	
2	B07ND1	↓	↓	↓	↓	
3	B07ND9					
4	B07NF3					
5	B07NF4					
6	B07NF5					
7	B07NF6					
8	B07NF7					
9	B07NF8				DS	
10						
11						
12						
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14						
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16						
17						
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20						
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22						
23						
24						
25						
26						
27						

Samples are from site known to have Rad-Contamination: YES ✓ NO
Samples have detectable amounts of Radioactive Material: YES NO ✓

SUBCONTRACT: YES/NO TO: DATE: 17

REVIEWED

complete 12/2/92 BP

* EPA/CLP required Rev. 1.6 PAGE:

9613492.8629

PAGE 1 TMA/Norcal CHAIN OF CUSTODY ORD # N2-11-191

RCVD: 11/25/92 DUE: 12/25/92 11/30/92 09:25:09 KEEP: 03/25/93 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY		
01A-S	B07NC8	S&S	WH001	WH002	WH004
02A-S	B07ND1	S&S	WH001	WH002	WH004
03A-S	B07ND9	S&S	WH001	WH002	WH004
04A-S	B07NF3	S&S	WH001	WH002	WH004
05A-S	B07NF4	S&S	WH001	WH002	WH004
06A-S	B07NF5	S&S	WH001	WH002	WH004
07A-S	B07NF6	S&S	WH001	WH002	WH004
08A-S	B07NF7	S&S	WH001	WH002	WH004
09A-S	B07NF8	S&S	WH001	WH002	WH004
09B-S	B07NF8 MS	S&S	WH001	WH002	WH004
09C-S	B07NF8 DUP	S&S	WH001	WH002	WH004
09D-S	L C S	S&S	WH001	WH002	WH004

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
Yamamoto	11-30-92	SKINNER	11-30-92	[illegible]	12/1/92

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~~Figure 7 CHAIN OF CUSTODY FORM~~

N2-11-01

Westinghouse Hanford Company	CHAIN OF CUSTODY

OSM Project No. 92-374

Custody Form Initiator Linda RB Glaman (see original)

Company Contact Steve Weiss, Ron Mitchell — Telephone 376-1689, 376-5722

Project Designation/Sampling Locations 100 B/C area and Upstream of Vernita Bridge — Collection Date 11/20/92

Ice Chest No. 42 PIT — Field Logbook No. 199806-226

Bill of Lading/Airbill No. 678 692 7011 — Offsite Property No. UPI-0-0122-12

Method of Shipment Fed Ex- Am delivery

Shipped to TMA Vorcal, 2030 Wright Av, Richmond Ca. 94804-0040

Possible Sample Hazards/Remarks None

Sample Identification

B07VC8 - 1x1000 ml, 2x250 ml, 1x125 ml	Sand
B07VD1 - 1x1000 ml, 2x250 ml, 1x125 ml	Columbia River Sediment
B07VD9 - 1x1000 ml, 2x250 ml, 1x125 ml	Columbia River Sediment
B07VF3 - 1x1000 ml, 2x250 ml, 1x125 ml	Columbia River Sediment
B07VF4 - 1x1000 ml, 2x250 ml, 1x125 ml	Columbia River Sediment

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

Relinquished by:	Received by:	Date/Time:
Linda RB Glaman		11/24/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 11-25-92 1100
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

180A

9613492.8631

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector R. Mahood, B. Martingly, L. Glaman Date 11/20/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
X B07NC8	SE	11/20/92	08:30	✓ 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta Gamma Spec, ^{90}Sr
	SE			✓ 1 x 250ml-Glass: Mercury
	SE			✓ 1 x 250 ml-Glass: Lead X
	SE			✓ 1 x 125 ml-Glass: ICP and AA Metals
X B07ND1	SE	11/20/92	1035	✓ 1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			✓ 1 x 250 ml-Glass: Lead X
	SE			✓ 1 x 250 ml-Glass: Mercury
	SE			✓ 1 x 125 ml-Glass: ICP and AA Metals
X B07ND9	SE	11/20/92	1035	✓ 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec Sr-90
	SE			✓ 1x250ml-Glass: Lead
	SE			✓ 1x250 ml Glass: Mercury X
	SE			✓ 1x125ml Glass: ICP and AA Metals
X B07NE3	SE	~~1130~~ 11/20/92	1130	✓ 1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			✓ 1x 250ml-Glass: Lead X
	SE			✓ 1x 250 ml-Glass: Mercury
	SE			✓ 1x 125 ml-Glass: ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

180B

A-6000-406 (06/9

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~~Figure 7 CHAIN OF CUSTODY FORM~~

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: Linda RB Glaman (see originals) — OSM Project No 92-374

Company Contact: Steve Weiss, Ron Mitchell — Telephone: 376-1693, 376-5722

Project Designation/Sampling Locations: 100 B/C area and upstream of Vernita Bridge — Collection Date: 11/20/92

Ice Chest No.: IT 13 — Field Logbook No.: 199806-226

Bill of Lading/Airbill No.: 678 692 7011 — Offsite Property No.: W93.0-0122 12

Method of Shipment: Fed Ex - Am delivery

Shipped to: TMA Parcel, 2030, Wright Ave, Richmond Calif, 94804-0040

Possible Sample Hazards/Remarks: None

Sample Identification

B07NF5-1x1000 ml, 2x250 ml, 1x125 ml	Columbia River Sediment
B07NF6-1x1000 ml, 2x250 ml, 1x125 ml	Columbia River Sediment
B07NF7-1x1000 ml, 2x250 ml, 1x125 ml	Columbia River Sediment
B07NF8-1x1000 ml, 2x250 ml, 1x125 ml	Columbia River Sediment.

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

Relinquished by:	Received by:	Date/Time:
Linda RB Glaman		11/24/92 1145
Relinquished by:	Received by: Kermit Blum	Date/Time: 11-25-92 1100
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

180C

9613492.8633

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector R. Mahood, B. Mattingly, L. Glaman Date 11/20/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683, 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
α B07NF4	SE	11/20/92	1150	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
B07NF4	SE			1 x 250ml-Glass: Mercury
	SE			1 x 250 ml-Glass: Lead X
	SE			1 x 125 ml-Glass: ICP and AA Metals
α B07NF5	SE	11/20/92	1400	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			
	SE			1 x 250 ml-Glass: Lead
	SE			1 x 250ml-Glass: Mercury X
	SE			1 x 125 ml-Glass: ICP and AA Metals
α B07NF6	SE	11/20/92	1415	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec Sr-90
	SE			1x250ml-Glass: Lead X
	SE			1x250 ml Glass: Mercury
	SE			1x125ml Glass: ICP and AA Metals
α B07NF7	SE	11/20/92	1452	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
	SE			1x 250ml-Glass: Lead X
	SE			1x 250 ml-Glass: Mercury
	SE			1x 125 ml-Glass: ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

1800

9613492.8634

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector B. Mattingly, R. Mahood, L. Glaman Date 11/20/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
X B07NF8	SE	12/20/92	15~~45~~	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta
	SE		Ron 11/20/92	Gamma Spec, ^{90}Sr
	SE			1 x 250ml-Glass: Mercury
	SE			1 x 250 ml-Glass: Lead X
	SE			1 x 125 ml-Glass: ICP and AA Metals

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

180E

9613492.8635

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

MAR 1993
RECEIVED
OSM DMO

March 11, 1993

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N2-11-152-7131

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

Dear Ms. Colley:

Enclosed on the Summary Data Section, are the gross alpha, gross beta, ^{90}Sr, isotopic uranium, isotopic plutonium, ^{241}Am, and gamma scan results for the soil samples from OSM PROJECT NO. 93-374 Location, we received 24 November 1992. The QA/QC results are also given in the Summary Data Section. The Summary Data Section is numbered pages 1 to 65, and the appendices are numbered pages 66 to 651.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

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

DPK/ss

Enclosures: Section 1 and 2
Appendices

SDG 7131	Client Westinghouse Hanford
Contact Dinkar P. Kharkar	Contract MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

Soil sample results from OSM PROJECT NO. 93-374 Location (TMA/Norcal Group 7131) are reported herein. TMA/Norcal Group 7131 is comprised of the twenty samples listed on the Chain-of-Custody documents and is identified as Samples 1 through 20.

1.1 CHAINS-OF-CUSTODY

This report includes data from samples delivered under Chain-of-Custody documents Field Logbook No. 199806.226.

1.2 SAMPLE VOLUME

1000 mL bottles of samples were received for the analyses.

1.3 MISSING SAMPLES

All samples were accounted for in an undamaged condition.

1.4 HOLDING TIMES

Samples were collected on 11/19/92 and 11/22/92 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control, a blank, and a replicate. All original analyses were performed with QC samples 7131-21 through 26.

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

2.1 LABORATORY CONTROL SAMPLES

The LCS recoveries for all nuclides were good. The MDA's of ^{238}Pu, $^{239,240}Pu$, and ^{241}Am were above RDL due to slightly lower chemical recoveries.

2.2 BLANKS

MDA's for all of the analyses met the RDL requirements except for ^{238}Pu because of higher background in the region. The ^{90}Sr error was underlined because the counting error was larger than both the MDA and the result. The ^{241}Am result was underlined because the negative result plus the associated error was still less than zero.

SDG 7131	Client Westinghouse Hanford
Contact Dinkar P. Kharkar	Contract MBH-SVV-069262

CASE NARRATIVE

2.3 REPLICATES

Results were satisfactory for all replicate analyses. The ^{90}Sr error was underlined because the counting error was bigger than both the MDA and the result, implying that the MDA may not be a good estimate of the "real" minimum detectable activity. The MDA's for gamma nuclides were higher than the RDL due to small aliquots available for gamma analysis.

3.0 ANALYTICAL NOTES

3.1 Gross Alpha Analyses: The average MDA for gross alpha was 5 ± 3 pCi/g. Positive gross alpha concentration above RDL was not found in any sample except in sample number 7131-20.

3.2 Gross Beta Analyses: The average MDA for gross beta was 5 ± 0.9 pCi/g. Positive gross beta concentration was found in all the samples except in sample number 7131-2.

3.3 Strontium-90 Analyses: The average yield for twenty-three analyses was (84 ± 15%). The lowest yield was 60% and the highest was 95%. The average MDA was 0.5 ± 0.7 pCi/g. Positive ^{90}Sr concentration was not found in any of the samples. All sample results were below RDL.

3.4 Uranium-233, 234, 234, and 238 Analyses: The average yield for twenty-three analyses was (51 ± 19%). The lowest yield was 34% and the highest was 71%. The average MDA was 0.2 ± 0.1 pCi/g. Concentrations of ^{234}U and ^{238}U above the RDL were found in all of the samples. The MDA of uranium in sample number 7131-11 was higher than RDL due to lower chemical recovery. The counting times in sample numbers 7131-7 and 11 were smaller than the nominal counting time of 150 minutes.

3.5 Plutonium-238, 239/240 Analyses: The average yield for twenty-five analyses was (54 ± 29%). The lowest yield was 23% and the highest was 66%. The average MDA was 0.05 ± 0.04 pCi/g. Positive plutonium concentrations above the RDL were not found in any of the samples. All sample results were below RDL. The MDA of sample numbers 7131-2, 10, 11, 14, 15, and 17 were higher than RDL due to lower chemical recoveries and, in some cases, due to higher background.

TM

SDG 7131	Client Westinghouse Hanford
Contact Dinkar P. Kharkar	Contract MBH-SVV-069262

CASE NARRATIVE

3.6 Americium-241 Analyses: The average yield for twenty-three analyses was (61 ± 38%). The lowest yield was 21% and the highest was 95%. The average MDA was 0.04 ± 0.05 pCi/g. Positive americium concentrations above the RDL were not found in any of the samples. All sample results were below the RDL. The MDA of sample numbers 7131-4, 9, 11, and 15 were higher than RDL due to lower chemical recoveries.

3.7 Gamma Scan Analyses: Gamma scan analysis found positive concentration above RDL of ^{137}Cs in sample numbers 7131-1, 2, 3, 4, 5, 6, 7, 12, 15, 17, 18, and 19. Positive concentration of ^{60}Co above RDL was found in sample numbers 7131-1, 2, 3, 4, 5, and 7. The MDA;s for all of the samples were higher than RDL due to small sample aliquots available for analysis.

Positive concentration of ^{152}Eu above the RDL was found in sample numbers 7131-1, 2, 3, 4, 5, and 7.

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N211152-09

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NC8

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-09	Client sample id	B07NC8
Dept sample id	7131-009	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	0.1	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.58	3.6	5	10	U	80A
Gross Beta	Beta	27	4.7	5	10		80B
Uranium 233/234		0.16	0.14	0.2	0.3	U	U
Uranium 235	15117-96-1	0	0.054	0.2	0.3	U	U
Uranium 238	7440-61-1	0.18	0.14	0.2	0.3	U	U
Plutonium 238	13981-16-3	0.005	0.022	0.04	0.05	U	PU
Plutonium 239/240		0.027	0.022	0.03	0.05	U	PU
Americium 241	14596-10-2	-0.014	0.045	0.09	0.05	U	AM
Strontium 90	10098-97-2	0.014	0.086	0.1		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	22	1.1				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-67-7	0.28	0.070				GAM
Thorium 228	14274-82-9	0.55	0.084				GAM
Thorium 232	7440-29-1	0.51	0.22				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-10

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND1

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-10	Client sample id	B07ND1
Dept sample id	7131-010	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	22.5	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	6.7	4.0	4	10	J	80A
Gross Beta	Beta	13	4.3	6	10		80B
Uranium 233/234		0.59	0.22	0.1	0.3		U
Uranium 235	15117-96-1	0.061	0.082	0.2	0.3	U	U
Uranium 238	7440-61-1	0.44	0.18	0.1	0.3		U
Plutonium 238	13981-16-3	0.003	0.032	0.06	0.05	U	PU
Plutonium 239/240		0.013	0.019	0.04	0.05	U	PU
Americium 241	14596-10-2	0.013	0.022	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.66	1.2	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	12	0.85				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-67-7	0.51	0.099				GAM
Thorium 228	14274-82-9	1.1	0.087				GAM
Thorium 232	7440-29-1	0.75	0.19				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8641

N211152-04

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND4

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-04	Client sample id	B07ND4
Dept sample id	7131-004	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	20.2	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	4.9	3.7	4	10	J	80A
Gross Beta	Beta	17	4.1	5	10		80B
Uranium 233/234		0.58	0.22	0.2	0.3		U
Uranium 235	15117-96-1	-0.021	0.042	0.2	0.3	U	U
Uranium 238	7440-61-1	0.68	0.23	0.1	0.3		U
Plutonium 238	13981-16-3	-0.011	0.015	0.05	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Americium 241	14596-10-2	0	0.027	0.06	0.05	U	AM
Strontium 90	10098-97-2	-0.47	1.4	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.0				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.18	0.052		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	0.56	0.065		0.05		GAM
Europium 152	14683-23-9	0.22	0.073		0.1		GAM
Europium 154	15585-10-1	U		0.1	0.1	U	GAM
Radium 226	13982-67-7	0.46	0.066				GAM
Thorium 228	14274-82-9	0.50	0.076				GAM
Thorium 232	7440-29-1	0.58	0.19				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8642

N211152-05

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND5

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-05	Client sample id	B07ND5
Dept sample id	7131-005	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	23.5	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	2.9	3.2	4	10	U	80A
Gross Beta	Beta	20	4.4	6	10		80B
Uranium 233/234		0.49	0.22	0.2	0.3		U
Uranium 235	15117-96-1	0.051	0.052	0.2	0.3	U	U
Uranium 238	7440-61-1	0.36	0.18	0.2	0.3		U
Plutonium 238	13981-16-3	-0.008	0.017	0.04	0.05	U	PU
Plutonium 239/240		0.006	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.016	0.04	0.05	U	AM
Strontium 90	10098-97-2	0.068	0.091	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.1				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.41	0.073		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	0.74	0.075		0.05		GAM
Europium 152	14683-23-9	0.48	0.089		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.42	0.11				GAM
Thorium 228	14274-82-9	0.46	0.048				GAM
Thorium 232	7440-29-1	0.50	0.21				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8643

N211152-06

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND6

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-06	Client sample id	B07ND6
Dept sample id	7131-006	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	4.4	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	6.2	3.8	4	10	J	80A
Gross Beta	Beta	14	4.4	6	10		80B
Uranium 233/234		0.29	0.18	0.2	0.3	J	U
Uranium 235	15117-96-1	0.035	0.070	0.3	0.3	U	U
Uranium 238	7440-61-1	0.49	0.24	0.2	0.3		U
Plutonium 238	13981-16-3	0.002	0.014	0.03	0.05	U	PU
Plutonium 239/240		0.002	0.010	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.009	0.009	0.03	0.05	U	AM
Strontium 90	10098-97-2	0	0.98	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.0				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.10	0.046		0.05		GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Radium 226	13982-67-7	0.58	0.10				GAM
Thorium 228	14274-82-9	0.88	0.076				GAM
Thorium 232	7440-29-1	0.84	0.18				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8644

N211152-07

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND7

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-07	Client sample id	B07ND7
Dept sample id	7131-007	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	19.8	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	4.5	3.5	4	10	J	80A
Gross Beta	Beta	13	3.9	5	10		80B
Uranium 233/234		0.44	0.20	0.1	0.3		U
Uranium 235	15117-96-1	0.023	0.092	0.2	0.3	U	U
Uranium 238	7440-61-1	0.44	0.20	0.1	0.3		U
Plutonium 238	13981-16-3	-0.007	0.011	0.03	0.05	U	PU
Plutonium 239/240		0.005	0.007	0.01	0.05	U	PU
Americium 241	14596-10-2	0.007	0.019	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.076	0.46	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.1				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.19	0.065		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.62	0.069		0.05		GAM
Europium 152	14683-23-9	0.25	0.077		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.48	0.087				GAM
Thorium 228	14274-82-9	0.53	0.055				GAM
Thorium 232	7440-29-1	0.50	0.16				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-08

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND8

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-08	Client sample id	B07ND8
Dept sample id	7131-008	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	1.1	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	7.5	4.8	5	10	J	80A
Gross Beta	Beta	18	4.2	5	10		80B
Uranium 233/234		0.46	0.21	0.2	0.3		U
Uranium 235	15117-96-1	0.024	0.048	0.2	0.3	U	U
Uranium 238	7440-61-1	0.46	0.21	0.2	0.3		U
Plutonium 238	13981-16-3	0.005	0.026	0.05	0.05	U	PU
Plutonium 239/240		0	0.011	0.03	0.05	U	PU
Americium 241	14596-10-2	0.014	0.023	0.04	0.05	U	AM
Strontium 90	10098-97-2	0	1.0	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	17	1.2				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-67-7	0.50	0.095				GAM
Thorium 228	14274-82-9	0.69	0.058				GAM
Thorium 232	7440-29-1	0.89	0.23				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-11

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND9

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-11	Client sample id	B07ND9
Dept sample id	7131-011	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	21.7	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	4.7	4.0	5	10	U	80A
Gross Beta	Beta	14	3.9	5	10		80B
Uranium 233/234		0.45	0.27	0.4	0.3		U
Uranium 235	15117-96-1	0.039	0.079	0.3	0.3	U	U
Uranium 238	7440-61-1	0.26	0.20	0.2	0.3	J	U
Plutonium 238	13981-16-3	-0.023	0.020	0.06	0.05	U	PU
Plutonium 239/240		0	0.007	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.027	0.043	0.1	0.05	U	AM
Strontium 90	10098-97-2	-0.011	0.42	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	12	0.48				GAM
Iron 59		U		0.1	0.05	U	GAM
Chromium 51	14392-02-0	U		0.8		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Zinc 65	17982-39-3	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Cesium 134	17967-70-9	U		0.04		U	GAM
Cesium 137	10045-97-3	0.031	0.017		0.05	J	GAM
Europium 152	14683-23-9	U		0.05	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Radium 226	13982-67-7	0.52	0.045				GAM
Thorium 228	14274-82-9	0.82	0.030				GAM
Thorium 232	7440-29-1	0.79	0.077				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-01

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF0

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-01	Client sample id	B07NF0
Dept sample id	7131-001	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	55.4	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	8.7	5.5	6	10	J	80A
Gross Beta	Beta	12	3.9	5	10		80B
Uranium 233/234		0.84	0.32	0.2	0.3		U
Uranium 235	15117-96-1	0.030	0.060	0.2	0.3	U	U
Uranium 238	7440-61-1	0.69	0.27	0.2	0.3		U
Plutonium 238	13981-16-3	0.005	0.021	0.04	0.05	U	PU
Plutonium 239/240		0.003	0.016	0.03	0.05	U	PU
Americium 241	14596-10-2	0.012	0.018	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.10	0.52	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	8.4	1.0				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.33	0.098		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.56	0.067		0.05		GAM
Europium 152	14683-23-9	0.41	0.11		0.1		GAM
Europium 154	15585-10-1	U		0.3	0.1	U	GAM
Radium 226	13982-67-7	0.55	0.12				GAM
Thorium 228	14274-82-9	0.84	0.12				GAM
Thorium 232	7440-29-1	0.71	0.26				GAM
Manganese 54		0.057	0.034				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8648

N211152-02

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF1

SDG 7131
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-02
Dept sample id 7131-002
Received 11/24/92
% moisture 23.3
Client sample id B07NF1
Matrix SOIL
Collected 11/19/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.7	4.0	5	10	J	80A
Gross Beta	Beta	9.0	4.2	6	10	J	80B
Uranium 233/234		0.44	0.23	0.2	0.3		U
Uranium 235	15117-96-1	0.066	0.067	0.3	0.3	U	U
Uranium 238	7440-61-1	0.44	0.23	0.2	0.3		U
Plutonium 238	13981-16-3	-0.010	0.026	0.06	0.05	U	PU
Plutonium 239/240		0.013	0.013	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.007	0.021	0.04	0.05	U	AM
Strontium 90	10098-97-2	0.11	0.094	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	12	0.96				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.20	0.058		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.48	0.066		0.05		GAM
Europium 152	14683-23-9	0.35	0.087		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.54	0.097				GAM
Thorium 228	14274-82-9	0.91	0.10				GAM
Thorium 232	7440-29-1	0.74	0.18				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8649

N211152-03

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF2

SDG 7131
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-03
Dept sample id 7131-003
Received 11/24/92
% moisture 31.3
Client sample id B07NF2
Matrix SOIL
Collected 11/19/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	1.7	5.1	8	10	U	80A
Gross Beta	Beta	12	4.0	5	10		80B
Uranium 233/234		0.37	0.18	0.1	0.3		U
Uranium 235	15117-96-1	0.021	0.043	0.2	0.3	U	U
Uranium 238	7440-61-1	0.58	0.22	0.1	0.3		U
Plutonium 238	13981-16-3	0.018	0.018	0.02	0.05	U	PU
Plutonium 239/240		0.018	0.018	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.005	0.42	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	0.95				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.089	0.061		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	1.3	0.094		0.05		GAM
Europium 152	14683-23-9	0.90	0.14		0.1		GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-67-7	0.61	0.091				GAM
Thorium 228	14274-82-9	0.95	0.086				GAM
Thorium 232	7440-29-1	0.93	0.23				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8650

N211152-12

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF3

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-12	Client sample id	B07NF3
Dept sample id	7131-012	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	26.0	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	2.2	5.3	8	10	U	80A
Gross Beta	Beta	13	4.2	6	10		80B
Uranium 233/234		0.57	0.21	0.1	0.3		U
Uranium 235	15117-96-1	0.061	0.082	0.2	0.3	U	U
Uranium 238	7440-61-1	0.52	0.21	0.1	0.3		U
Plutonium 238	13981-16-3	0.009	0.025	0.04	0.05	U	PU
Plutonium 239/240		0	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.003	0.021	0.05	0.05	U	AM
Strontium 90	10098-97-2	0	0.96	0.1		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.55				GAM
Iron 59		U		0.2	0.05	U	GAM
Chromium 51	14392-02-0	U		0.9		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	17982-39-3	U		0.08		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Cesium 134	17967-70-9	U		0.03		U	GAM
Cesium 137	10045-97-3	0.058	0.022		0.05		GAM
Europium 152	14683-23-9	U		0.05	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Radium 226	13982-67-7	0.58	0.051				GAM
Thorium 228	14274-82-9	1.0	0.036				GAM
Thorium 232	7440-29-1	0.95	0.11				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-13

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF4

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-13	Client sample id	B07NF4
Dept sample id	7131-013	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	21.1	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	8.1	5.2	6	10	J	80A
Gross Beta	Beta	16	4.0	5	10		80B
Uranium 233/234		0.84	0.27	0.1	0.3		U
Uranium 235	15117-96-1	0.085	0.086	0.2	0.3	U	U
Uranium 238	7440-61-1	1.1	0.31	0.1	0.3		U
Plutonium 238	13981-16-3	-0.013	0.019	0.04	0.05	U	PU
Plutonium 239/240		0	0.004	0.01	0.05	U	PU
Americium 241	14596-10-2	-0.006	0.022	0.05	0.05	U	AM
Strontium 90	10098-97-2	0.041	0.22	0.8		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.51				GAM
Iron 59		U		0.2	0.05	U	GAM
Chromium 51	14392-02-0	U		1		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Zinc 65	17982-39-3	U		0.08		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Cesium 134	17967-70-9	U		0.03		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM
Europium 152	14683-23-9	U		0.05	0.1	U	GAM
Europium 154	15585-10-1	U		0.04	0.1	U	GAM
Radium 226	13982-67-7	0.70	0.049				GAM
Thorium 228	14274-82-9	1.4	0.046				GAM
Thorium 232	7440-29-1	1.1	0.12				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-14

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF5

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-14
Dept sample id 7131-014
Received 11/25/92
% moisture 20.3

Client sample id B07NF5
Matrix SOIL
Collected 11/20/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	8.3	3.9	4	10	J	80A
Gross Beta	Beta	16	4.0	5	10		80B
Uranium 233/234		0.85	0.29	0.2	0.3		U
Uranium 235	15117-96-1	0.054	0.055	0.2	0.3	U	U
Uranium 238	7440-61-1	0.54	0.24	0.2	0.3		U
Plutonium 238	13981-16-3	0.011	0.057	0.1	0.05	U	PU
Plutonium 239/240		0.011	0.011	0.04	0.05	U	PU
Americium 241	14596-10-2	-0.002	0.010	0.02	0.05	U	AM
Strontium 90	10098-97-2	0	0.86	0.7		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	16	1.1				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Radium 226	13982-67-7	0.78	0.11				GAM
Thorium 228	14274-82-9	1.3	0.076				GAM
Thorium 232	7440-29-1	1.2	0.22				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8653

N211152-15

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF6

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-15
Dept sample id 7131-015
Received 11/25/92
% moisture 23.6

Client sample id B07NF6
Matrix SOIL
Collected 11/20/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	6.1	4.1	5	10	J	80A
Gross Beta	Beta	14	3.9	5	10		80B
Uranium 233/234		0.53	0.19	0.1	0.3		U
Uranium 235	15117-96-1	0.018	0.036	0.1	0.3	U	U
Uranium 238	7440-61-1	0.74	0.22	0.1	0.3		U
Plutonium 238	13981-16-3	-0.079	0.054	0.1	0.05	U	PU
Plutonium 239/240		0.007	0.026	0.05	0.05	U	PU
Americium 241	14596-10-2	0.028	0.042	0.08	0.05	U	AM
Strontium 90	10098-97-2	-0.017	0.51	0.9		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.1				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.08		U	GAM
Cesium 137	10045-97-3	0.082	0.060		0.05		GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.08	0.1	U	GAM
Radium 226	13982-67-7	1.2	0.14				GAM
Thorium 228	14274-82-9	2.5	0.091				GAM
Thorium 232	7440-29-1	2.5	0.24				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8654

N211152-16

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF7

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-16	Client sample id	B07NF7
Dept sample id	7131-016	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	23.5	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	8.4	4.2	4	10	J	80A
Gross Beta	Beta	15	4.0	5	10		80B
Uranium 233/234		1.0	0.31	0.2	0.3		U
Uranium 235	15117-96-1	0.024	0.049	0.2	0.3	U	U
Uranium 238	7440-61-1	0.58	0.21	0.2	0.3		U
Plutonium 238	13981-16-3	0.011	0.023	0.05	0.05	U	PU
Plutonium 239/240		0.014	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.005	0.011	0.02	0.05	U	AM
Strontium 90	10098-97-2	-0.27	0.32	0.9		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.92				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-67-7	0.63	0.091				GAM
Thorium 228	14274-82-9	1.3	0.077				GAM
Thorium 232	7440-29-1	1.0	0.19				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8655

N211152-17

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF8

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-17	Client sample id	B07NF8
Dept sample id	7131-017	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	21.4	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	7.5	4.0	3	10	J	80A
Gross Beta	Beta	16	4.0	5	10		80B
Uranium 233/234		1.0	0.24	0.09	0.3		U
Uranium 235	15117-96-1	0.072	0.058	0.1	0.3	U	U
Uranium 238	7440-61-1	0.80	0.21	0.09	0.3		U
Plutonium 238	13981-16-3	-0.028	0.022	0.06	0.05	U	PU
Plutonium 239/240		0.003	0.017	0.03	0.05	U	PU
Americium 241	14596-10-2	0.006	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.39	0.92	0.8		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	12	0.86				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.14	0.051		0.05		GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-67-7	0.60	0.088				GAM
Thorium 228	14274-82-9	1.1	0.063				GAM
Thorium 232	7440-29-1	0.99	0.20				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8656

N211152-18

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NG0

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-18	Client sample id	B07NG0
Dept sample id	7131-018	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	32.0	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.2	4.4	5	10	J	80A
Gross Beta	Beta	13	4.3	6	10		80B
Uranium 233/234		0.53	0.21	0.2	0.3		U
Uranium 235	15117-96-1	0	0.049	0.2	0.3	U	U
Uranium 238	7440-61-1	0.57	0.21	0.2	0.3		U
Plutonium 238	13981-16-3	0.005	0.024	0.04	0.05	U	PU
Plutonium 239/240		0.005	0.009	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	0.25	1.2	0.9		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.0				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.8		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.27	0.056		0.05		GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-67-7	0.71	0.073				GAM
Thorium 228	14274-82-9	0.91	0.062				GAM
Thorium 232	7440-29-1	0.89	0.20				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8657

N211152-19

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NG1

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-19	Client sample id	B07NG1
Dept sample id	7131-019	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	28.6	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	2.7	4.4	6	10	U	80A
Gross Beta	Beta	14	3.9	5	10		80B
Uranium 233/234		0.45	0.23	0.2	0.3		U
Uranium 235	15117-96-1	0.081	0.11	0.2	0.3	U	U
Uranium 238	7440-61-1	0.67	0.24	0.2	0.3		U
Plutonium 238	13981-16-3	0.006	0.024	0.05	0.05	U	PU
Plutonium 239/240		-0.003	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0.007	0.014	0.02	0.05	U	AM
Strontium 90	10098-97-2	0	0.45	0.8		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	0.82				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	0.11	0.035		0.05		GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-67-7	0.66	0.080				GAM
Thorium 228	14274-82-9	1.1	0.072				GAM
Thorium 232	7440-29-1	0.91	0.16				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8658

N211152-20

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NG2

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-20	Client sample id	B07NG2
Dept sample id	7131-020	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	20.5	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	15	4.8	3	10		80A
Gross Beta	Beta	16	4.3	5	10		80B
Uranium 233/234		0.98	0.30	0.1	0.3		U
Uranium 235	15117-96-1	0.13	0.086	0.2	0.3	U	U
Uranium 238	7440-61-1	0.68	0.23	0.1	0.3		U
Plutonium 238	13981-16-3	0.003	0.007	0.02	0.05	U	PU
Plutonium 239/240		0.002	0.007	0.01	0.05	U	PU
Americium 241	14596-10-2	-0.004	0.012	0.03	0.05	U	AM
Strontium 90	10098-97-2	0.40	0.26	0.9		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.75				GAM
Iron 59		U		0.2	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM
Europium 152	14683-23-9	U		0.08	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-67-7	0.95	0.090				GAM
Thorium 228	14274-82-9	1.9	0.085				GAM
Thorium 232	7440-29-1	1.5	0.18				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8659

Figure 7 CHAIN OF CUSTODY FORM

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: DAVID A MYERS

OSM PROJECT NO 92-374

Company Contact: STEVE WEISS

Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: COLUMBIA RIVER HANFORD REACH 100-D AREA

Collection Date: 11/19/92

Ice Chest No.:

Field Logbook No.: 199806.226

Bill of Lading/Airbill No.: 251 900 7282

Offsite Property No.: W93-0-0122 #1

Method of Shipment: EMORY AIR FREIGHT

Shipped to: TMA NORCAL, 2030 WRIGHT AVE, RICHMOND, CA 94804

Possible Sample Hazards/Remarks:

Sample Identification

B07NF0 1x1000ml, 2x250ml, 1x125ml	COLUMBIA RIVER SEDIMENT
B07NF1 " " "	" " "
B07NF2 1x1000ml, 2x250ml, 1x125ml	COLUMBIA RIVER SEDIMENT

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
RICHARD MAHOOD 11/23/92	DAVID A MYERS	11/23/92 702 AM
Relinquished by:	Received by: Kermit Blum	Date/Time: 11-24-92 1150
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: SUBSET OF ORIGINAL COC

067

9613492.8660 CHAIN OF CUSTODY FORM

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: DAVID A MYERS — OSM PROJECT NO 92-374

Company Contact: STEVE WEISS — Telephone: 376-1683, 376-5122

Project Designation/Sampling Locations: 100 AREA COLUMBIA RIV. HANFORD REACH, 100-D AREA — Collection Date: 11/19/92

Ice Chest No.: — Field Logbook No.: 199806, 226

Bill of Lading/Airbill No.: 251900 7282 — Offsite Property No.: W93-0-122 #11

Method of Shipment: EMORY AIR FREIGHT

Shipped to: TMA NORCAL, 2030 WRIGHT AVE, RICHMOND CA 94804

Possible Sample Hazards/Remarks: NONE

Sample Identification

B07ND4	1x1000ml, 2x250ml, 1x125ml	COLUMBIA RIVER SEDIMENT
B07ND5		
B07ND6		
B07ND7		
B07ND8	1x1000ml, 2x250ml, 1x125ml	COLUMBIA RIVER SEDIMENT

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
RICHARD MAHOOD	DAVID A MYERS	11/23/92 7:02 AM
Relinquished by:	Received by:	Date/Time:
	Kermit Blum	11-24-92 1150
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: SUBSET OF ORIGINAL COC 11/23/92

A68

9613492.8661

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector R. Mahood, B. Mattingly, L. Glaman Date 11/19/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07ND8	SE	11/19/92	10:45	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
—	SE	—	—	
B07ND8	SE	11/19/92	10:45	1 x 250ml - Glass : Mercury
↓	SE	↓	↓	1 x 250 ml - Glass : Lead
↓	SE	↓	↓	1 x 125 ml - Glass : ICP and AA Metals
B07NF0	SE	11/19/92	13:30	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
—	SE	—	—	
B07NF0	SE	11/19/92	13:30	1 x 250 ml - Glass : Lead
↓	SE	↓	↓	1 x 250ml - Glass : Mercury
↓	SE	↓	↓	1 x 125 ml - Glass : ICP and AA Metals
B07NF1	SE	11/19/92	14:30	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Sr-90
↓	SE	↓	↓	1x250ml-Glass : Lead
↓	SE	↓	↓	1x250 ml Glass : Mercury
↓	SE	↓	↓	1x 125ml Glass : ICP and AA Metals
B07NF2	SE	11/19/92	14:40	1x1000ml-Plastic : Alpha Spec (Am, Pu, U), Gross Beta Gamma Spec, ^{90}Sr
—	—	—	—	
B07NF2	SE	11/19/92	14:40	1x 250ml - Glass : Lead
↓	SE	↓	↓	1x 250 ml - Glass : Mercury
↓	SE	↓	↓	1x 125 ml - Glass : ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

069

A-6000-406 (06/

9613492.8662

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector R. Mahood, Brian Martingly, L. Glaman Date 11/19/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07ND4	SE	11/19/92	09:30	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
—	SE	—	—	
B07ND4	SE	11/19/92	09:30	1 x 250ml-Glass: Mercury
↓	SE	↓	↓	1 x 250 ml-Glass: Lead
↓	SE	↓	↓	1 x 125 ml-Glass: ICP and AA Metals
B07ND5	SE	11/19/92	09:45	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Spec, ^{90}Sr
—	SE	—	—	
B07ND5	SE	11/19/92	09:45	1 x 250 ml-Glass: Lead
↓	SE	↓	↓	1 x 250ml-Glass: Mercury
↓	SE	↓	↓	1 x 125 ml-Glass: ICP and AA Metals
B07ND6	SE	11/19/92	10:30	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Sr-90
↓	SE	↓	↓	1x250ml-Glass: Lead
↓	SE	↓	↓	1x250ml Glass: Mercury
↓	SE	↓	↓	1x125ml Glass: ICP and AA Metals
B07ND7	SE	11/19/92	09:30	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta Gamma Spec, ^{90}Sr
—	—	—	—	
B07ND7	SE	11/19/92	09:30	1x 250ml-Glass: Lead
↓	SE	↓	↓	1x 250 ml-Glass: Mercury
↓	SE	↓	↓	1x 125 ml-Glass: ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

070

A-6000-406 (08/

9613492.8663

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector R. Mahood, B. Mattingly, L. Glaman Date 11/19/92

Company Contact Steve Weiss or Ron Mitchell Telephone (509) 376-1683 376-6122

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
BØ7ND8	SE	11/19/92	1Ø:45	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta
—	SE	—	—	Gamma Spec, ^{90}Sr
BØ7ND8	SE	11/19/92	1Ø:45	1 x 250ml-Glass: Mercury
↓	SE	↓	↓	1 x 250 ml-Glass: Lead
↓	SE	↓	↓	1 x 125 ml-Glass: ICP and AA Metals
BØ7NFØ	SE	11/19/92	13:3Ø	1 x 1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta,
—	SE	—	—	Gamma Spec, ^{90}Sr
BØ7NFØ	SE	11/19/92	13:3Ø	1 x 250 ml-Glass: Lead
↓	SE	↓	↓	1 x 250ml-Glass: Mercury
↓	SE	↓	↓	1 x 125 ml-Glass: ICP and AA Metals
BØ7NF1	SE	11/19/92	14:3Ø	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta, Gamma Sp Sr-90
↓	SE	↓	↓	1x250ml-Glass: Lead
↓	SE	↓	↓	1x250 ml Glass: Mercury
↓	SE	↓	↓	1x125ml Glass: ICP and AA Merals
BØ7NF2	SE	11/19/92	14:4Ø	1x1000ml-Plastic: Alpha Spec (Am, Pu, U), Gross Beta
—	—	—	—	Gamma Spec, ^{90}Sr
BØ7NF2	SE	11/19/92	14:4Ø	1x 250ml-Glass: Lead
↓	SE	↓	↓	1x 250 ml-Glass: Mercury
↓	SE	↓	↓	1x 125 ml-Glass: ICP & AA metals
	SE			

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

Field Information OSM Project No. 92-374

Special Handling and/or Storage 4°C

Possible Sample Hazards NONE

071

A-6000-406 (06/

9613492.8664

SAMPLE ANALYSIS REQUEST

100 AREAS FACILITIES HEALTH & SAFETY

373-1436

FAX: 373-4030

REQUESTER: R MAHOOD

PHONE: 943-6728

DATE: 11-19-92 / 11-20-92

HEALTH PHYSICS USE ONLY

SAMPLE NUMBER	SAMPLE DATE/TIME	SAMPLE DESCRIPTION	ANALYSIS DATE/TIME	LAB NUMBER	BETA/GAMMA/ALPHA RESULTS (pCi/gm)	ALPHA RESULTS (pCi/gm)
BØ7ND8	11-19-92/1045	RIVER SEDIMENT	11-19-92/2300	G92-1260	< 36.45	< 60
BØ7ND7	11-19-92/0930	RIVER SEDIMENT	11-19-92/22:24	G92-1259	< 26.16	< 60
BØ7ND6	11-19-92/1030	RIVER SEDIMENT	11-19-92/2146	G92-1258	< 25.01	< 60
BØ7ND5	11-19-92/0945	RIVER SEDIMENT	11-20-92/1126	G92-1257	< 23.53	< 60
BØ7ND4	11-19-92/0930	RIVER SEDIMENT	11-19-92 2026	G92-1256	< 25.97	< 60
BØ7NF2	11-19-92/1440	RIVER SEDIMENT	11-20-92/0940	G92-1255	< 22.87	< 60
BØ7NF1	11-19-92/1430	RIVER SEDIMENT	11-19-92/1403	G92-1254	< 21.13	< 60
BØ7NFØ	11-19-92/1330	RIVER SEDIMENT	11-19-92/1810	G92-1253	< 22.82	< 60

ANALYSIS BY: J. Shiff 5-5326

DATE: 11-19-92

072

9613492.8665

Golder Associates

Golder Associates Inc./Redmond, WA

TRANSMITTAL LETTER

To Hanford Analytical Services Management
345 Hills Street
Richland, Washington 99352

Date April 14, 1993
Project No. 923-E018

ATTENTION: Ms. Brianna Colley

Sent by Kent Angelos

☐ Mail
☒ Air Freight
☐ Hand Carried

☐ Under Separate Cover
☒ Enclosed

Quantity	Item	Description
1	Validated Data	Data Package:B07NB6-TMA-351
1	Validated Data	Data Package:B07NC4-TMA-356
1	Validated Data	Data Package:B07NC8-TMA-355
1	Validated Data	Data Package:B07ND4-TMA-353
1	Validated Data	Data Package:B07NF9-TMA-354
1	Validated Data	Data Package:9212L888-WES-914

Remarks Validated data packages as part of completion of Task Order S-93-18

cc: P.K. Brockman, SAIC

Per Kent Angelos

9613492.8666

MEMORANDUM

TO: Columbia River Sediment Project QA Record April 8, 1993

FR: Christina Jensen, Golder Associates Inc. CJ

RE: Inorganics Analysis Data Validation Summary for B07NF9-TMA-354

INTRODUCTION

This memo presents the results of data validation on data package B07NF9-TMA-354 consisting of 17 sediment samples submitted for inorganics analysis. The samples were analyzed by TMA/Skinner & Sherman using CLP protocols. A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA
B07NF9	11/21/92	SEDIMENT
B07NG0	11/21/92	SEDIMENT
B07NG1	11/21/92	SEDIMENT
B07NG2	11/21/92	SEDIMENT
B07NG3	11/22/92	SEDIMENT
B07NG4	11/22/92	SEDIMENT
B07NG5	11/22/92	SEDIMENT
B07NG6	11/22/92	SEDIMENT
B07NG8	11/23/92	SEDIMENT
B07NG9	11/23/92	SEDIMENT
B07NH0	11/23/92	SEDIMENT
B07NH1	11/23/92	SEDIMENT
B07NH2	11/23/92	SEDIMENT
B07NH3	11/23/92	SEDIMENT
B07NH4	11/23/92	SEDIMENT
B07NH5	11/24/92	SEDIMENT
B07NH6	11/24/92	SEDIMENT

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (Bechtold 1992). Attachments 1 through 4 to this memo provide the data validation supporting documentation and a summary of the validated results.

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met with the exception of the percent difference (%D) for barium which was exceeded for the serial dilution. Therefore, associated sample results were qualified as estimated (J).

Accuracy. Goals for accuracy were met with the exception of antimony and manganese spike recoveries and arsenic, selenium, thallium and lead GFAA analytical spike recoveries.

Sample Result Verification. All sample results were supported in the raw data with no data correction necessary.

Detection Limits. Detection limit goals were met for all analyses.

Completeness. The data package was complete for all requested analyses. A total of 17 samples were validated in this data set with a total of 391 determinations reported. Out of the 391 determinations reported, all determinations were deemed valid which results in a completeness of 100 percent. This completeness percentage meets the work plan objectives of 90%.

MAJOR DEFICIENCIES

There were no major deficiencies identified requiring rejection of the data.

MINOR DEFICIENCIES

Blanks

Cadmium, magnesium, silver, sodium, vanadiun and zinc were detected in the laboratory blanks. Sample results have been qualified undetected as follows, since sample concentrations were less than five times the associated blank concentrations:

ANALYTE	SAMPLE
Cadmium	B07NG0 B07NG1 B07NG5 B07NG9 B07NH0
Silver	B07NG0 B07NG1 B07NH2 B07NF9 B07NH6 B07NG5 B07NG8 B07NG9 B07NH1 B07NH3 B07NH5
Magnesium, Sodium, Vanadium and Zinc	B07NG8

Matrix Spike

Antimony and manganese spike results exceeded the QC limits of 75% to 125% with results qualified as estimated (J for detects, UJ for nondetects).

Laboratory Control Sample

The laboratory control sample percent recovery for barium exceeded the specified control limits. The sample results were qualified as estimated (J).

GFAA Analytical Spikes

The analytical spike percent recoveries exceeded the QC limits of 85% to 115% for the following samples and analytes and the associated sample results have been qualified as estimated (J for detects, UJ for nondetects):

Sample	Analyte
B07NG1, B07NG2, B07NG4, B07NG6, B07NG9, B07NH2, B07NH3, B07NF9, B07NH5	Selenium
B07NG8, B07NH0	Arsenic
B07NG3, B07NG5, B07NG6 B07NG2	Thallium

Method of Standard Additions

The method of standard additions MSA for lead analysis was needed for sample B07NG3, however was not performed by the laboratory. The results were qualified as estimated (J).

REFERENCES

WHC, 1993, Westinghouse Hanford Company, Validation of Columbia River Sediment Data, Statement of Work, Revision 0, January 1993. Westinghouse Hanford Company, Richland, Washington.

Bechtold, 1992, Westinghouse Hanford Company, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 1, 1992. Westinghouse Hanford Company, Richland, Washington.

9613492.8669

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9615492_8670

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the analyte was analyzed for and detected. The value reported is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). The data are usable for decision making purposes.

U - Indicates the analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.

UJ - Indicates the analyte was analyzed for and not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.

J - Indicates the analyte was analyzed for and detected. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

UR - Indicates the analyte was analyzed for and not detected; however, due to an identified quality control deficiency the data are unusable.

R - Indicates the analyte was analyzed and detected; however, due to an identified quality control deficiency the data are unusable.

9613492.8671

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B07NF9	REVIEWER: [illegible]	DATE: 4/8/93	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Cadmium	U	B07N60, B07N61	Blank Contam.
↓	↓	B07N65, B07N69	↓
↓	↓	B07NH0	↓
Silver	U	B07N60, B07N61	↓
↓	↓	B07NH2, B07NF9	↓
↓	↓	B07NH6, B07N65	↓
↓	↓	B07N68, B07N69	↓
↓	↓	B07NH1, B07NH3	↓
↓	↓	B07NH5	↓
Magnesium	UL	B07N68	↓
Sodium	U	B07N68	↓
Vanadium	U	B07N68	↓
Zinc	U	B07N68	↓
Antimony	J or UJ	all	SSR out
Manganese	J for detects	all	↓
Selenium	J or UJ	B07N61, B07N62	GFAA spike out
Selenium	J or UJ	B07N64, B07N66, 69	↓
Arsenic	↓	B07N68, B07NH0	↓
Selenium	↓	B07NH2, H3, F9, H5	↓
thallium	↓	B07N63, B07N65, 66	↓
lead	↓	B07N63	↓

9613492.8673

ATTACHMENT 3

AS QUALIFIED DATA SUMMARY

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG0

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-01S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 65.3

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7250			P	Q
7440-36-0	Antimony	5.1	~~U~~	N	P	UJ
7440-38-2	Arsenic	5.1		S	F	
7440-39-3	Barium	61.3	—	E	P	J
7440-41-7	Beryllium	0.12	U		P	
7440-43-9	Cadmium	1.5	—		P	U
7440-70-2	Calcium	4070			P	
7440-47-3	Chromium	25.8			P	
7440-48-4	Cobalt	7.3	B		P	
7440-50-8	Copper	20.5			P	
7439-89-6	Iron	15300			P	
7439-92-1	Lead	40.2			F	
7439-95-4	Magnesium	4320			P	
7439-96-5	Manganese	203	—	N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	13.7			P	
7440-09-7	Potassium	1010	B		P	
7782-49-2	Selenium	1.1	~~U~~		F	~~UJ~~ U
7440-22-4	Silver	0.92	~~B~~		P	U
7440-23-5	Sodium	232	B		P	
7440-28-0	Thallium	1.1	U		F	
7440-62-2	Vanadium	30.8			P	
7440-66-6	Zinc	378			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

4/6/93

003

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NG1

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-02S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 68.2

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	6040			P	
7440-36-0	Antimony	4.8	~~U~~	N	P	UJ
7440-38-2	Arsenic	6.0			F	
7440-39-3	Barium	58.0		E	P	J
7440-41-7	Beryllium	0.11	U		P	
7440-43-9	Cadmium	0.65	~~B~~		P	U
7440-70-2	Calcium	3580			P	
7440-47-3	Chromium	24.3			P	
7440-48-4	Cobalt	6.7	B		P	
7440-50-8	Copper	23.2			P	
7439-89-6	Iron	14900			P	
7439-92-1	Lead	30.5		W	F	
7439-95-4	Magnesium	3870			P	
7439-96-5	Manganese	231		N	P	J
7439-97-6	Mercury	0.07	U		CV	
7440-02-0	Nickel	12.3			P	
7440-09-7	Potassium	831	B		P	
7782-49-2	Selenium	1.0	~~U~~	W	F	UJ
7440-22-4	Silver	0.89	~~B~~		P	U
7440-23-5	Sodium	237	B		P	
7440-28-0	Thallium	1.1	U		F	
7440-62-2	Vanadium	31.8			P	
7440-66-6	Zinc	209			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

5/16/93

004

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NG2

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-03S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 80.7

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7550			P	
7440-36-0	Antimony	3.7	~~U~~	N	P	UJ
7440-38-2	Arsenic	2.9			F	
7440-39-3	Barium	55.1		E	P	J
7440-41-7	Beryllium	0.09	U		P	
7440-43-9	Cadmium	0.22	U		P	
7440-70-2	Calcium	3760			P	
7440-47-3	Chromium	18.8			P	
7440-48-4	Cobalt	6.7	B		P	
7440-50-8	Copper	17.7			P	
7439-89-6	Iron	15400			P	
7439-92-1	Lead	10.6			F	
7439-95-4	Magnesium	4640			P	
7439-96-5	Manganese	222		N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	15.2			P	
7440-09-7	Potassium	877	B		P	
7782-49-2	Selenium	0.83	~~U~~	W	F	UJ
7440-22-4	Silver	0.55	U		P	
7440-23-5	Sodium	168	B		P	
7440-28-0	Thallium	0.88	U		F	
7440-62-2	Vanadium	30.5			P	
7440-66-6	Zinc	94.8			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

5/16/93

005

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NG3

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-04S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 68.4

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7640			P	
7440-36-0	Antimony	4.4	~~U~~	N	P	UJ
7440-38-2	Arsenic	4.5		S	F	
7440-39-3	Barium	58.4		E	P	J
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	2.0			P	
7440-70-2	Calcium	3720			P	
7440-47-3	Chromium	22.8			P	
7440-48-4	Cobalt	8.5	B		P	
7440-50-8	Copper	18.9			P	
7439-89-6	Iron	15500			P	
7439-92-1	Lead	32.7		W	F	J
7439-95-4	Magnesium	4450			P	
7439-96-5	Manganese	193		N	P	J
7439-97-6	Mercury	0.07	B		CV	
7440-02-0	Nickel	13.8			P	
7440-09-7	Potassium	1040	B		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	0.65	U		P	
7440-23-5	Sodium	205	B		P	
7440-28-0	Thallium	1.1	~~U~~	W	F	UJ
7440-62-2	Vanadium	29.9			P	
7440-66-6	Zinc	397			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

SJ 4/6/93

006

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B07NG4

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-05S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 72.5

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5110			P	
7440-36-0	Antimony	4.5	~~U~~	N	P	UJ
7440-38-2	Arsenic	10.7		S	F	
7440-39-3	Barium	60.5		E	P	J
7440-41-7	Beryllium	0.11	U		P	
7440-43-9	Cadmium	0.27	U		P	
7440-70-2	Calcium	3310			P	
7440-47-3	Chromium	56.4			P	
7440-48-4	Cobalt	6.7	B		P	
7440-50-8	Copper	14.9			P	
7439-89-6	Iron	15800			P	
7439-92-1	Lead	23.9			F	
7439-95-4	Magnesium	3310			P	
7439-96-5	Manganese	305		N	P	J
7439-97-6	Mercury	0.07	U		CV	
7440-02-0	Nickel	10.9			P	
7440-09-7	Potassium	630	B		P	
7782-49-2	Selenium	0.92	~~U~~	W	F	UJ
7440-22-4	Silver	0.66	U		P	
7440-23-5	Sodium	166	B		P	
7440-28-0	Thallium	0.97	U		F	
7440-62-2	Vanadium	32.7			P	
7440-66-6	Zinc	152			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES.

SJ 4/6/93

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NG5

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-06S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 76.4

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	8620			P	
7440-36-0	Antimony	4.0	~~U~~	N	P	UJ
7440-38-2	Arsenic	4.8		S	F	
7440-39-3	Barium	88.5		E	P	J
7440-41-7	Beryllium	0.09	U		P	
7440-43-9	Cadmium	1.2			P	U
7440-70-2	Calcium	3970			P	
7440-47-3	Chromium	20.8			P	
7440-48-4	Cobalt	8.6	B		P	
7440-50-8	Copper	21.5			P	
7439-89-6	Iron	16700			P	
7439-92-1	Lead	27.8			F	
7439-95-4	Magnesium	4990			P	
7439-96-5	Manganese	182		N	P	J
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	15.1			P	
7440-09-7	Potassium	1420			P	
7782-49-2	Selenium	0.89	U	M	F	
7440-22-4	Silver	1.0	~~U~~		P	U
7440-23-5	Sodium	194	B		P	
7440-28-0	Thallium	0.94	~~U~~	W	F	UJ
7440-62-2	Vanadium	33.9			P	
7440-66-6	Zinc	253			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

5 4/6/93

008

9613492.8680

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG6

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-07S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 67.2

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7430			P	
7440-36-0	Antimony	4.6	~~U~~	N	P	UJ
7440-38-2	Arsenic	3.9		S	F	
7440-39-3	Barium	58.5		E	P	J
7440-41-7	Beryllium	0.11	U		P	
7440-43-9	Cadmium	1.7			P	
7440-70-2	Calcium	3520			P	
7440-47-3	Chromium	21.7			P	
7440-48-4	Cobalt	7.8	B		P	
7440-50-8	Copper	18.4			P	
7439-89-6	Iron	15000			P	
7439-92-1	Lead	31.3			F	
7439-95-4	Magnesium	4350			P	
7439-96-5	Manganese	193		N	P	J
7439-97-6	Mercury	0.08	B		CV	
7440-02-0	Nickel	14.5			P	
7440-09-7	Potassium	1050	B		P	
7782-49-2	Selenium	0.97	~~U~~	W	F	UJ
7440-22-4	Silver	0.68	U		P	
7440-23-5	Sodium	209	B		P	
7440-28-0	Thallium	1.0	~~U~~	W	F	UJ
7440-62-2	Vanadium	28.7			P	
7440-66-6	Zinc	369			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

SJ 4/6/93

009

9613492.8681

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NG8

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-08S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 74.3

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	572			P	
7440-36-0	Antimony	4.4	~~B~~	N	P	UJ
7440-38-2	Arsenic	0.70	~~B~~		F	J
7440-39-3	Barium	13.6	~~B~~	E	P	J
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	162	B		P	
7440-47-3	Chromium	1.2	B		P	
7440-48-4	Cobalt	0.81	B		P	
7440-50-8	Copper	0.91	U		P	
7439-89-6	Iron	1940			P	
7439-92-1	Lead	2.8			F	
7439-95-4	Magnesium	88.6	~~B~~		P	U
7439-96-5	Manganese	58.6	—	N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	1.4	U		P	
7440-09-7	Potassium	147	B		P	
7782-49-2	Selenium	0.92	U		F	
7440-22-4	Silver	0.86	~~B~~		P	U
7440-23-5	Sodium	51.6	~~B~~		P	U
7440-28-0	Thallium	0.97	U		F	
7440-62-2	Vanadium	1.8	~~B~~		P	U
7440-66-6	Zinc	8.3	—		P	U
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

5/4/6/93

010

9615492.8682

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NG9

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-09S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 77.4

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6700			P	Q
7440-36-0	Antimony	4.0	~~U~~	N	P	UJ
7440-38-2	Arsenic	4.9		S	F	
7440-39-3	Barium	48.7		E	P	J
7440-41-7	Beryllium	0.09	U		P	
7440-43-9	Cadmium	0.53	~~B~~		P	U
7440-70-2	Calcium	4060			P	
7440-47-3	Chromium	15.4			P	
7440-48-4	Cobalt	6.6	B		P	
7440-50-8	Copper	29.3			P	
7439-89-6	Iron	14700			P	
7439-92-1	Lead	49.7		S	F	
7439-95-4	Magnesium	4190			P	
7439-96-5	Manganese	156		N	P	J
7439-97-6	Mercury	0.07	U		CV	
7440-02-0	Nickel	11.7			P	
7440-09-7	Potassium	855	B		P	
7782-49-2	Selenium	0.88	~~U~~	W	F	UJ
7440-22-4	Silver	1.3	~~B~~		P	U
7440-23-5	Sodium	291	B		P	
7440-28-0	Thallium	0.93	U		F	
7440-62-2	Vanadium	29.8			P	
7440-66-6	Zinc	296			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

cj 4/6/93

011

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NH0

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-10S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 78.8

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5040			P	
7440-36-0	Antimony	4.2	~~U~~	N	P	UJ
7440-38-2	Arsenic	4.9	—	S	F	~~J~~ J
7440-39-3	Barium	48.1	~~B~~	E	P	J
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.38	~~B~~		P	U
7440-70-2	Calcium	2300			P	
7440-47-3	Chromium	12.5			P	
7440-48-4	Cobalt	4.8	B		P	
7440-50-8	Copper	12.8			P	
7439-89-6	Iron	11700			P	
7439-92-1	Lead	11.1			F	
7439-95-4	Magnesium	3760			P	
7439-96-5	Manganese	170	—	N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	13.9			P	
7440-09-7	Potassium	570	B		P	
7782-49-2	Selenium	0.83	U		F	
7440-22-4	Silver	0.62	U		P	
7440-23-5	Sodium	147	B		P	
7440-28-0	Thallium	0.88	U		F	
7440-62-2	Vanadium	21.1			P	
7440-66-6	Zinc	97.3			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

4/6/93

012

9613492.8684

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH1

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-11S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 76.2

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	8030			P	
7440-36-0	Antimony	4.2	~~U~~	N	P	UJ
7440-38-2	Arsenic	6.1			F	
7440-39-3	Barium	73.2	—	E	P	J
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	1.6			P	
7440-70-2	Calcium	4260			P	
7440-47-3	Chromium	22.3			P	
7440-48-4	Cobalt	7.7	B		P	
7440-50-8	Copper	23.8			P	
7439-89-6	Iron	16700			P	
7439-92-1	Lead	59.8			F	
7439-95-4	Magnesium	4640			P	
7439-96-5	Manganese	202	—	N	P	J
7439-97-6	Mercury	0.07	B		CV	
7440-02-0	Nickel	14.3			P	
7440-09-7	Potassium	993	B		P	
7782-49-2	Selenium	0.86	U		F	
7440-22-4	Silver	1.4	~~B~~		P	U
7440-23-5	Sodium	224	B		P	
7440-28-0	Thallium	0.91	U		F	
7440-62-2	Vanadium	35.4			P	
7440-66-6	Zinc	294			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

4/6/93

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH2

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-12S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 95.2

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	11100			P	
7440-36-0	Antimony	4.7	~~B~~	N	P	J
7440-38-2	Arsenic	6.0		S	F	
7440-39-3	Barium	111		E	P	J
7440-41-7	Beryllium	0.54	B		P	
7440-43-9	Cadmium	0.20	U		P	
7440-70-2	Calcium	2830			P	
7440-47-3	Chromium	31.9			P	
7440-48-4	Cobalt	9.7	B		P	
7440-50-8	Copper	31.1			P	
7439-89-6	Iron	31100			P	
7439-92-1	Lead	11.4			F	
7439-95-4	Magnesium	3880			P	
7439-96-5	Manganese	168		N	P	J
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	21.6			P	
7440-09-7	Potassium	619	B		P	
7782-49-2	Selenium	0.74	~~U~~	W	F	UJ
7440-22-4	Silver	0.94	~~B~~		P	U
7440-23-5	Sodium	113	B		P	
7440-28-0	Thallium	0.78	~~U~~	W	F	UJ
7440-62-2	Vanadium	86.2			P	
7440-66-6	Zinc	85.1			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS AND STONES

5-4/6/93

014

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B07NH3

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-13S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 82.6

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6410			P	Q
7440-36-0	Antimony	4.1	~~U~~	N	P	UJ
7440-38-2	Arsenic	4.5		S	F	
7440-39-3	Barium	100		E	P	J
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.24	U		P	
7440-70-2	Calcium	5450			P	
7440-47-3	Chromium	10.1			P	
7440-48-4	Cobalt	8.0	B		P	
7440-50-8	Copper	13.4			P	
7439-89-6	Iron	12800			P	
7439-92-1	Lead	22.6		S	F	
7439-95-4	Magnesium	3940			P	
7439-96-5	Manganese	344		N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	10.4			P	
7440-09-7	Potassium	952	B		P	
7782-49-2	Selenium	0.85	~~U~~	W	F	UJ
7440-22-4	Silver	0.77	~~B~~		P	U
7440-23-5	Sodium	144	B		P	
7440-28-0	Thallium	0.89	U		F	
7440-62-2	Vanadium	25.4			P	
7440-66-6	Zinc	82.0			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

5/16/93

015

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NH4

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-14S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 76.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7700			P	Q
7440-36-0	Antimony	4.2	~~U~~	N	P	UJ
7440-38-2	Arsenic	3.5			F	
7440-39-3	Barium	97.1	—	E	P	J
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.25	U		P	
7440-70-2	Calcium	6210			P	
7440-47-3	Chromium	12.5			P	
7440-48-4	Cobalt	7.2	B		P	
7440-50-8	Copper	16.5			P	
7439-89-6	Iron	13400			P	
7439-92-1	Lead	12.1			F	
7439-95-4	Magnesium	4420			P	
7439-96-5	Manganese	286	—	N	P	J
7439-97-6	Mercury	0.07	U		CV	
7440-02-0	Nickel	9.9	B		P	
7440-09-7	Potassium	1210	B		P	
7782-49-2	Selenium	0.87	U	M	F	
7440-22-4	Silver	0.63	U		P	
7440-23-5	Sodium	141	B		P	
7440-28-0	Thallium	0.92	U		F	
7440-62-2	Vanadium	25.9			P	
7440-66-6	Zinc	96.0			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

5-4/6/93

016

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF9

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-15S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 63.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	9850			P	
7440-36-0	Antimony	4.9	~~U~~	N	P	UJ
7440-38-2	Arsenic	6.2			F	
7440-39-3	Barium	87.5		E	P	J
7440-41-7	Beryllium	0.12	U		P	
7440-43-9	Cadmium	5.6			P	
7440-70-2	Calcium	5040			P	
7440-47-3	Chromium	64.1			P	
7440-48-4	Cobalt	10.1	B		P	
7440-50-8	Copper	42.7			P	
7439-89-6	Iron	17600			P	
7439-92-1	Lead	59.3			F	
7439-95-4	Magnesium	5520			P	
7439-96-5	Manganese	173		N	P	J
7439-97-6	Mercury	0.09	B		CV	
7440-02-0	Nickel	19.1			P	
7440-09-7	Potassium	1650			P	
7782-49-2	Selenium	1.1	~~U~~	W	F	UJ
7440-22-4	Silver	1.4	~~B~~		P	U
7440-23-5	Sodium	213	B		P	
7440-28-0	Thallium	1.1	U		F	
7440-62-2	Vanadium	41.7			P	
7440-66-6	Zinc	454			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

G 4/6/93

002

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH5

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-16S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 78.7

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4400			P	
7440-36-0	Antimony	3.9	~~U~~	N	P	UJ
7440-38-2	Arsenic	3.0			F	
7440-39-3	Barium	42.3	~~B~~	E	P	J
7440-41-7	Beryllium	0.09	U		P	
7440-43-9	Cadmium	0.23	U		P	
7440-70-2	Calcium	2770			P	
7440-47-3	Chromium	9.1			P	
7440-48-4	Cobalt	4.2	B		P	
7440-50-8	Copper	18.2			P	
7439-89-6	Iron	10200			P	
7439-92-1	Lead	24.1			F	
7439-95-4	Magnesium	3010			P	
7439-96-5	Manganese	206	~~—~~	N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	8.4	B		P	
7440-09-7	Potassium	560	B		P	
7782-49-2	Selenium	0.81	~~U~~	W	F	UJ
7440-22-4	Silver	0.61	~~B~~		P	U
7440-23-5	Sodium	199	B		P	
7440-28-0	Thallium	0.85	U		F	
7440-62-2	Vanadium	18.3			P	
7440-66-6	Zinc	185			P	
	Cyanide				NR	

Q

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

SJ 4/6/93

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NH6

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

Lab Code: SKINER Case No.: N2-12-009SAS No.: SDG No.: B07NF9

Matrix (soil/water): SOIL Lab Sample ID: 12032-17S

Level (low/med): LOW Date Received: 12/03/92

% Solids: 78.2

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5630			P	
7440-36-0	Antimony	4.2	~~U~~	N	P	W
7440-38-2	Arsenic	2.8			F	
7440-39-3	Barium	53.3		E	P	J
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.25	U		P	
7440-70-2	Calcium	3460			P	
7440-47-3	Chromium	11.3			P	
7440-48-4	Cobalt	5.9	B		P	
7440-50-8	Copper	23.7			P	
7439-89-6	Iron	12500			P	
7439-92-1	Lead	24.8			F	
7439-95-4	Magnesium	3830			P	
7439-96-5	Manganese	234		N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	11.2			P	
7440-09-7	Potassium	726	B		P	
7782-49-2	Selenium	0.89	U	M	F	
7440-22-4	Silver	0.89	~~B~~		P	U
7440-23-5	Sodium	272	B		P	
7440-28-0	Thallium	0.94	U		F	
7440-62-2	Vanadium	23.6			P	
7440-66-6	Zinc	209			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

G 11/6/92

9613492.8691

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

9613492.8692

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Columbia Rvr Sediment Spls	REVIEWER: CN2-12-009	DATE: 4/5/93
LABORATORY: TMA-Skinner & Sherman	CASE: B07NF9-TMA	SDG: B07NF9
SAMPLES/MATRIX: Soils B07NF9, B07N60, -354		
B07N61, B07N62, B07N63, B07N64, B07N65, B07N66, B07N68,		
B07N69, B07NH0, B07NH1, B07NH2, B07NH3, B07NH4,		
B07NH5, B07NH6		

1. COMPLETENESS AND CONTRACT COMPLIANCE

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

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

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

2. HOLDING TIMES

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

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

3. INITIAL CALIBRATIONS

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

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

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

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

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

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

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

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

5. ICP INTERFERENCE CHECK SAMPLE

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

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

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

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

6. LABORATORY BLANKS

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

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

7. FIELD BLANKS

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

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

8. MATRIX SPIKE SAMPLE ANALYSIS

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

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

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

9. LABORATORY CONTROL SAMPLE

9/4/6/93

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

Are there calculation errors? Yes No N/A

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

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

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

10. PERFORMANCE AUDIT ANALYSES

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

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

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

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

12. ICP SERIAL DILUTION

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

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

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

13. FIELD DUPLICATE SAMPLES

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

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

14. FIELD SPLIT SAMPLES

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

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

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

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

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

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

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

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

See note 1

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

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

17. ANALYTE QUANTITATION AND DETECTION LIMITS

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

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

18. OVERALL ASSESSMENT AND SUMMARY

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

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

COMMENTS (attach additional sheets as necessary):

① An MSA was not performed on sample B07N63 for lead. Sample result was qualified as J.

HOLDING TIME SUMMARY - FORM B-1

SDG: 207NF9	REVIEWER: C Jansen	DATE: 4/5/93	PAGE 1 OF 1
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
All	Metals	11/21/92 11/22/92 11/23/92 11/24/92	12/29/92	01/7/93	38, 37, 36, 35 9, 10, 11, 12	< 6 mos	none
All	Mercury	↓	12/9/92	12/9/92	14, 15, 16, 17	1	none

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BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B07NF9 REVIEWER: C Jensen DATE: 4/6/93 PAGE 1 OF 1

COMMENTS:

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
Blank	Silver	.0058			ug/L	.029		B07N60, G1, H2, F9, H0 65, G8, G9, H1, H3, H5	U
	Cadmium	.0011			ug/L	.0055		B07N60, G1, G5 G9, H0	U
	Magnesium	.0883			ug/L	.4415		B07N68	U
	Sodium	.1112			ug/L	.556		B07N68	U
	Vanadium	.0028			ug/L	.014		B07N68	U
	Zinc	.0145			ug/L	.0725		B07N68	U

ACCURACY DATA SUMMARY - FORM B-4

SDG: B07N60 (5/16/93)	REVIEWER: C. Jensen	DATE: 4/6/93	PAGE 1 OF 2
COMMENTS:			

SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B07NH6S	Antimony	73.1	all	J or UJ
B07NH6S	manganese	125.7	all	J for detects
—	Selenium	80.3	B07N G1	J or UJ
		69.16	B07N G2	
		82.59	B07N G4	
		83.68	B07N G6	
	Arsenic	84.73	B07N G8	
	Selenium	61.37	B07N G9	
	Arsenic	69.29	B07N H0	
	Se	76.93	B07N H2	
	Se	46.05	B07N H3	
	Se	54.76	B07N H9	
	Se	80.29	B07N H5	
	Thallium	128.23	B07N G3	
	Lead	193.07	B07N G3	J for detects (UJ rejected)
	Thallium	132.49	B07 NG5	J or UJ
	Thallium	119.66	B07N G6	J or UJ
	Thallium	129.80	B07NH2	J or UJ

P spike rec. out

FAA spike rec out

no MSA done should have

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PRECISION DATA SUMMARY - FORM B-5

SDG: ~~B07N60~~ B07NF1 6/4/8/93	REVIEWER C. Jensen	DATE: 4/6/93	PAGE 1 OF 1
COMMENTS:			

COMPOUND	SAMPLE ID:	SAMPLE ID:	~~RPD~~	SAMPLES AFFECTED	QUALIFIER
Barium	B07NH6L	—	%D=12.6	all	J

serial dilu & %D out conc>50x IDL

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FEDEX PRIORITY OVERNIGHT THU

emp# 9401 14APR93

Trk# 588 8690 823

PSCA

99352-WA-US

82PSC

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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

June 1, 1993

Ms. Jeanette Duncan
Westinghouse Hanford Company
Hanford Analytical Services Management
P.O. Box 1970
Richland WA 99352

Dear Ms. Duncan:

Enclosed are the standard factors and background data that you requested for TMA data packages 7136, 7131, 7116, and 7106. The counter QC information for alpha counting you requested is already contained in the data packages.

Please call if you have any further questions.

Yours sincerely,

N. Joseph Verville

N. Joseph Verville
Asst. Manager TMA/Norcal
Nuclear Projects

Enclosures: SF/backgrounds 7136, 7131, 7116, 7106

JUN 2003
RECEIVED
K. K. Pool

Additional Missing Data Identified as of 4/29/93:

ANALYSIS	DETECTOR OR SAMPLE ID	MISSING DATA
Data Package ID: B07FF7-TMA-380 Lab. Reporting Group: 7106 Lab: TMA/Norcal Project: 200-BP-1		
Isotopic Plutonium	SS12, SS14, SS23, SS24, SS25, SS26, SS27, SS28 through SS29	QC status is not recorded on the "Aspec Eff Summary Sheet"
Uranium	All Samples	SOP detailing calibration procedures and sample result calculations for Laser Phosphorimetry method
Technetium-99	LBG1 through LBG4, LBG10 through LBG14	Background QC check data is missing

ANALYSIS	DETECTOR OR SAMPLE ID	MISSING DATA
Data Package ID: B07FG0-TMA-374 Lab Reporting Group: 7108 Lab: TMA/Norcal Project: 200-BP-1		
Isotopic Plutonium	SS12, SS14, SS23, SS24, SS25, SS26, SS27, SS28 through SS46	QC status is not recorded on the "Aspec Eff Summary Sheet"
Uranium	All Samples	SOP detailing calibration procedures and sample result calculations for Laser Phosphorimetry method
Gross Alpha and Beta	All detectors used for sample analysis	No continuing calibration or background check QC status information reported.

ANALYSIS	DETECTOR OR SAMPLE ID	MISSING DATA
Data Package ID: B079P8-TMA-363 Lab Reporting Group: 7116 Lab: TMA/Norcal Project: 200-BP-1		
Isotopic Plutonium	SS27, SS28, and SS31 through SS37	QC status is not recorded on the "Aspec Eff Summary Sheet"

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Gross Counter Q.C. Status 03:15:53 05-JAN-93

****

TUE

Status at this time

Detector		SF	GMT	BK	GMT	BK4.75	GMT	BK6.49	
LBG	1	0.999	4.	0.632	2.	0.930FC	290.	0.663	214.
LBG	2	1.005	4.	0.541	2.	0.692	290.	0.705	214.
LBG	3	0.983	4.	0.510	2.	0.553	290.	0.479	214.
LBG	4	1.012	4.	0.732	2.	0.791	290.	0.768	214.
LBG	5	1.071NG	99.	0.368NG	225.	0.854	185.	0.578	281.
LBG	6	1.024NG	77.	0.791NG	76.	0.770	185.	0.665	281.
LBG	9	1.002	4.	0.647	2.	0.576	290.	0.587	214.
LBG	10	0.966	4.	0.593	2.	0.711	290.	0.620	214.
LBG	11	0.992	4.	0.537	2.	0.599	185.	0.564	214.
LBG	12	0.977	4.	0.635	2.	0.692	185.	0.599	214.
LBG	13	1.044	4.	0.538	2.	0.822	185.	0.564	214.
LBG	14	1.081	4.	0.607	2.	0.736	185.	0.623	214.
LBG	15	1.034	4.	0.692	4.	0.762	290.	0.785	214.
LBG	16	1.035	4.	0.618	2.	0.622	290.	0.589	214.
GAW	17	3.207	5.	0.151	2.	0.000	0.	0.000	0.
MEW	19	1.017	4.	13.230NG	4.	0.666	123.	0.777	123.
GAW	21	3.686	5.	0.122NG	2.	0.000	0.	0.000	0.
2PI	22	2.177NG	365.	0.188NG	2.	0.000	0.	0.000	0.
GAW	23	3.208	90.	0.018	32.	0.000	0.	0.000	0.
GAW	24	2.951	5.	0.069	2.	0.000	0.	0.000	0.
2PI	25	2.083	118.	0.107NG	180.	0.000	0.	0.000	0.
2PI	26	2.326	118.	0.199NG	180.	0.000	0.	0.000	0.
LSC	4	0.000	0.	0.000	0.	0.000	0.	0.000	0.
LSC	5	0.000	0.	0.000	0.	0.000	0.	0.000	0.
VLB	1	1.100	190.	0.289	190.	0.000	0.	0.000	0.
VLB	2	1.130	190.	0.246	190.	0.000	0.	0.000	0.
VLB	3	1.105FC	190.	0.236	190.	0.000	0.	0.000	0.
VLB	4	1.109	190.	0.291	190.	0.000	0.	0.000	0.
VLB	5	1.057	190.	0.219	190.	0.000	0.	0.000	0.
VLB	6	1.068	190.	0.246	190.	0.000	0.	0.000	0.
VLB	7	1.091	190.	0.196	190.	0.000	0.	0.000	0.
VLB	8	1.213	190.	0.251	190.	0.000	0.	0.000	0.
GAW	101	0.999	4.	0.116	3.	0.000	0.	0.000	0.
GAW	102	1.000	4.	0.098	3.	0.000	0.	0.000	0.
GAW	103	0.993	4.	0.106	3.	0.000	0.	0.000	0.
GAW	104	0.997	4.	0.077	3.	0.000	0.	0.000	0.
GAW	105	1.003	4.	0.065	3.	0.000	0.	0.000	0.
GAW	106	1.001	4.	0.075	3.	0.000	0.	0.000	0.
GAW	107	1.003	4.	0.081	3.	0.000	0.	0.000	0.
GAW	108	1.000	4.	0.080	3.	0.000	0.	0.000	0.
GAW	109	0.999	4.	0.068	3.	0.000	0.	0.000	0.
GAW	110	1.002	4.	0.088	3.	0.000	0.	0.000	0.
GAW	111	0.995	4.	0.118	3.	0.000	0.	0.000	0.
GAW	112	1.001	4.	0.086	3.	0.000	0.	0.000	0.
GAW	113	1.008	4.	0.120	3.	0.000	0.	0.000	0.
GAW	114	1.012	4.	0.093	3.	0.000	0.	0.000	0.
GAW	115	1.006	4.	0.110	3.	0.000	0.	0.000	0.
GAW	116	1.006	4.	0.071	3.	0.000	0.	0.000	0.
GRB	101	0.990	4.	1.085NG	3.	0.000	0.	0.000	0.
GRB	102	0.987	4.	1.561	3.	0.000	0.	0.000	0.
GRB	103	0.996	4.	1.141	3.	0.000	0.	0.000	0.
GRB	104	0.985	4.	1.060	3.	0.000	0.	0.000	0.
GRB	105	1.014	4.	1.280	3.	0.000	0.	0.000	0.
GRB	106	1.017	4.	1.532	3.	0.000	0.	0.000	0.

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GRB	107	1.005	4.	1.007	3.	0.000	0.	0.000	0.
GRB	108	1.009	4.	1.046NG	3.	0.000	0.	0.000	0.
GRB	109	1.000	4.	1.041	3.	0.000	0.	0.000	0.
GRB	110	1.000	4.	1.365	3.	0.000	0.	0.000	0.
GRB	111	0.988	4.	1.049	3.	0.000	0.	0.000	0.
GRB	112	0.986	4.	1.219	3.	0.000	0.	0.000	0.
GRB	113	1.005	4.	1.013	3.	0.000	0.	0.000	0.
GRB	114	0.999	4.	1.053	3.	0.000	0.	0.000	0.
GRB	115	0.991	4.	0.996	3.	0.000	0.	0.000	0.
GRB	116	1.001	4.	0.993	3.	0.000	0.	0.000	0.
GAW	201	1.015	4.	0.011	3.	0.000	0.	0.000	0.
GAW	202	1.011	4.	0.014	3.	0.000	0.	0.000	0.
GAW	203	1.001	4.	0.023	3.	0.000	0.	0.000	0.
GAW	204	0.994	4.	0.010	3.	0.000	0.	0.000	0.
GAW	205	1.043	4.	0.010	3.	0.000	0.	0.000	0.
GAW	206	1.035	4.	0.008	3.	0.000	0.	0.000	0.
GAW	207	1.007	4.	0.020	3.	0.000	0.	0.000	0.
GAW	208	0.992	4.	0.027	3.	0.000	0.	0.000	0.
GAW	209	1.003	4.	0.031	3.	0.000	0.	0.000	0.
GAW	210	0.990	4.	0.011	3.	0.000	0.	0.000	0.
GAW	211	0.985	4.	0.019	3.	0.000	0.	0.000	0.
GAW	212	0.980	4.	0.014	3.	0.000	0.	0.000	0.
GAW	213	0.996	4.	0.021	3.	0.000	0.	0.000	0.
GAW	214	0.998	4.	0.011	3.	0.000	0.	0.000	0.
GAW	215	1.006	4.	0.015	3.	0.000	0.	0.000	0.
GAW	216	0.998	4.	0.018	3.	0.000	0.	0.000	0.
GRB	201	0.994	2.	0.480	3.	0.000	0.	0.000	0.
GRB	202	0.992	2.	0.381	3.	0.000	0.	0.000	0.
GRB	203	0.988	2.	0.464	3.	0.000	0.	0.000	0.
GRB	204	0.991	2.	0.388	3.	0.000	0.	0.000	0.
GRB	205	1.008	4.	0.320	3.	0.000	0.	0.000	0.
GRB	206	1.005	4.	0.447	3.	0.000	0.	0.000	0.
GRB	207	0.995	4.	0.478	3.	0.000	0.	0.000	0.
GRB	208	0.994	4.	0.489	3.	0.000	0.	0.000	0.
GRB	209	1.008	4.	0.449	3.	0.000	0.	0.000	0.
GRB	210	0.998	4.	0.388	3.	0.000	0.	0.000	0.
GRB	211	0.989	4.	0.460	3.	0.000	0.	0.000	0.
GRB	212	0.997	4.	0.402	3.	0.000	0.	0.000	0.
GRB	213	1.010	4.	0.480	3.	0.000	0.	0.000	0.
GRB	214	1.001	4.	0.556	3.	0.000	0.	0.000	0.
GRB	215	1.001	4.	0.417	3.	0.000	0.	0.000	0.
GRB	216	1.005	4.	0.440	3.	0.000	0.	0.000	0.

Recent Q.C. counts

Detector		QC	Date	Gross Counts	Min.	Q.C. Value	Sigma	Control limits	
GRB	209	BK	1.190	960.	2157.60	0.445	0.014	0.363 -	0.549
GAW	209	BK	1.190	65.	2157.60	0.030	0.004	0.006 -	0.058
GRB	210	BK	1.190	864.	2157.60	0.400	0.014	0.357 -	0.422
GAW	210	BK	1.190	30.	2157.60	0.014	0.003	-0.006 -	0.028
GRB	211	BK	1.190	1096.	2157.60	0.508	0.015	0.266 -	0.648
GAW	211	BK	1.190	49.	2157.60	0.023	0.003	0.005 -	0.031
GRB	212	BK	1.190	882.	2157.60	0.409	0.014	0.345 -	0.455
GAW	212	BK	1.190	31.	2157.60	0.014	0.003	-0.008 -	0.035
GRB	201	BK	1.192	986.	2154.41	0.458	0.015	0.420 -	0.549
GAW	201	BK	1.192	23.	2154.41	0.011	0.002	0.001 -	0.022
GRB	202	BK	1.192	789.	2154.42	0.366	0.013	0.312 -	0.447
GAW	202	BK	1.192	19.	2154.42	0.009	0.002	0.004 -	0.023
GRB	203	BK	1.192	999.	2154.41	0.464	0.015	0.401 -	0.535
GAW	203	BK	1.192	49.	2154.41	0.023	0.003	0.004 -	0.040
GRB	204	BK	1.192	873.	2154.41	0.405	0.014	0.283 -	0.481

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GAW	204	BK	1.192	26.	2154.41	0.012	0.002	-0.003	-	0.022	
GRB	205	BK	1.196	700.	2148.97	0.326	0.012	0.255	-	0.399	
GAW	205	BK	1.196	20.	2148.97	0.009	0.002	-0.004	-	0.027	
GRB	206	BK	1.196	976.	2148.97	0.454	0.015	0.399	-	0.492	
GAW	206	BK	1.196	18.	2148.97	0.008	0.002	-0.003	-	0.019	
GRB	207	BK	1.196	947.	2148.97	0.441	0.014	0.379	-	0.608	
GAW	207	BK	1.196	37.	2148.97	0.017	0.003	-0.015	-	0.066	
GRB	208	BK	1.196	1000.	2148.97	0.465	0.015	0.378	-	0.619	
GAW	208	BK	1.196	47.	2148.97	0.022	0.003	0.011	-	0.048	
GRB	213	BK	1.191	987.	2156.30	0.458	0.015	0.409	-	0.565	
GAW	213	BK	1.191	31.	2156.30	0.014	0.003	0.003	-	0.041	
GRB	214	BK	1.191	1180.	2156.30	0.547	0.016	0.422	-	0.690	
GAW	214	BK	1.191	23.	2156.30	0.011	0.002	-0.005	-	0.028	
GRB	215	BK	1.191	907.	2156.30	0.421	0.014	0.345	-	0.485	
GAW	215	BK	1.191	27.	2156.30	0.013	0.002	0.001	-	0.031	
GRB	216	BK	1.191	961.	2156.30	0.446	0.014	0.397	-	0.478	
GAW	216	BK	1.191	23.	2156.30	0.011	0.002	0.008	-	0.032	
GRB	209	SF	2.756	91111.	10.00	1.017	0.003	0.977	-	1.037	
GRB	210	SF	2.756	93577.	10.00	1.005	0.003	0.968	-	1.028	
GRB	211	SF	2.756	98718.	10.00	0.994	0.003	0.960	-	1.019	
GRB	212	SF	2.756	94932.	10.00	1.002	0.003	0.965	-	1.025	
GRB	213	SF	2.756	94667.	10.00	1.010	0.003	0.968	-	1.061	
GRB	214	SF	2.756	91112.	10.00	1.009	0.003	0.964	-	1.045	
GRB	215	SF	2.756	95560.	10.00	0.994	0.003	0.974	-	1.034	
GRB	216	SF	2.756	94339.	10.00	1.000	0.003	0.978	-	1.039	
GRB	205	SF	2.756	89378.	10.00	0.998	0.003	0.980	-	1.041	
GRB	206	SF	2.756	92666.	10.00	0.999	0.003	0.975	-	1.036	
GRB	207	SF	2.756	91382.	10.00	0.991	0.003	0.967	-	1.027	
GRB	208	SF	2.756	101198.	10.00	0.984	0.003	0.965	-	1.025	
GRB	201	SF	2.774	88723.	10.00	0.995	0.003	0.964	-	1.023	
GRB	202	SF	2.774	91546.	10.00	0.989	0.003	0.963	-	1.022	
GRB	203	SF	2.774	95702.	10.00	0.986	0.003	0.958	-	1.018	
GRB	204	SF	2.774	72881.	10.00	0.988	0.004	0.961	-	1.021	
GRB	101	BK	0.000	2424.	2467.32	0.982	0.020	0.997	-	1.164	FAIL
GAW	101	BK	0.000	264.	2467.32	0.107	0.007	0.088	-	0.148	
GRB	102	BK	0.000	3778.	2467.32	1.531	0.025	1.486	-	1.657	
GAW	102	BK	0.000	205.	2467.32	0.083	0.006	0.061	-	0.131	
GRB	103	BK	0.000	3014.	2467.32	1.222	0.022	1.010	-	1.266	
GAW	103	BK	0.000	289.	2467.32	0.117	0.007	0.061	-	0.148	
GRB	104	BK	0.000	2638.	2467.32	1.069	0.021	0.992	-	1.130	
GAW	104	BK	0.000	208.	2467.32	0.084	0.006	0.054	-	0.104	
GRB	105	BK	0.000	3143.	2468.06	1.273	0.023	1.176	-	1.410	
GAW	105	BK	0.000	163.	2468.06	0.066	0.005	0.041	-	0.095	
GRB	106	BK	0.000	3843.	2468.06	1.557	0.025	1.397	-	1.717	
GAW	106	BK	0.000	248.	2468.06	0.100	0.006	0.018	-	0.148	
GRB	107	BK	0.000	2523.	2468.06	1.022	0.020	0.867	-	1.166	
GAW	107	BK	0.000	178.	2468.06	0.072	0.005	-0.001	-	0.181	
GRB	108	BK	0.000	2558.	2468.06	1.036	0.020	0.905	-	1.174	
GAW	108	BK	0.000	195.	2468.06	0.079	0.006	0.025	-	0.149	
GRB	109	BK	0.000	2607.	2467.97	1.056	0.021	0.910	-	1.176	
GAW	109	BK	0.000	140.	2467.97	0.057	0.005	0.053	-	0.087	
GRB	110	BK	0.000	3301.	2467.97	1.338	0.023	1.248	-	1.515	
GAW	110	BK	0.000	191.	2467.97	0.077	0.006	0.048	-	0.123	
GRB	111	BK	0.000	2656.	2467.97	1.076	0.021	0.931	-	1.138	
GAW	111	BK	0.000	276.	2467.97	0.112	0.007	0.078	-	0.160	
GRB	112	BK	0.000	2934.	2467.97	1.189	0.022	1.128	-	1.327	
GAW	112	BK	0.000	201.	2467.97	0.081	0.006	0.047	-	0.124	
GRB	113	BK	0.000	2417.	2468.38	0.979	0.020	0.877	-	1.138	
GAW	113	BK	0.000	289.	2468.38	0.117	0.007	0.083	-	0.153	
GRB	114	BK	0.000	2545.	2468.38	1.031	0.020	0.960	-	1.156	
GAW	114	BK	0.000	199.	2468.38	0.081	0.006	0.060	-	0.134	
GRB	115	BK	0.000	2444.	2468.38	0.990	0.020	0.844	-	1.172	

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GAW	115	BK	0.000	278.	2468.38	0.113	0.007	0.082	-	0.146	
GRB	116	BK	0.000	2503.	2468.38	1.014	0.020	0.922	-	1.078	
GAW	116	BK	0.000	164.	2468.38	0.066	0.005	0.031	-	0.118	
GRB	109	BK	2.694	1679.	1695.01	0.991	0.024	0.908	-	1.184	
GAW	109	BK	2.694	104.	1695.01	0.061	0.006	0.053	-	0.085	
GRB	110	BK	2.694	2300.	1695.01	1.357	0.028	1.245	-	1.524	
GAW	110	BK	2.694	165.	1695.01	0.097	0.008	0.047	-	0.125	
GRB	111	BK	2.694	1846.	1695.01	1.089	0.025	0.927	-	1.145	
GAW	111	BK	2.694	198.	1695.01	0.117	0.008	0.076	-	0.163	
GRB	112	BK	2.694	1998.	1695.01	1.179	0.026	1.135	-	1.328	
GAW	112	BK	2.694	126.	1695.01	0.074	0.007	0.051	-	0.124	
GRB	101	BK	2.694	1658.	1694.53	0.978	0.024	0.995	-	1.170	FAIL
GAW	101	BK	2.694	196.	1694.53	0.116	0.008	0.086	-	0.149	
GRB	102	BK	2.694	2561.	1694.53	1.511	0.030	1.480	-	1.658	
GAW	102	BK	2.694	153.	1694.53	0.090	0.007	0.061	-	0.133	
GRB	103	BK	2.694	1960.	1694.53	1.157	0.026	1.004	-	1.264	
GAW	103	BK	2.694	176.	1694.53	0.104	0.008	0.061	-	0.151	
GRB	104	BK	2.694	1745.	1694.53	1.030	0.025	0.987	-	1.132	
GAW	104	BK	2.694	129.	1694.53	0.076	0.007	0.061	-	0.101	
GRB	105	BK	2.694	2108.	1695.07	1.244	0.027	1.169	-	1.417	
GAW	105	BK	2.694	107.	1695.07	0.063	0.006	0.040	-	0.094	
GRB	106	BK	2.694	2472.	1695.07	1.458	0.029	1.407	-	1.721	
GAW	106	BK	2.694	121.	1695.07	0.071	0.006	0.014	-	0.151	
GRB	107	BK	2.694	1612.	1695.07	0.951	0.024	0.901	-	1.151	
GAW	107	BK	2.694	128.	1695.07	0.076	0.007	-0.004	-	0.187	
GRB	108	BK	2.694	1746.	1695.07	1.030	0.025	0.926	-	1.168	
GAW	108	BK	2.694	120.	1695.07	0.071	0.006	0.023	-	0.153	
GRB	113	BK	2.694	1672.	1695.28	0.986	0.024	0.882	-	1.144	
GAW	113	BK	2.694	201.	1695.28	0.119	0.008	0.096	-	0.146	
GRB	114	BK	2.694	1761.	1695.28	1.039	0.025	0.955	-	1.163	
GAW	114	BK	2.694	131.	1695.28	0.077	0.007	0.059	-	0.136	
GRB	115	BK	2.694	1614.	1695.28	0.952	0.024	0.875	-	1.117	
GAW	115	BK	2.694	172.	1695.28	0.101	0.008	0.083	-	0.147	
GRB	116	BK	2.694	1674.	1695.28	0.987	0.024	0.922	-	1.071	
GAW	116	BK	2.694	110.	1695.28	0.065	0.006	0.029	-	0.120	
LBG	1	BK	2.566	610.	1053.70	0.579	0.023	0.289	-	1.002	
LBG	2	BK	2.566	515.	1053.70	0.489	0.022	0.284	-	0.824	
LBG	3	BK	2.566	513.	1053.70	0.487	0.021	0.302	-	0.717	
LBG	4	BK	2.566	760.	1053.70	0.721	0.026	0.647	-	0.811	
LBG	9	BK	2.566	600.	1053.70	0.569	0.023	0.442	-	0.882	
LBG	10	BK	2.566	591.	1053.70	0.561	0.023	0.441	-	0.755	
LBG	11	BK	2.566	587.	1053.70	0.557	0.023	0.434	-	0.638	
LBG	12	BK	2.566	689.	1053.70	0.654	0.025	0.545	-	0.724	
LBG	13	BK	2.566	483.	1053.70	0.458	0.021	0.437	-	0.658	
LBG	14	BK	2.566	632.	1053.70	0.600	0.024	0.523	-	0.695	
LBG	15	BK	2.566	889.	1053.70	0.844	0.028	0.592	-	0.800	FAIL
LBG	16	BK	2.566	695.	1053.70	0.660	0.025	0.360	-	0.870	
MEW	19	BK	2.533	13476.	1101.20	12.238	0.105	12.582	-	13.988	FAIL
GAW	17	BK	2.532	164.	1102.40	0.149	0.012	0.075	-	0.222	
GAW	21	BK	2.532	4820.	1102.40	4.372	0.063	-0.242	-	0.544	FAIL
2PI	22	BK	2.532	66.	1102.40	0.060	0.007	0.135	-	0.235	FAIL
GAW	24	BK	2.532	81.	1102.40	0.073	0.008	0.028	-	0.106	
GRB	201	BK	3.914	509.	1105.88	0.460	0.020	0.413	-	0.550	
GAW	201	BK	3.914	13.	1105.88	0.012	0.003	0.001	-	0.021	
GRB	202	BK	3.914	414.	1105.88	0.374	0.018	0.312	-	0.448	
GAW	202	BK	3.914	24.	1105.88	0.022	0.004	0.003	-	0.023	
GRB	203	BK	3.914	466.	1105.88	0.421	0.020	0.407	-	0.533	
GAW	203	BK	3.914	30.	1105.88	0.027	0.005	0.007	-	0.039	
GRB	204	BK	3.914	405.	1105.88	0.366	0.018	0.296	-	0.481	
GAW	204	BK	3.914	11.	1105.88	0.010	0.003	-0.002	-	0.022	
GRB	205	BK	3.915	334.	1104.20	0.302	0.017	0.255	-	0.396	
GAW	205	BK	3.915	7.	1104.20	0.006	0.002	-0.004	-	0.027	

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GRB	206	BK	3.915	464.	1104.20	0.420	0.020	0.400	-	0.494	
GAW	206	BK	3.915	9.	1104.20	0.008	0.003	-0.003	-	0.019	
GRB	207	BK	3.915	505.	1104.20	0.457	0.020	0.409	-	0.548	
GAW	207	BK	3.915	20.	1104.20	0.018	0.004	0.003	-	0.040	
GRB	208	BK	3.915	511.	1104.20	0.463	0.020	0.373	-	0.621	
GAW	208	BK	3.915	29.	1104.20	0.026	0.005	0.010	-	0.047	
GRB	209	BK	3.913	472.	1107.00	0.426	0.020	0.361	-	0.547	
GAW	209	BK	3.913	24.	1107.00	0.022	0.004	0.006	-	0.056	
GRB	210	BK	3.913	401.	1107.00	0.362	0.018	0.357	-	0.424	
GAW	210	BK	3.913	22.	1107.00	0.020	0.004	-0.007	-	0.028	
GRB	211	BK	3.913	472.	1107.00	0.426	0.020	0.274	-	0.658	
GAW	211	BK	3.913	29.	1107.00	0.026	0.005	0.005	-	0.032	
GRB	212	BK	3.913	436.	1107.00	0.394	0.019	0.348	-	0.449	
GAW	212	BK	3.913	14.	1107.00	0.013	0.003	-0.008	-	0.034	
GRB	213	BK	3.913	523.	1106.72	0.473	0.021	0.408	-	0.552	
GAW	213	BK	3.913	29.	1106.72	0.026	0.005	0.002	-	0.038	
GRB	214	BK	3.913	606.	1106.72	0.548	0.022	0.421	-	0.685	
GAW	214	BK	3.913	11.	1106.72	0.010	0.003	-0.005	-	0.027	
GRB	215	BK	3.913	460.	1106.72	0.416	0.019	0.345	-	0.484	
GAW	215	BK	3.913	14.	1106.72	0.013	0.003	0.000	-	0.032	
GRB	216	BK	3.913	470.	1106.72	0.425	0.020	0.412	-	0.471	
GAW	216	BK	3.913	18.	1106.72	0.016	0.004	0.004	-	0.033	
GRB	101	BK	3.916	1042.	1101.38	0.946	0.029	1.006	-	1.168	FAIL
GAW	101	BK	3.916	115.	1101.38	0.104	0.010	0.085	-	0.149	
GRB	102	BK	3.916	1648.	1101.38	1.496	0.037	1.461	-	1.670	
GAW	102	BK	3.916	94.	1101.38	0.085	0.009	0.060	-	0.133	
GRB	103	BK	3.916	1281.	1101.38	1.163	0.032	1.004	-	1.268	
GAW	103	BK	3.916	111.	1101.38	0.101	0.010	0.061	-	0.149	
GRB	104	BK	3.916	1156.	1101.38	1.050	0.031	0.980	-	1.135	
GAW	104	BK	3.916	75.	1101.38	0.068	0.008	0.062	-	0.096	
GRB	105	BK	3.916	1373.	1101.72	1.246	0.034	1.154	-	1.417	
GAW	105	BK	3.916	84.	1101.72	0.076	0.008	0.040	-	0.092	
GRB	106	BK	3.916	1670.	1101.72	1.516	0.037	1.366	-	1.724	
GAW	106	BK	3.916	77.	1101.72	0.070	0.008	0.013	-	0.151	
GRB	107	BK	3.916	1075.	1101.72	0.976	0.030	0.873	-	1.164	
GAW	107	BK	3.916	83.	1101.72	0.075	0.008	-0.006	-	0.188	
GRB	108	BK	3.916	1038.	1101.72	0.942	0.029	0.955	-	1.150	FAIL
GAW	108	BK	3.916	95.	1101.72	0.086	0.009	0.020	-	0.154	
GRB	109	BK	3.916	1170.	1101.72	1.062	0.031	0.894	-	1.190	
GAW	109	BK	3.916	77.	1101.72	0.070	0.008	0.051	-	0.086	
GRB	110	BK	3.916	1499.	1101.72	1.361	0.035	1.241	-	1.514	
GAW	110	BK	3.916	91.	1101.72	0.083	0.009	0.046	-	0.128	
GRB	111	BK	3.916	1160.	1101.72	1.053	0.031	0.929	-	1.161	
GAW	111	BK	3.916	123.	1101.72	0.112	0.010	0.078	-	0.156	
GRB	112	BK	3.916	1321.	1101.72	1.199	0.033	1.116	-	1.333	
GAW	112	BK	3.916	90.	1101.72	0.082	0.009	0.048	-	0.122	
GRB	113	BK	3.916	1076.	1101.87	0.977	0.030	0.884	-	1.143	
GAW	113	BK	3.916	122.	1101.87	0.111	0.010	0.096	-	0.146	
GRB	114	BK	3.916	1138.	1101.87	1.033	0.031	0.953	-	1.155	
GAW	114	BK	3.916	96.	1101.87	0.087	0.009	0.052	-	0.139	
GRB	115	BK	3.916	1081.	1101.87	0.981	0.030	0.863	-	1.121	
GAW	115	BK	3.916	111.	1101.87	0.101	0.010	0.081	-	0.142	
GRB	116	BK	3.916	1051.	1101.87	0.954	0.029	0.937	-	1.063	
GAW	116	BK	3.916	69.	1101.87	0.063	0.008	0.027	-	0.121	
LBG	1	SF	4.688	32303.	12.49	1.004	0.006	0.965	-	1.034	
LBG	2	SF	4.688	35048.	12.49	1.006	0.005	0.966	-	1.037	
LBG	3	SF	4.688	28150.	12.49	0.990	0.006	0.954	-	1.013	
LBG	4	SF	4.688	27193.	12.49	1.010	0.006	0.982	-	1.042	
LBG	9	SF	4.688	35429.	12.49	1.006	0.005	0.973	-	1.033	
LBG	10	SF	4.688	35995.	12.49	0.997	0.005	0.889	-	1.038	
LBG	11	SF	4.688	30801.	12.49	0.997	0.006	0.961	-	1.021	
LBG	12	SF	4.688	31093.	12.49	0.985	0.006	0.947	-	1.005	

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LBG	13	SF	4.688	29484.	12.49	1.042	0.006	1.013	-	1.076
LBG	14	SF	4.688	25154.	12.49	1.066	0.007	1.050	-	1.117
LBG	15	SF	4.688	29619.	12.49	1.028	0.006	1.002	-	1.066
LBG	16	SF	4.688	29576.	12.49	1.043	0.006	1.003	-	1.065
MEW	19	SF	4.688	567458.	12.49	1.041	0.001	0.983	-	1.044
GRB	209	SF	4.693	92502.	10.00	1.002	0.003	0.978	-	1.039
GRB	210	SF	4.693	94559.	10.00	0.994	0.003	0.968	-	1.028
GRB	211	SF	4.693	99482.	10.00	0.986	0.003	0.960	-	1.020
GRB	212	SF	4.693	95424.	10.00	0.997	0.003	0.967	-	1.026
GRB	213	SF	4.693	94912.	10.00	1.008	0.003	0.969	-	1.056
GRB	214	SF	4.693	93195.	10.00	0.987	0.003	0.965	-	1.042
GRB	215	SF	4.693	94882.	10.00	1.001	0.003	0.972	-	1.032
GRB	216	SF	4.693	94134.	10.00	1.002	0.003	0.976	-	1.037
GRB	205	SF	4.693	88651.	10.00	1.006	0.003	0.979	-	1.039
GRB	206	SF	4.693	91816.	10.00	1.008	0.003	0.975	-	1.035
GRB	207	SF	4.693	91311.	10.00	0.992	0.003	0.966	-	1.026
GRB	208	SF	4.693	100170.	10.00	0.995	0.003	0.964	-	1.024
GAW	209	SF	4.724	33938.	10.00	1.004	0.005	0.972	-	1.033
GAW	210	SF	4.724	34616.	10.00	0.982	0.005	0.960	-	1.019
GAW	211	SF	4.724	34633.	10.00	0.979	0.005	0.955	-	1.014
GAW	212	SF	4.724	34845.	10.00	0.971	0.005	0.951	-	1.010
GAW	213	SF	4.724	33875.	10.00	0.988	0.005	0.960	-	1.038
GAW	214	SF	4.724	34534.	10.00	0.991	0.005	0.971	-	1.031
GAW	215	SF	4.724	34295.	10.00	0.995	0.005	0.961	-	1.057
GAW	216	SF	4.724	34222.	10.00	0.993	0.005	0.966	-	1.031
GAW	201	SF	4.724	31953.	10.00	1.011	0.006	0.985	-	1.046
GAW	202	SF	4.724	33557.	10.00	1.022	0.006	0.979	-	1.040
GAW	203	SF	4.724	33754.	10.00	0.997	0.005	0.971	-	1.031
GAW	204	SF	4.724	33986.	10.00	0.999	0.005	0.963	-	1.022
GAW	205	SF	4.724	33397.	10.00	1.044	0.006	1.012	-	1.074
GAW	206	SF	4.724	29181.	10.00	1.042	0.006	1.004	-	1.066
GAW	207	SF	4.724	33387.	10.00	1.019	0.006	0.975	-	1.036
GAW	208	SF	4.724	35039.	10.00	0.991	0.005	0.962	-	1.022
GRB	101	SF	4.726	91788.	10.00	0.989	0.003	0.961	-	1.020
GRB	102	SF	4.726	94672.	10.00	0.986	0.003	0.954	-	1.018
GRB	103	SF	4.726	98064.	10.00	0.995	0.003	0.965	-	1.025
GRB	104	SF	4.726	74864.	10.00	0.991	0.004	0.955	-	1.014
GRB	105	SF	4.726	90950.	10.00	1.016	0.003	0.984	-	1.045
GRB	106	SF	4.726	94804.	10.00	1.015	0.003	0.987	-	1.048
GRB	107	SF	4.726	92852.	10.00	1.008	0.003	0.974	-	1.035
GRB	108	SF	4.726	101153.	10.00	1.017	0.003	0.978	-	1.039
GRB	109	SF	4.726	96984.	10.00	0.987	0.003	0.971	-	1.032
GRB	110	SF	4.726	96929.	10.00	1.002	0.003	0.969	-	1.029
GRB	111	SF	4.726	103657.	10.00	0.982	0.003	0.959	-	1.019
GRB	112	SF	4.726	100370.	10.00	0.981	0.003	0.956	-	1.015
GRB	113	SF	4.726	98405.	10.00	1.008	0.003	0.974	-	1.035
GRB	114	SF	4.726	94463.	10.00	1.003	0.003	0.969	-	1.029
GRB	115	SF	4.726	99299.	10.00	0.991	0.003	0.962	-	1.021
GRB	116	SF	4.726	96202.	10.00	1.008	0.003	0.971	-	1.031
GAW	101	SF	4.715	42063.	10.00	0.997	0.005	0.968	-	1.028
GAW	102	SF	4.715	44567.	10.00	1.001	0.005	0.970	-	1.030
GAW	103	SF	4.715	43990.	10.00	0.990	0.005	0.964	-	1.024
GAW	104	SF	4.715	44154.	10.00	1.003	0.005	0.967	-	1.027
GAW	105	SF	4.715	44834.	10.00	1.011	0.005	0.972	-	1.032
GAW	106	SF	4.715	39679.	10.00	0.998	0.005	0.972	-	1.032
GAW	107	SF	4.715	43472.	10.00	1.011	0.005	0.971	-	1.031
GAW	108	SF	4.715	44831.	10.00	1.003	0.005	0.970	-	1.030
GAW	109	SF	4.715	44316.	10.00	0.997	0.005	0.969	-	1.029
GAW	110	SF	4.715	44330.	10.00	1.002	0.005	0.971	-	1.031
GAW	111	SF	4.715	44475.	10.00	0.988	0.005	0.965	-	1.025
GAW	112	SF	4.715	44061.	10.00	1.001	0.005	0.971	-	1.031
GAW	113	SF	4.715	43203.	10.00	1.009	0.005	0.977	-	1.037

GAW	114	SF	4.715	44013.	10.00	1.010	0.005	0.981	-	1.042	
GAW	115	SF	4.715	43994.	10.00	1.000	0.005	0.978	-	1.039	
GAW	116	SF	4.715	43671.	10.00	1.009	0.005	0.976	-	1.036	
LBG	15	BK	4.715	161.	228.00	0.706	0.056	0.586	-	0.803	
MEW	19	BK	4.787	4304.	355.30	12.114	0.185	12.703	-	13.757	FAIL
GAW	17	SF	4.913	753635.	174.50	7.482	0.009	3.116	-	3.308	FAIL
GAW	21	SF	4.913	506617.	174.50	10.905	0.015	3.575	-	3.796	FAIL
GAW	24	SF	4.913	609309.	174.50	7.816	0.010	2.866	-	3.044	FAIL
GAW	17	SF	5.036	54078.	5.37	3.207	0.014	3.111	-	3.303	
GAW	21	SF	5.036	46165.	5.37	3.677	0.017	3.575	-	3.796	
GAW	24	SF	5.036	49962.	5.37	2.932	0.013	2.865	-	3.042	

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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

June 1, 1993

Ms. Jeanette Duncan
Westinghouse Hanford Company
Hanford Analytical Services Management
P.O. Box 1970
Richland WA 99352

Dear Ms. Duncan:

Enclosed are the standard factors and background data that you requested for TMA data packages 7136, 7131, 7116, and 7106. The counter QC information for alpha counting you requested is already contained in the data packages.

Please call if you have any further questions.

Yours sincerely,

N. Joseph Verville

N. Joseph Verville
Asst. Manager TMA/Norcal
Nuclear Projects

Enclosures: SF/backgrounds 7136, 7131, 7116, 7106

JUN 1993
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K. M. Pool

Additional missing data identified as of 4/17/93:

ANALYSIS	DETECTOR ID	MISSING DATA
Data Package ID: B07NF9-TMA-354 Lab Reporting Group: 7136 Lab: TMA/Norcal Project: Columbia River Sediment		
GROSS ALPHA/BETA	all detectors used for sample analysis	All SF and BK continuing calibration QC status
STRONTIUM-90	GRB209, GRB210, GRB211, GRB212, GRB205, GRB206, GRB207, GRB208	All BK continuing calibration QC status
PLUTONIUM (isotopic)	SS40, SS41, SS42, SS27, SS28, SS29, SS30, SS31, SS32, SS33, SS34, SS35, SS36, SS38, SS37, SS39, SS40	QC Status is not recorded on "Aspec Eff Summary Sheet"
AMERICIUM (isotopic)	SS41, SS42, SS27, SS28, SS28, SS29, SS30, SS31, SS32, SS33, SS34, SS39, SS40, SS47, SS50, SS49, SS48	QC Status is not recorded on "Aspec Eff Summary Sheet"

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Cross Counter Q.C. Status 03:09:37 23-FEB-93

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TUE

Status at this time

Detector		SF	GMT	BK	GMT	BK4.75	GMT	BK6.49	GMT
LBG	1	0.946	53.	0.552	53.	0.930FC	290.	0.663	214.
LBG	2	0.996	53.	0.551	53.	0.692	290.	0.705	214.
LBG	3	0.979	53.	0.492	53.	0.553	290.	0.479	214.
LBG	4	1.013	53.	0.735	53.	0.791	290.	0.768	214.
LBG	5	1.071NG	99.	0.363NG	31.	0.854	185.	0.578	281.
LBG	6	1.024NG	77.	0.791NG	31.	0.770	185.	0.665	281.
LBG	9	1.026	53.	0.536	53.	0.576	290.	0.587	214.
LBG	10	1.040	53.	0.559	53.	0.711	290.	0.620	214.
LBG	11	0.989	53.	0.529	53.	0.599	185.	0.564	214.
LBG	12	0.974	53.	0.637	53.	0.692	185.	0.599	214.
LBG	13	1.052	53.	0.506	53.	0.822	185.	0.564	214.
LBG	14	1.069	53.	0.579	53.	0.736	185.	0.623	214.
LBG	15	1.035	53.	0.652	53.	0.762	290.	0.785	214.
LBG	16	1.021	53.	0.551	53.	0.622	290.	0.589	214.
GAW	17	3.218	53.	0.132	53.	0.000	0.	0.000	0.
MEW	19	1.018	53.	13.082	53.	0.666	123.	0.777	123.
GAW	21	3.676	53.	0.053NG	52.	0.000	0.	0.000	0.
2PI	22	2.184	53.	0.172	53.	0.000	0.	0.000	0.
GAW	23	3.208	90.	0.018	32.	0.000	0.	0.000	0.
GAW	24	2.962	53.	0.066	53.	0.000	0.	0.000	0.
2PI	25	2.083	118.	1.520FC	8.	0.000	0.	0.000	0.
2PI	26	2.326	118.	0.171FC	8.	0.000	0.	0.000	0.
LSC	4	0.000	0.	0.000	0.	0.000	0.	0.000	0.
LSC	5	0.000	0.	0.000	0.	0.000	0.	0.000	0.
VLB	1	1.100	190.	0.289	190.	0.000	0.	0.000	0.
VLB	2	1.130	190.	0.246	190.	0.000	0.	0.000	0.
VLB	3	1.105FC	190.	0.236	190.	0.000	0.	0.000	0.
VLB	4	1.109	190.	0.291	190.	0.000	0.	0.000	0.
VLB	5	1.057	190.	0.219	190.	0.000	0.	0.000	0.
VLB	6	1.068	190.	0.246	190.	0.000	0.	0.000	0.
VLB	7	1.091	190.	0.196	190.	0.000	0.	0.000	0.
VLB	8	1.213	190.	0.251	190.	0.000	0.	0.000	0.
GAW	101	0.995	53.	0.115	51.	0.000	0.	0.000	0.
GAW	102	1.001	53.	0.076	51.	0.000	0.	0.000	0.
GAW	103	0.992	53.	0.092	51.	0.000	0.	0.000	0.
GAW	104	1.004	53.	0.067	51.	0.000	0.	0.000	0.
GAW	105	1.007	53.	0.056	51.	0.000	0.	0.000	0.
GAW	106	0.999	53.	0.071	51.	0.000	0.	0.000	0.
GAW	107	1.003	53.	0.074	51.	0.000	0.	0.000	0.
GAW	108	1.001	53.	0.071	51.	0.000	0.	0.000	0.
GAW	109	1.005	53.	0.060	51.	0.000	0.	0.000	0.
GAW	110	1.001	53.	0.079	51.	0.000	0.	0.000	0.
GAW	111	0.998	53.	0.109	51.	0.000	0.	0.000	0.
GAW	112	1.001	53.	0.068	51.	0.000	0.	0.000	0.
GAW	113	1.008	53.	0.087	51.	0.000	0.	0.000	0.
GAW	114	1.010	53.	0.069	51.	0.000	0.	0.000	0.
GAW	115	1.006	53.	0.099	51.	0.000	0.	0.000	0.
GAW	116	1.004	53.	0.068	51.	0.000	0.	0.000	0.
GRB	101	0.991	53.	0.969	51.	0.000	0.	0.000	0.
GRB	102	0.985	53.	1.472	51.	0.000	0.	0.000	0.
GRB	103	0.991	53.	1.105	51.	0.000	0.	0.000	0.
GRB	104	0.989	53.	0.969	51.	0.000	0.	0.000	0.
GRB	105	1.011	53.	1.199	51.	0.000	0.	0.000	0.
GRB	106	1.014	53.	1.454	51.	0.000	0.	0.000	0.

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GRB	107	1.003	53.	0.988	51.	0.000	0.	0.000	0.
GRB	108	1.009	53.	1.003	51.	0.000	0.	0.000	0.
GRB	109	0.996	53.	0.994	51.	0.000	0.	0.000	0.
GRB	110	0.997	53.	1.362	51.	0.000	0.	0.000	0.
GRB	111	0.989	53.	0.994	51.	0.000	0.	0.000	0.
GRB	112	0.990	53.	1.159	51.	0.000	0.	0.000	0.
GRB	113	1.006	53.	0.959	51.	0.000	0.	0.000	0.
GRB	114	1.000	53.	1.008	51.	0.000	0.	0.000	0.
GRB	115	0.996	53.	0.956	51.	0.000	0.	0.000	0.
GRB	116	1.005	53.	0.956	51.	0.000	0.	0.000	0.
GAW	201	1.017	53.	0.015	52.	0.000	0.	0.000	0.
GAW	202	1.017	53.	0.013	52.	0.000	0.	0.000	0.
GAW	203	1.000	53.	0.022	52.	0.000	0.	0.000	0.
GAW	204	0.996	53.	0.014	52.	0.000	0.	0.000	0.
GAW	205	1.040	53.	0.012	50.	0.000	0.	0.000	0.
GAW	206	1.037	53.	0.010	50.	0.000	0.	0.000	0.
GAW	207	1.014	53.	0.013	50.	0.000	0.	0.000	0.
GAW	208	1.000	53.	0.061	50.	0.000	0.	0.000	0.
GAW	209	1.003	53.	0.031	50.	0.000	0.	0.000	0.
GAW	210	0.991	53.	0.014	50.	0.000	0.	0.000	0.
GAW	211	0.985	53.	0.079	50.	0.000	0.	0.000	0.
GAW	212	0.984	53.	0.025	50.	0.000	0.	0.000	0.
GAW	213	0.987	53.	0.026	52.	0.000	0.	0.000	0.
GAW	214	0.980	53.	0.019	52.	0.000	0.	0.000	0.
GAW	215	0.999	53.	0.029	52.	0.000	0.	0.000	0.
GAW	216	0.989	53.	0.032	52.	0.000	0.	0.000	0.
GRB	201	0.997	53.	0.491	52.	0.000	0.	0.000	0.
GRB	202	0.994	53.	0.442	52.	0.000	0.	0.000	0.
GRB	203	0.991	53.	0.491	52.	0.000	0.	0.000	0.
GRB	204	0.995	53.	0.453	52.	0.000	0.	0.000	0.
GRB	205	1.005	53.	0.404	50.	0.000	0.	0.000	0.
GRB	206	1.004	53.	0.495	50.	0.000	0.	0.000	0.
GRB	207	0.996	53.	0.461	50.	0.000	0.	0.000	0.
GRB	208	0.996	53.	0.616	50.	0.000	0.	0.000	0.
GRB	209	1.007	53.	0.514	50	0.000	0.	0.000	0.
GRB	210	1.001	53.	0.435	50.	0.000	0.	0.000	0.
GRB	211	0.994	53.	0.776	50.	0.000	0.	0.000	0.
GRB	212	0.999	53.	0.501	50.	0.000	0.	0.000	0.
GRB	213	0.977	53.	0.548NG	52.	0.000	0.	0.000	0.
GRB	214	0.991	53.	0.509	52.	0.000	0.	0.000	0.
GRB	215	0.995	53.	0.430	52.	0.000	0.	0.000	0.
GRB	216	1.000	53.	0.439	52.	0.000	0.	0.000	0.

Recent Q.C. counts

Detector	QC	Date	Gross Counts	Min.	Q.C. Value	Sigma	Control limits
LBG 1	BK	53.020	560.	967.50	0.579	0.024	0.408 - 0.705
LBG 2	BK	53.020	544.	967.50	0.562	0.024	0.370 - 0.718
LBG 3	BK	53.020	484.	967.50	0.500	0.023	0.294 - 0.713
LBG 4	BK	53.020	644.	967.50	0.666	0.026	0.629 - 0.848
LBG 9	BK	53.020	542.	967.50	0.560	0.024	0.373 - 0.703
LBG 10	BK	53.020	477.	967.50	0.493	0.023	0.436 - 0.694
LBG 11	BK	53.020	518.	967.50	0.535	0.024	0.447 - 0.613
LBG 12	BK	53.020	589.	967.50	0.609	0.025	0.569 - 0.714
LBG 13	BK	53.020	483.	967.50	0.499	0.023	0.386 - 0.633
LBG 14	BK	53.020	515.	967.50	0.532	0.023	0.506 - 0.665
LBG 15	BK	53.020	559.	967.50	0.578	0.024	0.445 - 0.856
LBG 16	BK	53.020	486.	967.50	0.502	0.023	0.459 - 0.644
MEW 19	BK	53.020	12492.	967.50	12.912	0.116	12.144 - 14.097
GAW 17	BK	53.006	136.	988.80	0.138	0.012	0.065 - 0.197
2PI 22	BK	53.006	168.	988.80	0.170	0.013	0.115 - 0.225

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GAW	24	BK		53.006	71.	988.80	0.072	0.009	0.033	-	0.097
LSC	4	H	DIR	53.344	363.	84.00	4.320	0.227	3.525	-	5.379
LSC	4	Ni	LSC	52.290	742.	100.00	7.420	0.272	5.042	-	12.218
LSC	4	H	OXY	51.863	3160.	600.00	5.267	0.094	3.376	-	8.683
LSC	5	H	OXY	54.214	3975.	800.00	4.969	0.079	-0.008	-	11.163
LSC	4	H	DST	52.937	236.	50.00	4.720	0.307	3.822	-	5.036
LSC	4	C	OXY	53.043	6622.	600.00	11.037	0.136	6.459	-	20.668
LSC	5	C	OXY	53.935	2777.	400.00	6.943	0.132	1.895	-	15.929
LBG	1	SF		53.698	54880.	19.97	0.944	0.004	0.919	-	0.976
LBG	2	SF		53.698	56236.	19.97	1.002	0.004	0.966	-	1.026
LBG	3	SF		53.698	45222.	19.97	0.985	0.005	0.949	-	1.008
LBG	4	SF		53.698	43494.	19.97	1.010	0.005	0.983	-	1.044
LBG	9	SF		53.698	54978.	19.97	1.036	0.004	0.994	-	1.055
LBG	10	SF		53.698	53994.	19.97	1.062	0.005	1.007	-	1.070
LBG	11	SF		53.698	50079.	19.97	0.980	0.004	0.960	-	1.019
LBG	12	SF		53.698	50643.	19.97	0.966	0.004	0.946	-	1.004
LBG	13	SF		53.698	47092.	19.97	1.043	0.005	1.021	-	1.084
LBG	14	SF		53.698	39434.	19.97	1.087	0.005	1.056	-	1.121
LBG	15	SF		53.698	46779.	19.97	1.040	0.005	1.001	-	1.073
LBG	16	SF		53.698	47313.	19.97	1.042	0.005	0.989	-	1.050
MEW	19	SF		53.698	929438.	19.97	1.016	0.001	0.988	-	1.049
LSC	4	Rn	LSC	51.015	324.	100.00	3.240	0.180	2.904	-	4.153
GAW	209	SF		53.734	33761.	10.00	1.009	0.005	0.972	-	1.032
GAW	210	SF		53.734	33972.	10.00	1.001	0.005	0.960	-	1.020
GAW	211	SF		53.734	34310.	10.00	0.988	0.005	0.956	-	1.015
GAW	212	SF		53.734	33917.	10.00	0.997	0.005	0.953	-	1.012
GAW	213	SF		53.734	33472.	10.00	1.000	0.005	0.957	-	1.016
GAW	214	SF		53.734	34440.	10.00	0.994	0.005	0.950	-	1.009
GAW	215	SF		53.734	33887.	10.00	1.007	0.005	0.968	-	1.028
GAW	216	SF		53.734	34530.	10.00	0.984	0.005	0.921	-	1.058
GAW	201	SF		53.734	31771.	10.00	1.017	0.006	0.986	-	1.047
GAW	202	SF		53.734	33508.	10.00	1.024	0.006	0.986	-	1.047
GAW	203	SF		53.734	33470.	10.00	1.006	0.005	0.968	-	1.028
GAW	204	SF		53.734	33665.	10.00	1.008	0.005	0.965	-	1.025
GAW	205	SF		53.734	33742.	10.00	1.033	0.006	1.006	-	1.076
GAW	206	SF		53.734	29411.	10.00	1.034	0.006	1.005	-	1.067
GAW	207	SF		53.734	33623.	10.00	1.012	0.006	0.984	-	1.045
GAW	208	SF		53.734	34561.	10.00	1.005	0.005	0.969	-	1.029
GRB	201	SF		53.710	193099.	21.70	0.992	0.002	0.967	-	1.027
GRB	202	SF		53.710	197844.	21.70	0.993	0.002	0.964	-	1.024
GRB	203	SF		53.710	206732.	21.70	0.990	0.002	0.961	-	1.020
GRB	204	SF		53.710	156764.	21.71	0.997	0.003	0.965	-	1.025
GRB	205	SF		53.710	192066.	21.70	1.008	0.002	0.974	-	1.035
GRB	206	SF		53.710	199710.	21.70	1.006	0.002	0.973	-	1.033
GRB	207	SF		53.710	197145.	21.70	0.997	0.002	0.966	-	1.026
GRB	208	SF		53.710	216111.	21.69	1.000	0.002	0.966	-	1.025
GRB	209	SF		53.710	198997.	21.72	1.011	0.002	0.976	-	1.037
GRB	210	SF		53.710	204686.	21.72	0.998	0.002	0.971	-	1.031
GRB	211	SF		53.710	213970.	21.71	0.995	0.002	0.965	-	1.024
GRB	212	SF		53.710	206966.	21.72	0.998	0.002	0.969	-	1.029
GRB	213	SF		53.710	210489.	21.73	0.987	0.002	0.938	-	1.019
GRB	214	SF		53.710	201336.	21.73	0.992	0.002	0.961	-	1.021
GRB	215	SF		53.710	206821.	21.73	0.998	0.002	0.964	-	1.024
GRB	216	SF		53.710	204983.	21.73	1.000	0.002	0.969	-	1.029
GAW	101	SF		53.703	41963.	10.00	1.000	0.005	0.965	-	1.025
GAW	102	SF		53.703	44597.	10.00	1.000	0.005	0.972	-	1.032
GAW	103	SF		53.703	43824.	10.00	0.994	0.005	0.963	-	1.022
GAW	104	SF		53.703	44180.	10.00	1.003	0.005	0.975	-	1.035
GAW	105	SF		53.703	44767.	10.00	1.012	0.005	0.976	-	1.036
GAW	106	SF		53.703	39561.	10.00	1.000	0.005	0.969	-	1.029
GAW	107	SF		53.703	43584.	10.00	1.009	0.005	0.971	-	1.031
GAW	108	SF		53.703	44869.	10.00	1.002	0.005	0.970	-	1.030

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GAW	109	SF		53.703	44188.	10.00	1.000	0.005	0.974	-	1.034	
GAW	110	SF		53.703	44431.	10.00	1.000	0.005	0.971	-	1.031	
GAW	111	SF		53.703	44184.	10.00	0.995	0.005	0.968	-	1.027	
GAW	112	SF		53.703	43993.	10.00	1.003	0.005	0.970	-	1.030	
GAW	113	SF		53.703	43076.	10.00	1.012	0.005	0.977	-	1.038	
GAW	114	SF		53.703	43667.	10.00	1.018	0.005	0.978	-	1.039	
GAW	115	SF		53.703	43511.	10.00	1.011	0.005	0.976	-	1.036	
GAW	116	SF		53.703	43297.	10.00	1.015	0.005	0.972	-	1.033	
GRB	101	BK		51.953	2593.	2500.89	1.037	0.020	0.848	-	1.090	
GAW	101	BK		51.953	287.	2500.89	0.115	0.007	0.070	-	0.158	
GRB	102	BK		51.953	3583.	2500.89	1.433	0.024	1.306	-	1.647	
GAW	102	BK		51.953	188.	2500.89	0.075	0.005	0.040	-	0.110	
GRB	103	BK		51.953	2672.	2500.89	1.068	0.021	0.973	-	1.239	
GAW	103	BK		51.953	212.	2500.89	0.085	0.006	0.058	-	0.127	
GRB	104	BK		51.953	2391.	2500.89	0.956	0.020	0.808	-	1.132	
GAW	104	BK		51.953	160.	2500.89	0.064	0.005	0.041	-	0.093	
GRB	105	BK		51.952	3145.	2501.70	1.257	0.022	1.077	-	1.306	
GAW	105	BK		51.952	143.	2501.70	0.057	0.005	0.027	-	0.083	
GRB	106	BK		51.952	3546.	2501.70	1.417	0.024	1.353	-	1.576	
GAW	106	BK		51.952	182.	2501.70	0.073	0.005	0.029	-	0.108	
GRB	107	BK		51.952	2486.	2501.70	0.994	0.020	0.909	-	1.068	
GAW	107	BK		51.952	199.	2501.70	0.080	0.006	0.035	-	0.115	
GRB	108	BK		51.952	2376.	2501.70	0.950	0.019	0.946	-	1.066	
GAW	108	BK		51.952	200.	2501.70	0.080	0.006	0.041	-	0.097	
GRB	109	BK		51.952	2391.	2501.65	0.956	0.020	0.888	-	1.100	
GAW	109	BK		51.952	147.	2501.65	0.059	0.005	0.017	-	0.101	
GRB	110	BK		51.952	3418.	2501.65	1.366	0.023	1.240	-	1.473	
GAW	110	BK		51.952	183.	2501.65	0.073	0.005	0.045	-	0.113	
GRB	111	BK		51.952	2539.	2501.65	1.015	0.020	0.866	-	1.117	
GAW	111	BK		51.952	268.	2501.65	0.107	0.007	0.073	-	0.146	
GRB	112	BK		51.952	2877.	2501.65	1.150	0.021	1.108	-	1.208	
GAW	112	BK		51.952	153.	2501.65	0.061	0.005	0.051	-	0.084	
GRB	113	BK		51.952	2396.	2502.08	0.958	0.020	0.842	-	1.084	
GAW	113	BK		51.952	239.	2502.08	0.096	0.006	0.041	-	0.134	
GRB	114	BK		51.952	2457.	2502.08	0.982	0.020	0.814	-	1.213	
GAW	114	BK		51.952	162.	2502.08	0.065	0.005	0.037	-	0.103	
GRB	115	BK		51.952	2286.	2502.08	0.914	0.019	0.875	-	1.046	
GAW	115	BK		51.952	230.	2502.08	0.092	0.006	0.079	-	0.122	
GRB	116	BK		51.952	2364.	2502.08	0.945	0.019	0.859	-	1.059	
GAW	116	BK		51.952	167.	2502.08	0.067	0.005	0.026	-	0.109	
GAW	17	SF		53.770	534428.	53.26	3.221	0.004	3.120	-	3.313	
GAW	21	SF		53.770	450978.	53.26	3.734	0.006	3.561	-	3.781	
2PI	22	SF		53.770	425805.	53.26	2.186	0.003	2.118	-	2.249	
GAW	24	SF		53.770	485998.	53.26	2.991	0.004	2.869	-	3.047	
GAW	21	SF		53.818	315522.	36.49	3.657	0.007	3.581	-	3.802	
GAW	21	SF		53.844	110838.	12.57	3.585	0.011	3.576	-	3.797	
LSC	5	C	OXY	56.214	6187.	800.00	7.734	0.098	1.502	-	16.041	
LSC	4	H	DST	55.226	177.	50.00	3.540	0.266	3.804	-	5.134	FAIL
GRB	109	SF		53.876	96112.	10.00	0.996	0.003	0.966	-	1.026	
GRB	110	SF		53.876	97181.	10.00	0.999	0.003	0.967	-	1.027	
GRB	111	SF		53.876	102674.	10.00	0.991	0.003	0.960	-	1.019	
GRB	112	SF		53.876	99458.	10.00	0.990	0.003	0.960	-	1.020	
GRB	113	SF		53.876	98657.	10.00	1.006	0.003	0.975	-	1.036	
GRB	114	SF		53.876	94175.	10.00	1.006	0.003	0.970	-	1.030	
GRB	115	SF		53.876	98437.	10.00	0.999	0.003	0.966	-	1.026	
GRB	116	SF		53.876	96421.	10.00	1.006	0.003	0.975	-	1.035	
GRB	101	SF		53.876	91214.	10.00	0.996	0.003	0.961	-	1.020	
GRB	102	SF		53.876	94064.	10.00	0.992	0.003	0.955	-	1.014	
GRB	103	SF		53.876	98349.	10.00	0.992	0.003	0.961	-	1.021	
GRB	104	SF		53.876	75325.	10.00	0.985	0.004	0.960	-	1.020	
GRB	105	SF		53.876	91525.	10.00	1.010	0.003	0.981	-	1.042	
GRB	106	SF		53.876	94866.	10.00	1.015	0.003	0.984	-	1.045	

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GRB	107	SF	53.876	93350.	10.00	1.003	0.003	0.973	-	1.033
GRB	108	SF	53.876	101817.	10.00	1.011	0.003	0.978	-	1.039

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Golder Associates Inc.

4104-148th Avenue, NE
Redmond, WA 98052
Telephone (206) 883-0777
Fax (206) 882-5498

Golder Associates

May 19, 1993

Our ref: 923-E018
S/O/2263

Westinghouse Hanford Company
Hanford Analytical Services Management
345 Hills, MSIN H4-29
Richland, Washington 99352

ATTENTION: Ms. Brianna Colley

RE: COLUMBIA RIVER SEDIMENT DATA VALIDATION, TASK ORDER S93-18, TRANSMITTAL OF DATA VALIDATION PACKAGES

Dear Ms. Colley:

Enclosed are three radiochemistry analytical data package including associated data validation documentation for the referenced project. The data packages included in this shipment are:

- B07NC8-TMA-355
- B07NB6-TMA-351
- B07NF9-TMA-354

The validation documentation is located at the front of the data package folder.

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Kent M. Angelos
Task Manager

for

Donald M. Caldwell
Project Director

Enclosures

cc: Steve Weiss, WHC
P.K. Brockman, SAIC-Kennewick

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MEMORANDUM

TO: Columbia River Sediment Project QA Record May 11, 1993

FR: Christina Jensen, Golder Associates Inc.

RE: Radiochemical Analysis Data Validation Summary for B07NF9-TMA-354

INTRODUCTION

This memo presents the results of data validation on data package B07NF9-TMA-354 consisting of 14 sediment samples submitted for radiochemical analysis. The samples were analyzed by TMA/NORCAL laboratory using routine laboratory protocols. A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA
B07NF9	11/21/92	SEDIMENT
B07NG3	11/22/92	SEDIMENT
B07NG4	11/22/92	SEDIMENT
B07NG5	11/22/92	SEDIMENT
B07NG6	11/22/92	SEDIMENT
B07NG8	11/23/92	SEDIMENT
B07NG9	11/23/92	SEDIMENT
B07NH0	11/23/92	SEDIMENT
B07NH1	11/23/92	SEDIMENT
B07NH2	11/23/92	SEDIMENT
B07NH3	11/23/92	SEDIMENT
B07NH4	11/23/92	SEDIMENT
B07NH5	11/24/92	SEDIMENT
B07NH6	11/24/92	SEDIMENT

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (Bechtold 1992). Attachments 1 through 4 to this memo provide the data validation supporting documentation and a summary of the validated results.

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met with the exception of chemical yield recoveries as summarized in "Major Deficiencies".

Sample Result Verification. All sample results were supported in the raw data with no data correction necessary.

Detection Limits. Detection limit goals were met for all analyses.

Completeness. The data package was complete for all requested analyses.

A total of fourteen (14) samples were validated in this data set with a total of 308 determinations reported. Out of the 308 determinations reported a total of 302 determinations were deemed valid which results in a completeness of 99 percent. This completeness percentage meets the work plan objectives of 90%.

MAJOR DEFICIENCIES

Tracer Yields

The uranium tracer recovery was below the 30% control limit for samples B07NG3 and B07NG4. Therefore, the associated sample results for uranium 233/234, 235 and 238 have been qualified as unusable (R for detects, UR for non-detects).

MINOR DEFICIENCIES

There were no minor deficiencies identified during validation of the data.

REFERENCES

WHC, 1993, Westinghouse Hanford Company, Validation of Columbia River Sediment Data, Statement of Work, Revision 0, January 1993. Westinghouse Hanford Company, Richland, Washington.

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

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

U - Indicates the analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.

UJ - Indicates the analyte was analyzed for and not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.

J - Indicates the analyte was analyzed for and detected. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

UR - Indicates the analyte was analyzed for and not detected; however, due to an identified quality control deficiency the data are unusable.

R - Indicates the analyte was analyzed and detected; however, due to an identified quality control deficiency the data are unusable.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: 7136	REVIEWER: oj	DATE: 4/27/93	PAGE 1 OF 1
COMMENTS: Radiochemistry			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
U-233/234	K OR UK	B07N63, B07N64	Chem. yield
U-235	↓	B07N63, B07N64	< 30% ↓
U-238	↓	B07N63, B07N64	↓

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ATTACHMENT 3

AS QUALIFIED DATA SUMMARY

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N212017-01

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NF9

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-01	Client sample id	B07NF9
Dept sample id	7136-001	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	37.8	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.4	3.9	4	10	J	80A
Gross Beta	Beta	12	4.1	6	10		80B
Uranium 233/234		0.77	0.26	0.1	0.3		U
Uranium 235	15117-96-1	0.042	0.042	0.2	0.3	U	U
Uranium 238	7440-61-1	0.96	0.27	0.1	0.3		U
Plutonium 238	13981-16-3	0.004	0.013	0.03	0.05	U	PU
Plutonium 239/240		0.004	0.008	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.004	0.012	0.02	0.05	U	AM
Strontium 90	10098-97-2	-0.15	0.23	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.1				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	U		0.07	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.08		U	GAM
Cesium 137	10045-97-3	0.45	0.073		0.05		GAM
Europium 152	14683-23-9	0.32	0.17		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.90	0.15				GAM
Thorium 228	14274-82-9	1.4	0.11				GAM
Thorium 232	7440-29-1	0.91	0.26				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-02

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG3

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-02	Client sample id	B07NG3
Dept sample id	7136-002	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	34.2	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS Q	TEST
Gross Alpha	Alpha	3.5	4.4	6	10	U	80A
Gross Beta	Beta	14	4.5	6	10		80B
Uranium 233/234		0.45	0.23	0.2	0.3	— R	U
Uranium 235	15117-96-1	0.14	0.14	0.3	0.3	U UR	U
Uranium 238	7440-61-1	0.75	0.30	0.2	0.3	— R	U
Plutonium 238	13981-16-3	-0.016	0.013	0.04	0.05	U	PU
Plutonium 239/240		0.013	0.013	0.02	0.05	U	PU
Americium 241	14596-10-2	0.006	0.017	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.009	1.7	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.3				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.38	0.083		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.76	0.093		0.05		GAM
Europium 152	14683-23-9	0.50	0.12		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.64	0.14				GAM
Thorium 228	14274-82-9	0.85	0.079				GAM
Thorium 232	7440-29-1	0.84	0.29				GAM

5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-03

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG4

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-03	Client sample id	B07NG4
Dept sample id	7136-003	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	25.5	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	4.3	4.2	5	10	U	80A
Gross Beta	Beta	15	4.0	5	10		80B
Uranium 233/234		0.35	0.22	0.3	0.3	— R	U
Uranium 235	15117-96-1	0.17	0.17	0.3	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.53	0.30	0.3	0.3	— R	U
Plutonium 238	13981-16-3	-0.008	0.011	0.03	0.05	U	PU
Plutonium 239/240		0.005	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	0.002	0.022	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.091	2.1	0.9	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.2				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	U		0.07	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.19	0.076		0.05		GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.09	0.1	U	GAM
Radium 226	13982-67-7	0.90	0.12				GAM
Thorium 228	14274-82-9	1.3	0.087				GAM
Thorium 232	7440-29-1	1.2	0.24				GAM

5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-04

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG5

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-04	Client sample id	B07NG5
Dept sample id	7136-004	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	31.3	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	2.6	3.5	5	10	U	80A
Gross Beta	Beta	13	3.9	5	10		80B
Uranium 233/234		0.49	0.20	0.2	0.3		U
Uranium 235	15117-96-1	0.019	0.039	0.1	0.3	U	U
Uranium 238	7440-61-1	0.41	0.17	0.1	0.3		U
Plutonium 238	13981-16-3	-0.009	0.019	0.04	0.05	U	PU
Plutonium 239/240		0.016	0.014	0.02	0.05	U	PU
Americium 241	14596-10-2	0.016	0.023	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.13	0.25	0.9	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.1				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.12	0.064		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	1.5	0.11		0.05		GAM
Europium 152	14683-23-9	1.5	0.17		0.1		GAM
Europium 154	15585-10-1	0.21	0.17		0.1		GAM
Radium 226	13982-67-7	0.65	0.11				GAM
Thorium 228	14274-82-9	0.88	0.094				GAM
Thorium 232	7440-29-1	0.93	0.22				GAM

SJ 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-05

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG6

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-05	Client sample id	B07NG6
Dept sample id	7136-005	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	34.1	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS Q	TEST
Gross Alpha	Alpha	2.6	3.8	5	10	U	80A
Gross Beta	Beta	9.3	3.7	5	10	J	80B
Uranium 233/234		0.85	0.30	0.2	0.3		U
Uranium 235	15117-96-1	0.024	0.048	0.2	0.3	U	U
Uranium 238	7440-61-1	0.71	0.26	0.2	0.3		U
Plutonium 238	13981-16-3	0.002	0.021	0.04	0.05	U	PU
Plutonium 239/240		0.002	0.009	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.002	0.019	0.04	0.05	U	AM
Strontium 90	10098-97-2	0.009	0.17	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.3				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	0.37	0.084		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.08		U	GAM
Cesium 137	10045-97-3	0.79	0.097		0.05		GAM
Europium 152	14683-23-9	0.56	0.13		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.66	0.14				GAM
Thorium 228	14274-82-9	0.90	0.082				GAM
Thorium 232	7440-29-1	0.94	0.30				GAM

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Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-06

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG8

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-06	Client sample id	B07NG8
Dept sample id	7136-006	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	0.2	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	2.1	3.0	4	10	U	80A
Gross Beta	Beta	30	4.7	5	10		80B
Uranium 233/234		0.22	0.15	0.2	0.3	J	U
Uranium 235	15117-96-1	0.030	0.060	0.2	0.3	U	U
Uranium 238	7440-61-1	0.20	0.15	0.2	0.3	J	U
Plutonium 238	13981-16-3	0.013	0.026	0.05	0.05	U	PU
Plutonium 239/240		-0.003	0.013	0.03	0.05	U	PU
Americium 241	14596-10-2	0.009	0.017	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.41	0.72	0.9	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	23	1.3				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM
Europium 152	14683-23-9	U		0.07	0.1	U	GAM
Europium 154	15585-10-1	U		0.05	0.1	U	GAM
Radium 226	13982-67-7	0.24	0.079				GAM
Thorium 228	14274-82-9	0.46	0.077				GAM
Thorium 232	7440-29-1	0.34	0.20				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-07

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NG9

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-07	Client sample id	B07NG9
Dept sample id	7136-007	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	21.7	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	4.7	3.5	4	10	J	80A
Gross Beta	Beta	10	4.2	6	10		80B
Uranium 233/234		0.77	0.24	0.1	0.3		U
Uranium 235	15117-96-1	0.045	0.046	0.2	0.3	U	U
Uranium 238	7440-61-1	0.49	0.20	0.1	0.3		U
Plutonium 238	13981-16-3	-0.012	0.031	0.07	0.05	U	PU
Plutonium 239/240		0.019	0.023	0.04	0.05	U	PU
Americium 241	14596-10-2	0.009	0.023	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.094	1.9	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.1				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.36	0.078		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.83	0.095		0.05		GAM
Europium 152	14683-23-9	0.92	0.17		0.1		GAM
Europium 154	15585-10-1	0.16	0.16		0.1		GAM
Radium 226	13982-67-7	0.69	0.12				GAM
Thorium 228	14274-82-9	1.1	0.097				GAM
Thorium 232	7440-29-1	0.98	0.27				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-08

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH0

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-08	Client sample id	B07NH0
Dept sample id	7136-008	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	29.0	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	2.9	4.0	5	10	U	80A
Gross Beta	Beta	18	4.2	5	10		80B
Uranium 233/234		0.88	0.27	0.1	0.3		U
Uranium 235	15117-96-1	0.065	0.087	0.2	0.3	U	U
Uranium 238	7440-61-1	0.70	0.23	0.1	0.3		U
Plutonium 238	13981-16-3	0.006	0.023	0.05	0.05	U	PU
Plutonium 239/240		0.011	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	0.016	0.026	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.035	0.28	1	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.2				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.076	0.058		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.16	0.058		0.05		GAM
Europium 152	14683-23-9	0.30	0.096		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.67	0.11				GAM
Thorium 228	14274-82-9	0.99	0.074				GAM
Thorium 232	7440-29-1	0.92	0.22				GAM

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Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-09

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH1

SDG 7136
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N212017-09
Dept sample id 7136-009
Received 12/02/92
% moisture 16.7

Client sample id B07NH1
Matrix SOIL
Collected 11/23/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	7.7	4.5	4	10	J	80A
Gross Beta	Beta	14	4.2	6	10		80B
Uranium 233/234		0.90	0.31	0.2	0.3		U
Uranium 235	15117-96-1	0.15	0.10	0.2	0.3	U	U
Uranium 238	7440-61-1	0.98	0.32	0.2	0.3		U
Plutonium 238	13981-16-3	-0.006	0.017	0.04	0.05	U	PU
Plutonium 239/240		0.014	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	0.013	0.022	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.001	2.3	1	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.3				GAM
Iron 59		U		0.6	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	0.10	0.072		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.7		U	GAM
Cesium 134	17967-70-9	0.089	0.078				GAM
Cesium 137	10045-97-3	0.91	0.098		0.05		GAM
Europium 152	14683-23-9	0.79	0.14		0.1		GAM
Europium 154	15585-10-1	U		0.3	0.1	U	GAM
Radium 226	13982-67-7	0.98	0.17				GAM
Thorium 228	14274-82-9	1.5	0.10				GAM
Thorium 232	7440-29-1	1.2	0.36				GAM

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Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/19/93

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N212017-10

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH2

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-10	Client sample id	B07NH2
Dept sample id	7136-010	Matrix	SOIL
Received	12/02/92	Collected	11/23/92
% moisture	4.2	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	11	5.5	6	10		80A
Gross Beta	Beta	22	4.4	5	10		80B
Uranium 233/234		2.6	0.50	0.1	0.3		U
Uranium 235	15117-96-1	0.080	0.081	0.2	0.3	U	U
Uranium 238	7440-61-1	2.0	0.43	0.1	0.3		U
Plutonium 238	13981-16-3	0.009	0.031	0.05	0.05	U	PU
Plutonium 239/240		0.012	0.012	0.02	0.05	U	PU
Americium 241	14596-10-2	0.002	0.023	0.04	0.05	U	AM
Strontium 90	10098-97-2	0.17	0.32	1	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.2				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		4		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.7		U	GAM
Cesium 134	17967-70-9	U		0.09		U	GAM
Cesium 137	10045-97-3	U		0.07	0.05	U	GAM
Europium 152	14683-23-9	U		0.2	0.1	U	GAM
Europium 154	15585-10-1	U		0.1	0.1	U	GAM
Radium 226	13982-67-7	1.3	0.14				GAM
Thorium 228	14274-82-9	2.5	0.12				GAM
Thorium 232	7440-29-1	2.3	0.35				GAM

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Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8737

N212017-11

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH3

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-11	Client sample id	B07NH3
Dept sample id	7136-011	Matrix	SOIL
Received	12/02/92	Collected	11/24/92
% moisture	20.7	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	7.4	4.2	4	10	J	80A
Gross Beta	Beta	12	3.8	5	10		80B
Uranium 233/234		0.51	0.22	0.2	0.3		U
Uranium 235	15117-96-1	0.15	0.13	0.2	0.3	U	U
Uranium 238	7440-61-1	0.75	0.26	0.2	0.3		U
Plutonium 238	13981-16-3	-0.018	0.025	0.06	0.05	U	PU
Plutonium 239/240		0	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.009	0.02	0.05	U	AM
Strontium 90	10098-97-2	-0.23	0.24	0.9	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.1				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Radium 226	13982-67-7	0.67	0.10				GAM
Thorium 228	14274-82-9	0.94	0.064				GAM
Thorium 232	7440-29-1	0.83	0.17				GAM

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Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

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N212017-12

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH4

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-12	Client sample id	B07NH4
Dept sample id	7136-012	Matrix	SOIL
Received	12/02/92	Collected	11/24/92
% moisture	31.9	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	3.3	4.0	5	10	U	80A
Gross Beta	Beta	19	4.2	5	10		80B
Uranium 233/234		0.80	0.24	0.1	0.3		U
Uranium 235	15117-96-1	0.019	0.038	0.1	0.3	U	U
Uranium 238	7440-61-1	0.69	0.23	0.1	0.3		U
Plutonium 238	13981-16-3	0	0.023	0.05	0.05	U	PU
Plutonium 239/240		0.009	0.012	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.015	0.03	0.05	U	AM
Strontium 90	10098-97-2	0	1.5	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	17	1.3				GAM
Iron 59		U		0.5	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	U		0.07	0.05	U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Radium 226	13982-67-7	0.82	0.12				GAM
Thorium 228	14274-82-9	1.1	0.076				GAM
Thorium 232	7440-29-1	1.0	0.24				GAM

5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8739

N212017-13

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH5

SDG 7136
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N212017-13
Dept sample id 7136-013
Received 12/02/92
% moisture 25.4

Client sample id B07NH5
Matrix SOIL
Collected 11/24/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.3	4.4	5	10	J	80A
Gross Beta	Beta	17	4.6	6	10		80B
Uranium 233/234		0.49	0.21	0.1	0.3		U
Uranium 235	15117-96-1	0.020	0.041	0.2	0.3	U	U
Uranium 238	7440-61-1	0.30	0.14	0.1	0.3		U
Plutonium 238	13981-16-3	-0.012	0.023	0.05	0.05	U	PU
Plutonium 239/240		0	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0.011	0.018	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.087	0.60	0.7	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.96				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.25	0.057		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.50	0.068		0.05		GAM
Europium 152	14683-23-9	0.32	0.099		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.59	0.10				GAM
Thorium 228	14274-82-9	0.78	0.11				GAM
Thorium 232	7440-29-1	0.51	0.22				GAM

5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/19/93

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N212017-14

TMA NORCAL
REPORTING GROUP 7136

DATA SHEET

B07NH6

SDG	7136	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N212017-14	Client sample id	B07NH6
Dept sample id	7136-014	Matrix	SOIL
Received	12/02/92	Collected	11/24/92
% moisture	23.6	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	1.6	3.4	5	10	U	80A
Gross Beta	Beta	16	4.0	5	10		80B
Uranium 233/234		0.44	0.22	0.2	0.3		U
Uranium 235	15117-96-1	0	0.063	0.2	0.3	U	U
Uranium 238	7440-61-1	0.36	0.21	0.2	0.3		U
Plutonium 238	13981-16-3	-0.011	0.029	0.07	0.05	~~U~~ ~~UR~~ UPU	
Plutonium 239/240		0	0.007	0.03	0.05	~~U~~ ~~UR~~ UPU	
Americium 241	14596-10-2	0.010	0.030	0.06	0.05	~~U~~ ~~UR~~ UAM	
Strontium 90	10098-97-2	0.069	0.19	0.7	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.1				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.20	0.062		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.54	0.071		0.05		GAM
Europium 152	14683-23-9	0.32	0.086		0.1		GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	0.54	0.10				GAM
Thorium 228	14274-82-9	0.59	0.061				GAM
Thorium 232	7440-29-1	0.60	0.21				GAM

BJ 4/19/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/19/93

9613492.8741

N212017-16

TMA NORCAL
REPORTING GROUP 7136

REAGENT BLANK

Reagent Blank

SDG 7136
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N212017-16
Dept sample id 7136-016
Matrix SOIL
Material

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	-0.001	3.6	6	10	U	80A
Gross Beta	Beta	-0.73	3.1	5	10	U	80B
Uranium 233/234		0.060	0.061	0.2	0.3	U	U
Uranium 235	15117-96-1	0	0.073	0.3	0.3	U	U
Uranium 238	7440-61-1	0	0.060	0.2	0.3	U	U
Plutonium 238	13981-16-3	0.005	0.010	0.02	0.05	U	PU
Plutonium 239/240		0	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	0.019	0.024	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.070	0.23	0.8	2	U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		0.2		U	GAM
Iron 59		U		0.04	0.05	U	GAM
Chromium 51	14392-02-0	U		0.1		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Zinc 65	17982-39-3	U		0.02		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Cesium 134	17967-70-9	U		0.02		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM
Europium 152	14683-23-9	U		0.03	0.1	U	GAM
Europium 154	15585-10-1	U		0.02	0.1	U	GAM
Radium 226	13982-67-7	U		0.04		U	GAM
Thorium 228	14274-82-9	U		0.03		U	GAM
Thorium 232	7440-29-1	U		0.07		U	GAM

5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/19/93

9613492.8742

N212017-19

TMA NORCAL
REPORTING GROUP 7136

REAGENT BLANK

Reagent Blank

SDG 7136
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N212017-19
Dept sample id 7136-019

Matrix SOIL
Material

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Americium 241	14596-10-2	0	0.012	0.03	0.05	U	AM
GAMMA SCAN ANALYTES							

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/19/93

9613492.8743

N212017-15

TMA NORCAL

REPORTING GROUP 7136

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7136
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N212017-15
Dept sample id 7136-015

Matrix SOIL
Material

PARAMETER	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ADDED pCi/G	2σ ERR pCi/G	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	180	18	5	10		80A	225	9.0	80	73-127	
Gross Beta	140	8.8	5	10		80B	160	6.4	88	78-122	
Uranium 233/234	4.5	0.96	0.4	0.3		U	5.21	0.21	86	71-129	
Uranium 235	0.49	0.27	0.3	0.3		U	0.530	0.042	92	22-178	
Uranium 238	5.5	1.2	0.3	0.3		U	5.21	0.21	106	64-136	
Plutonium 238	-0.015	0.029	0.06	0.05	U	PU	0	0			
Plutonium 239/240	1.1	0.16	0.04	0.05		PU	1.17	0.047	94	77-123	
Americium 241	1.8	0.22	0.07	0.05		AM	1.69	0.068	107	78-123	
Strontium 90	17	0.97	0.8	2		Y	15.0	0.60	113	79-121	
GAMMA SCAN ANALYTES											
Potassium 40	U		0.3		U	GAM					
Iron 59	U		0.05	0.05	U	GAM					
Chromium 51	U		0.1		U	GAM					
Cobalt 60	0.22	0.042		0.05		GAM	0.245	0.010	90	67-133	
Zinc 65	U		0.06		U	GAM					
Ruthenium 106	U		0.2		U	GAM					
Cesium 134	U		0.03		U	GAM					
Cesium 137	0.17	0.034		0.05		GAM	0.165	0.007	103	61-139	
Europium 152	U		0.04	0.1	U	GAM					
Europium 154	U		0.03	0.1	U	GAM					
Radium 226	U		0.05		U	GAM					
Thorium 228	U		0.04		U	GAM					
Thorium 232	U		0.1		U	GAM					

5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 03/19/93

9613492.8744

N212017-18

TMA NORCAL

REPORTING GROUP 7136

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7136
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N212017-18
Dept sample id 7136-018

Matrix SOIL
Material

PARAMETER	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ADDED pCi/G	2σ ERR pCi/G	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Americium 241 GAMMA SCAN ANALYTES	1.1	0.11	0.03	0.05		AM	1.13	~~0.045~~ 0.068	~~97~~ 94	81-119	

ij 5/18/93

ij 5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 03/19/93

9613492.8745

N212017-17

TMA NORCAL

REPORTING GROUP 7136

REPLICATE

B07NF9

SDG 7136
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N212017-17
Dept sample id 7136-017

ORIGINAL
Lab sample id N212017-01
Dept sample id 7136-001
Received 12/02/92
% moisture 37.8

Client sample id B07NF9
Matrix SOIL
Collected 11/22/92
Chain of custody id 199806 226

PARAMETER	REPLICATE pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ORIGINAL pCi/G	2σ ERR (COUNT)	MDA pCi/G	QUALI-FIERS	RPD %	3σ TOT	PRO LIMI
Gross Alpha	6.6	4.0	4	10	J	80A	5.4	3.9	4	J	20	146	
Gross Beta	11	3.7	5	10		80B	12	4.1	6		9	79	
Uranium 233/234	0.86	0.28	0.1	0.3		U	0.77	0.26	0.1		11	71	
Uranium 235	0.068	0.091	0.2	0.3	U	U	0.042	0.042	0.2	U	-		
Uranium 238	0.90	0.29	0.1	0.3		U	0.96	0.27	0.1		6	65	
Plutonium 238	0	0.016	0.03	0.05	U	PU	0.004	0.013	0.03	U	-		
Plutonium 239/240	0.005	0.011	0.02	0.05	U	PU	0.004	0.008	0.02	U	-		
Americium 241	0.004	0.013	0.02	0.05	U	AM	-0.004	0.012	0.02	U	-		
Strontium 90	0.19	0.24	0.9	2	U	Y	-0.15	0.23	0.8	U	-		
GAMMA SCAN ANALYTES													
Potassium 40	15	1.1				GAM	13	1.1			14	37	
Iron 59	U		0.4	0.05	U	GAM	U		0.5	U	-		
Chromium 51	U		3		U	GAM	U		3	U	-		
Cobalt 60	U		0.06	0.05	U	GAM	U		0.07	U	-		
Zinc 65	U		0.2		U	GAM	U		0.2	U	-		
Ruthenium 106	U		0.5		U	GAM	U		0.6	U	-		
Cesium 134	U		0.06		U	GAM	U		0.08	U	-		
Cesium 137	0.46	0.067		0.05		GAM	0.45	0.073			2	46	
Europium 152	0.30	0.099		0.1		GAM	0.32	0.17			6	101	
Europium 154				0.1		GAM	U		0.2	U	0	215	
Radium 226	0.85	0.12				GAM	0.90	0.15			6	46	
Thorium 228	0.99	0.072				GAM	1.4	0.11			34	37	
Thorium 232	0.86	0.17				GAM	0.91	0.26			6	62	

QC: 11221-11225

cjs 5/10/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.23
Report date 03/19/93

9613492.8746

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

9613492.8747

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

PROJECT: Columbia River Sediments	VALIDATOR: aj	DATE: 4/16/93
LABORATORY: TMA - Norcal	DATA PACKAGE: B07NF9 - TMA - 354	
SAMPLES/MATRIX: Sediments: B07NF9, B07NG3, B07NG4, B07NG5, B07NG6, B07NG8, B07NG9, B07NH0, B07NH1, B07NH2, B07NH3, B07NH4, B07NH5, B07NH6 (14)		

1. Completeness

1.1 Completeness Checklist (Complete the appropriate checklist for each analysis type and attach). Not required for Col River Sed Data.

2. Calibration

2.1 Initial Calibration

Was instrument calibrated within specified time period or annually? (Yes) No N/A

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

Was each detector used for the associated data calibrated? (Yes) No N/A

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

Are calibration standards NIST traceable or equivalent? (Yes) No N/A

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

Were calibration standards expired? Yes No (N/A)

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

Comments:

9613492.8748

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

2.2 Continuing Calibration

Is check source identified by activity and radionuclides? Yes No N/A

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

Has check source been counted daily? Yes No N/A

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

Are check source counts within ±3S control limits? Yes No N/A

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

Have background counts been performed at least weekly and before and after all field and QC samples associated with the SDG? Yes No N/A

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

Are background counts within ±3S control limits? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

3. Blanks

Have reagent/method/field blanks been analyzed with the SDG? Yes No N/A

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

Are positive results reported in the reagent/method/field blanks? Yes No N/A

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

Can blank results be verified/calculated properly? Yes No N/A

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

4. Detection Limits and Sample Results

Can LLDs and MDAs be verified? Yes No N/A

If NO, qualify all results as estimated detects (J) or estimated nondetects (UJ).

Do reported results meet the detection limit requirements? Yes No N/A

Note discrepancies in the validation report narrative.

Can reported results be verified? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

5. Radiometric and Gravimetric Yields

Were spikes/tracers/chemical yields analyzed in each SDG and/or sample as appropriate for the analytical method? Yes No N/A

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

Was a field blank used for the spike/tracer/chemical yield analysis? Yes No N/A

If YES, note in the validation narrative.

Is spike/tracer/chemical yield recovery within the limits of 30-105% for sample results <4X the spike activity? Yes No N/A See Comment

Verify the spike recoveries and qualify associated results as follows:

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

Comments: Yield for uranium analysis low for samples B07N63 and B07N64. Results qualified as R ~~J~~ or UR.

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

6. Duplicate Samples and Analyses

Has at least one duplicate analysis been performed for every 10 samples in the SDG? — See comment — Yes **(No)** N/A

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

Has the field blank been used for duplicate or MS/MSD analysis? — Yes **(No)** N/A

Are RPD values ≤35% for results >5X the LLD and within ±2X the LLD for results <5X the LLD? — **(Yes)** No N/A

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

Comments: One duplicate sample was analyzed for a batch of 14 samples. No data qualification was done.

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

7. Laboratory Control Samples

Are LCS results within the control limits of 80-120% — Yes No N/A

If NO, qualify results as follows:

%R:	<50%	50-79%	>120%
Results < LLD:	R	UJ	R
Results > LLD:	R	J	R

Has at least one LCS been analyzed with the SDG? — Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

8. Holding Times

Have all samples/analyses been completed within 5 half-lives or 180 days, whichever comes first? **Yes No N/A**

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9. Method Specific and Other Quality Control

9.1 Gas Proportional Counters

Are field and QC sample preparations outside the range of the self absorption curves? 4/28/93 Yes No N/A

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

Are initial detector efficiencies <20%? Yes No N/A

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

Have statistical tests been performed routinely (at least weekly)? Yes No N/A

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

Have stability verifications been performed after each gas change? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.2 Alpha Spectroscopy

Has detector system been calibrated across the energy range of interest? Yes No N/A

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

Is detector resolution adequate to identify each peak centroid? Yes No N/A

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

Is resolution at least 20 keV FWHM? Yes No N/A

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

Do check source efficiencies agree within 5% of initial calibration efficiencies or are they within the control limits or ±3S of the mean? Yes No N/A

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

Was each sample spiked with a tracer? Yes No N/A

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

Are tracer recoveries within the control limits of 30 to 105%? Yes No N/A

If NO, qualify all results as follows:

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

Comments: Uranium recovery low (<30%) for samples B07N63 and B07N64, results qualified as R or UR

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.3 Gamma Spectroscopy

Does efficiency calibration approximate a smooth semi-log curve? Yes No N/A

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

Have geometry or matrix factors been accounted for in all analyses? Yes No N/A

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

Does the detector calibration cover the energy range of interest and at least 0 to 2 MeV? Yes No N/A

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

Is resolution of the detector system adequate and less than 5 FWHM? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.4 Alpha Emitting Radium Isotopes

Have single radium isotopes (Ra-223, Ra-224, Ra-226) been reported? Yes No N/A

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

Can time from sample precipitation to counting be verified? Yes No N/A

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

Have barium interferences been identified and accounted for? Yes No N/A

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

Has counting efficiency for Ra-226 been determined for each SDG? Yes No N/A

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

Have blanks been analyzed with each group to check for possible radium contamination in the reagents? Yes No N/A

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

If sample was preserved at collection has analysis been completed within 180 days or 5 half-lives? Yes No N/A

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

If samples were not preserved, were samples received within 5 days of sampling? Yes No N/A

- Were samples preserved at the laboratory upon receipt? Yes No N/A
- Were samples held after preservation for at least 16 days? Yes No N/A

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

Comments:_____

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.5 Radium 226 Analysis using Scintillation (Lucas) Cell Counting

Is calibration data present and can it be associated with the samples? Yes No N/A

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

Was the counting system calibrated each day that samples were analyzed? Yes No N/A

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

Was the counting system calibrated after replacing the scintillation cell? Yes No N/A

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

Were blanks analyzed with each sample group to check for radium contamination in reagents? Yes No N/A

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

If sample was preserved at collection has analysis been completed within 180 days or 5 half-lives? Yes No N/A

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

If samples were not preserved, were samples received within 5 days of sampling? Yes No N/A

- Were samples preserved at the laboratory upon receipt? Yes No N/A
- Were samples held after preservation for at least 16 days? Yes No N/A

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

Comments:_____

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.6 Tritium Analysis by Liquid Scintillation Counting

Do calibration standard matrices match the sample matrices? Yes No N/A

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

Has at least one calibration standard been processed with the samples? Yes No N/A

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

Have results for counting efficiency determination been provided? Yes No N/A

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

Do tritium levels in the blanks exceed the MDA? Yes No N/A

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

Have blanks been analyzed with each sample run to check for potential contamination in the chemical reagents? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.7 Fluorometric Analysis of Uranium

Has the laboratory provided evidence that cation and anion interferences are negligible for the matrix or that matrix interferences have been accounted for? Yes No N/A

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

Has the laboratory provided a description of the method of fusion standardization or provided data supporting fusion standardization? Yes No N/A

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

Was calibration performed immediately prior to sample analysis? Yes No N/A

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

Comments:

9613492.8762

Golder Associates

SUBJECT Calcs. B07NF9-TMA-354

Job No. Ref. 983-E018 | Made by CJ | Checked | Reviewed | Date 4/23/93 | Sheet 1 of 6

GROSS α+β

B07NF9 $\frac{.143-(.006\times1.132)}{1-(.006\times.281)} = .1362 = .1364$ (α) $\frac{1.132-(.281\times.143)}{1-(.006\times.281)} =$ (β)

pCi/g = .136/2.22×.113×.1 = 5.438 1.0937/2.22×.416×.1 = 1

MDA $\frac{4.66\times\sqrt{\frac{.136}{100}}}{2.22\times.113\times.1} = 6.85$ $\frac{4.66\times\sqrt{\frac{1.093}{100}}}{2.22\times.416\times.1} = 5.27$

B07NG3 cpm $\frac{.09-(.006\times1.265)}{1-(.006\times.291)} = .0826$ $\frac{1.265-(.291\times.090)}{1-(.006\times.291)} = 1.24$

pCi/g = .0826/2.22×.106×.1 = 3.5 pCi/g = 1.241/2.22×.414×.1 =

MDA = $\frac{4.66\times\sqrt{\frac{.0826}{100}}}{2.22\times.106\times.1} = .56914$ MDA $\frac{4.66\sqrt{\frac{1.241}{100}}}{2.22\times.414\times.1} = 5.64$

B07NG4

cpm = $\frac{.118-(.006\times1.422)}{1-(.006\times.281)} = .1097$ $\frac{1.422-(.281\times.118)}{1-(.006\times.281)} = 1.3912$

pCi/g = .1097/2.22×.115×.1 = 4.29 pCi/g 1.3912/2.22×.416×.1 = 15.

MDA = $\frac{4.66\times\sqrt{\frac{.1097}{100}}}{2.22\times.115\times.1} = 6.04$ MDA = $\frac{4.66\sqrt{\frac{1.392}{100}}}{2.22\times.416\times.1} = 5.95$

LCS $\frac{4.355-(.006\times14.156)}{1-(.006\times.288)} = 4.2775$ $\frac{14.156\times(.288\times4.355)}{1-(.006\times.288)} = 12.92$

pCi/g = 4.2775/2.22×.108×1.0 = 17.84 12.92/2.22×.414×1 = 14.056

MDA $\frac{4.66\times\sqrt{\frac{4.2775}{100}}}{2.22\times.108\times1} = 4.01$ $\frac{4.66\sqrt{\frac{12.92}{100}}}{2.22\times.414} = 1.822$

Blank $\frac{0-(.006\times.060)}{1-(.006\times.305)} = -.0004$ $\frac{-.060-(.305\times0)}{1-(.006\times.305)} = -.0661$

MDA of neg #? pCi/g = .0004/2.22×.094A = .0019 pCi/g = -.0661/2.22×.41×1 =

MDA $\frac{4.66\times\sqrt{\frac{-.0004}{100}}}{}$ MDA = $\frac{4.66\times\sqrt{\frac{-.0661}{100}}}{2.22\times.41\times1} = 5.1$

9613492.8763

Golder Associates

SUBJECT Calcs B07NF9-TMA-354		
Job No. Ref. 923-E018	Made by C Jensen Checked Reviewed	Date 4/26/93 Sheet 2 of 6

Gross α+β contd

α

Replicate

cpm $\frac{.193-(.006\times1.038)}{1-(.006\times.274)} = .1871$

pCi/g = .1871 / 2.22 x .128 x .1 = 6.583

MDA =

$\frac{4.66\times\sqrt{\frac{.1871}{100}}}{2.22\times.128\times.1} = \cancel{.3267}\ 7.09$

β

$\frac{1.038-(.274\times.193)}{1-(.006\times.274)} =$

.9867/2.22x.419x.1 = 10.6

$\frac{4.66\times\sqrt{\frac{.9867}{100}}}{2.22\times.419\times.1} = 4.97$

Sr90 calcs

B07NF9 product = .7440

dpm/spl = 0

MDA =

$\frac{4.66\times\sqrt{\frac{.4947}{33}\times1.859}}{2.22\times.744} = 0.642$

B07NG3 prod = .7112

dpm/spl = -.010677 x 1.8590 = -.0198

MDA =

$\frac{4.66\sqrt{\frac{.4558}{33}\times1.859}}{2.22\times.7112} = .644$

B07NG4 prod = .6831

dpm/spl = -.10868 x 1.859 = -.2020

MDA =

$\frac{4.66\times\sqrt{\frac{.4937}{33}\times1.859}}{2.22\times.6831} = .6987$

Blank prod = .7549

dpm/spl = 0

$\frac{4.66\times1.859\times\sqrt{\frac{.5027}{33}}}{2.22\times.7549} =$ ..

LCS prod = .7414

dpm/spl = 20.276 x 1.859 = 37.6931

MDA =

$\frac{4.66\times\sqrt{\frac{.443}{33}}\ \text{missing}\times1.859}{2.22\times.7414} = .6098$

Rep. prod = .6918

dpm/spl = .2281x1.859 = .4

$\frac{4.66\times1.859\times\sqrt{\frac{.4275}{33}}}{2.22\times.6918} = .6$

~~5 4/27/93 Step + blank LCS background info missing to recalc MDA~~

9613492.3764

Golder Associates

SUBJECT	Calcs B07NF9 - TMA-354	
Job No. / Ref.	Made by / Checked / Reviewed: C Jensen	Date 4/26/93 / Sheet 3 of 6

Uranium B07NF9

U238

$\frac{56 \div 1}{26.167 / 2.22} = 0.96$

U235

$\frac{2}{26.167 / 2.22} = .0344$

U233

$\frac{45}{26.167 / 2.22} = .7747$

MDA $\frac{4.66 \times \sqrt{0}}{26.167 \times 2.22 \times 1} = .0802$

$\frac{4.66 \times \sqrt{0}}{26.167 \times 2.22} = .0802$

.0802

B07N63

U238

$\frac{27}{16.117 / 2.22} = .754$

U235

$\frac{4}{16.117 / 2.22} = .1118$

U233

$\frac{16}{16.117 / 2.22} = .4472$

MDA $= \frac{4.66 \times \sqrt{0}}{16.117 \times 2.22} = .1302$

$\frac{4.66\sqrt{0}}{16.117 \times 2.22} = .1302$

$\frac{4.66\sqrt{1}}{16.117 \times 2.22} = .2603$

B07N64

U238

$\frac{15}{12.704 / 2.22} = .5319$

U235

$\frac{4}{12.704 / 2.22} = .1418$

U233

$\frac{10}{12.704 / 2.22} = .3546$

MDA $\frac{4.66\sqrt{0}}{12.704 \times 2.22} = .1652$

.1652

$\frac{4.66\sqrt{1}}{12.704 \times 2.22} = .165$

LCS U238

$\frac{205}{16.687 / 2.22} = 5.5338$

U235

$\frac{15}{16.687 / 2.22} = .4049$

U238

$\frac{165}{16.687 / 2.22} = 4.454$

MDA

$\frac{4.66\sqrt{1}}{16.687 \times 2.22 \times 1} = .1258$

MDA $\frac{4.66\sqrt{0}}{16.687 \times 2.22 \times 1} = .1258$

$\frac{4.66\sqrt{3}}{16.687 \times 2.22} = .2$

Blank U238

0

U235

0

U233

$\frac{2}{14.981 / 2.22} = .0601$

MDA $\frac{4.66\sqrt{0}}{14.981 \times 2.22} = .1401$

.1401

MDA = .1401

9613492.8765

Golder Associates

SUBJECT Calcs B07NF9-TMA-354		
Job No. 923-E018 Ref.	Made by C Jensen Checked Reviewed	Date 4/26/93 Sheet 4 of 6

Uranium calcs cont'd -
replicate U238 U235 U233

$\frac{\frac{48}{23.991}}{2.22} = .9012$ $\frac{\frac{3}{23.991}}{2.22} = .0563$ $\frac{\frac{46}{23.991}}{2.22} = .8637$

MDA $\frac{4.66\sqrt{1}}{23.991 \times 2.22} = .0875$ $\frac{4.66\sqrt{0}}{23.991 \times 2.22} = .0875$ $= .0875$

Plutonium
B07NF9 Pu 239 Pu 238

$\frac{\frac{2}{212.73}}{2.22} = .0678$ $\frac{\frac{2}{212.73}}{2.22} = .0678$

MDA $\frac{4.66\sqrt{1}}{212.73 \times 2.22} = .0099$ $\frac{4.66\sqrt{4}}{212.73 \times 2.22} = .0197$

B07N63 Pu 239 Pu 238

$\frac{\frac{4}{140.03}}{2.22} = .0129$ $\frac{\frac{-5}{140.03}}{2.22} = -.0161$

MDA
$\frac{4.66\sqrt{1}}{140.03 \times 2.22} = .0150$ $\frac{4.66\sqrt{5}}{140.03 \times 2.22} = .0335$

B07N64 Pu 239 Pu 238

$\frac{\frac{2}{169.89}}{2.22} = .0053$ $\frac{\frac{-3}{169.89}}{2.22} = .0080$

MDA $\frac{4.66\sqrt{1}}{169.89 \times 2.22} = .0124$ $\frac{4.66\sqrt{4}}{169.89 \times 2.22} = .0247$

LCS Pu 239 Pu 238

$\frac{\frac{305}{123.56}}{2.22} = 1.1119$ $\frac{\frac{-4}{123.56}}{2.22} = -.0146$

MDA $= \frac{4.66\sqrt{3}}{123.56 \times 2.22 \times 1} = .0294$ $\frac{4.66\sqrt{9}}{123.56 \times 2.22} = .0570$

9613492.8766

Golder Associates	SUBJECT Calcs B07NF9 - TMA-354		
	Job No. 923-E018 Ref.	Made by C Jensen Checked Reviewed	Date 4/26/93 Sheet 5 of 6

Plutonium Calcs contd -

Blank Pu 239

0

MDA $\frac{4.66\sqrt{1}}{174.84 \times 2.22} = .0120$

Pu 238

$\frac{2}{174.84} = .0052$

$\frac{4.66\sqrt{1}}{174.84 \times 2.22} = .0120$

Replicate Pu 239

$\frac{2}{165.98} = .0054$

MDA = $\frac{4.66\sqrt{1}}{165.98 \times 2.22} = .0126$

Pu 238

0

$\frac{4.66\sqrt{4}}{165.98 \times 2.22} = .0253$

Americium

B07NF9

$\frac{-2}{222.68} = -.004$

MDA $\frac{4.66\sqrt{4}}{222.68 \times 2.22} = .0189$

B07NG3

$\frac{-3}{215.21} = -.0063$

MDA $\frac{4.66\sqrt{4}}{215.21 \times 2.22} = .0195$

B07NG4

$\frac{1}{203.1} = .0022$

MDA $\frac{4.66\sqrt{9}}{203.1 \times 2.22} = .031$

LCS $\frac{470}{117.5} = 1.8018$

MDA $\frac{4.66\sqrt{11}}{117.5 \times 2.22} = .0593$ yield out see new calc

Blank $\frac{8}{187.55} = .0197$

MDA $\frac{4.66\sqrt{6}}{187.55 \times 2.22} = .0274$

Replicate $\frac{2}{205.72} = .0044$

MDA $\frac{4.66\sqrt{3}}{205.72 \times 2.22} = .0177$

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Golder Associates

SUBJECT	Palis B67NF9-TMA-354	
Job No. Ref. 923-E018	Made by Checked C Jensen Reviewed	Date 4/26/93 Sheet 6 of 6

Am calc. contd
LCS rerun

$$\frac{\frac{515}{218.84}}{2.22} = 1.0601$$

$$MDA = \frac{4.6675}{218.84 \times 2.22 \times 1} = .0214$$

9613492.6768

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

June 1, 1993

Ms. Jeanette Duncan
Westinghouse Hanford Company
Hanford Analytical Services Management
P.O. Box 1970
Richland WA 99352

Dear Ms. Duncan:

Enclosed are the standard factors and background data that you requested for TMA data packages 7136, 7131, 7116, and 7106. The counter QC information for alpha counting you requested is already contained in the data packages.

Please call if you have any further questions.

Yours sincerely,

N. Joseph Verville

N. Joseph Verville
Asst. Manager TMA/Norcal
Nuclear Projects

Enclosures: SF/backgrounds 7136, 7131, 7116, 7106

JUN 1993
RECEIVED
K. M. Pool

Additional Missing Data Identified as of 4/29/93:

ANALYSIS	DETECTOR OR SAMPLE ID	MISSING DATA
Data Package ID: B07FF7-TMA-380 Lab. Reporting Group: 7106 Lab: TMA/Norcal Project: 200-BP-1		
Isotopic Plutonium	SS12, SS14, SS23, SS24, SS25, SS26, SS27, SS28 through SS29	QC status is not recorded on the "Aspec Eff Summary Sheet"
Uranium	All Samples	SOP detailing calibration procedures and sample result calculations for Laser Phosphorimetry method
Technetium-99	LBG1 through LBG4, LBG10 through LBG14	Background QC check data is missing

ANALYSIS	DETECTOR OR SAMPLE ID	MISSING DATA
Data Package ID: B07FG0-TMA-374 Lab Reporting Group: 7108 Lab: TMA/Norcal Project: 200-BP-1		
Isotopic Plutonium	SS12, SS14, SS23, SS24, SS25, SS26, SS27, SS28 through SS46	QC status is not recorded on the "Aspec Eff Summary Sheet"
Uranium	All Samples	SOP detailing calibration procedures and sample result calculations for Laser Phosphorimetry method
Gross Alpha and Beta	All detectors used for sample analysis	No continuing calibration or background check QC status information reported.

ANALYSIS	DETECTOR OR SAMPLE ID	MISSING DATA
Data Package ID: B079P8-TMA-363 Lab Reporting Group: 7116 Lab: TMA/Norcal Project: 200-BP-1		
Isotopic Plutonium	SS27, SS28, and SS31 through SS37	QC status is not recorded on the "Aspec Eff Summary Sheet"

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Gross Counter Q.C. Status 03:15:53 05-JAN-93

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TUE

Status at this time

Detector		SF	GMT	BK	GMT	BK4.75	GMT	BK6.49	
LBG	1	0.999	4.	0.632	2.	0.930FC	290.	0.663	214.
LBG	2	1.005	4.	0.541	2.	0.692	290.	0.705	214.
LBG	3	0.983	4.	0.510	2.	0.553	290.	0.479	214.
LBG	4	1.012	4.	0.732	2.	0.791	290.	0.768	214.
LBG	5	1.071NG	99.	0.368NG	225.	0.854	185.	0.578	281.
LBG	6	1.024NG	77.	0.791NG	76.	0.770	185.	0.665	281.
LBG	9	1.002	4.	0.647	2.	0.576	290.	0.587	214.
LBG	10	0.966	4.	0.593	2.	0.711	290.	0.620	214.
LBG	11	0.992	4.	0.537	2.	0.599	185.	0.564	214.
LBG	12	0.977	4.	0.635	2.	0.692	185.	0.599	214.
LBG	13	1.044	4.	0.538	2.	0.822	185.	0.564	214.
LBG	14	1.081	4.	0.607	2.	0.736	185.	0.623	214.
LBG	15	1.034	4.	0.692	4.	0.762	290.	0.785	214.
LBG	16	1.035	4.	0.618	2.	0.622	290.	0.589	214.
GAW	17	3.207	5.	0.151	2.	0.000	0.	0.000	0.
MEW	19	1.017	4.	13.230NG	4.	0.666	123.	0.777	123.
GAW	21	3.686	5.	0.122NG	2.	0.000	0.	0.000	0.
2PI	22	2.177NG	365.	0.188NG	2.	0.000	0.	0.000	0.
GAW	23	3.208	90.	0.018	32.	0.000	0.	0.000	0.
GAW	24	2.951	5.	0.069	2.	0.000	0.	0.000	0.
2PI	25	2.083	118.	0.107NG	180.	0.000	0.	0.000	0.
2PI	26	2.326	118.	0.199NG	180.	0.000	0.	0.000	0.
LSC	4	0.000	0.	0.000	0.	0.000	0.	0.000	0.
LSC	5	0.000	0.	0.000	0.	0.000	0.	0.000	0.
VLB	1	1.100	190.	0.289	190.	0.000	0.	0.000	0.
VLB	2	1.130	190.	0.246	190.	0.000	0.	0.000	0.
VLB	3	1.105FC	190.	0.236	190.	0.000	0.	0.000	0.
VLB	4	1.109	190.	0.291	190.	0.000	0.	0.000	0.
VLB	5	1.057	190.	0.219	190.	0.000	0.	0.000	0.
VLB	6	1.068	190.	0.246	190.	0.000	0.	0.000	0.
VLB	7	1.091	190.	0.196	190.	0.000	0.	0.000	0.
VLB	8	1.213	190.	0.251	190.	0.000	0.	0.000	0.
GAW	101	0.999	4.	0.116	3.	0.000	0.	0.000	0.
GAW	102	1.000	4.	0.098	3.	0.000	0.	0.000	0.
GAW	103	0.993	4.	0.106	3.	0.000	0.	0.000	0.
GAW	104	0.997	4.	0.077	3.	0.000	0.	0.000	0.
GAW	105	1.003	4.	0.065	3.	0.000	0.	0.000	0.
GAW	106	1.001	4.	0.075	3.	0.000	0.	0.000	0.
GAW	107	1.003	4.	0.081	3.	0.000	0.	0.000	0.
GAW	108	1.000	4.	0.080	3.	0.000	0.	0.000	0.
GAW	109	0.999	4.	0.068	3.	0.000	0.	0.000	0.
GAW	110	1.002	4.	0.088	3.	0.000	0.	0.000	0.
GAW	111	0.995	4.	0.118	3.	0.000	0.	0.000	0.
GAW	112	1.001	4.	0.086	3.	0.000	0.	0.000	0.
GAW	113	1.008	4.	0.120	3.	0.000	0.	0.000	0.
GAW	114	1.012	4.	0.093	3.	0.000	0.	0.000	0.
GAW	115	1.006	4.	0.110	3.	0.000	0.	0.000	0.
GAW	116	1.006	4.	0.071	3.	0.000	0.	0.000	0.
GRB	101	0.990	4.	1.085NG	3.	0.000	0.	0.000	0.
GRB	102	0.987	4.	1.561	3.	0.000	0.	0.000	0.
GRB	103	0.996	4.	1.141	3.	0.000	0.	0.000	0.
GRB	104	0.985	4.	1.060	3.	0.000	0.	0.000	0.
GRB	105	1.014	4.	1.280	3.	0.000	0.	0.000	0.
GRB	106	1.017	4.	1.532	3.	0.000	0.	0.000	0.

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GRB	107	1.005	4.	1.007	3.	0.000	0.	0.000	0.
GRB	108	1.009	4.	1.046NG	3.	0.000	0.	0.000	0.
GRB	109	1.000	4.	1.041	3.	0.000	0.	0.000	0.
GRB	110	1.000	4.	1.365	3.	0.000	0.	0.000	0.
GRB	111	0.988	4.	1.049	3.	0.000	0.	0.000	0.
GRB	112	0.986	4.	1.219	3.	0.000	0.	0.000	0.
GRB	113	1.005	4.	1.013	3.	0.000	0.	0.000	0.
GRB	114	0.999	4.	1.053	3.	0.000	0.	0.000	0.
GRB	115	0.991	4.	0.996	3.	0.000	0.	0.000	0.
GRB	116	1.001	4.	0.993	3.	0.000	0.	0.000	0.
GAW	201	1.015	4.	0.011	3.	0.000	0.	0.000	0.
GAW	202	1.011	4.	0.014	3.	0.000	0.	0.000	0.
GAW	203	1.001	4.	0.023	3.	0.000	0.	0.000	0.
GAW	204	0.994	4.	0.010	3.	0.000	0.	0.000	0.
GAW	205	1.043	4.	0.010	3.	0.000	0.	0.000	0.
GAW	206	1.035	4.	0.008	3.	0.000	0.	0.000	0.
GAW	207	1.007	4.	0.020	3.	0.000	0.	0.000	0.
GAW	208	0.992	4.	0.027	3.	0.000	0.	0.000	0.
GAW	209	1.003	4.	0.031	3.	0.000	0.	0.000	0.
GAW	210	0.990	4.	0.011	3.	0.000	0.	0.000	0.
GAW	211	0.985	4.	0.019	3.	0.000	0.	0.000	0.
GAW	212	0.980	4.	0.014	3.	0.000	0.	0.000	0.
GAW	213	0.996	4.	0.021	3.	0.000	0.	0.000	0.
GAW	214	0.998	4.	0.011	3.	0.000	0.	0.000	0.
GAW	215	1.006	4.	0.015	3.	0.000	0.	0.000	0.
GAW	216	0.998	4.	0.018	3.	0.000	0.	0.000	0.
GRB	201	0.994	2.	0.480	3.	0.000	0.	0.000	0.
GRB	202	0.992	2.	0.381	3.	0.000	0.	0.000	0.
GRB	203	0.988	2.	0.464	3.	0.000	0.	0.000	0.
GRB	204	0.991	2.	0.388	3.	0.000	0.	0.000	0.
GRB	205	1.008	4.	0.320	3.	0.000	0.	0.000	0.
GRB	206	1.005	4.	0.447	3.	0.000	0.	0.000	0.
GRB	207	0.995	4.	0.478	3.	0.000	0.	0.000	0.
GRB	208	0.994	4.	0.489	3.	0.000	0.	0.000	0.
GRB	209	1.008	4.	0.449	3.	0.000	0.	0.000	0.
GRB	210	0.998	4.	0.388	3.	0.000	0.	0.000	0.
GRB	211	0.989	4.	0.460	3.	0.000	0.	0.000	0.
GRB	212	0.997	4.	0.402	3.	0.000	0.	0.000	0.
GRB	213	1.010	4.	0.480	3.	0.000	0.	0.000	0.
GRB	214	1.001	4.	0.556	3.	0.000	0.	0.000	0.
GRB	215	1.001	4.	0.417	3.	0.000	0.	0.000	0.
GRB	216	1.005	4.	0.440	3.	0.000	0.	0.000	0.

Recent Q.C. counts

Detector		QC	Date	Gross Counts	Min.	Q.C. Value	Sigma	Control limits	
GRB	209	BK	1.190	960.	2157.60	0.445	0.014	0.363 -	0.549
GAW	209	BK	1.190	65.	2157.60	0.030	0.004	0.006 -	0.058
GRB	210	BK	1.190	864.	2157.60	0.400	0.014	0.357 -	0.422
GAW	210	BK	1.190	30.	2157.60	0.014	0.003	-0.006 -	0.028
GRB	211	BK	1.190	1096.	2157.60	0.508	0.015	0.266 -	0.648
GAW	211	BK	1.190	49.	2157.60	0.023	0.003	0.005 -	0.031
GRB	212	BK	1.190	882.	2157.60	0.409	0.014	0.345 -	0.455
GAW	212	BK	1.190	31.	2157.60	0.014	0.003	-0.008 -	0.035
GRB	201	BK	1.192	986.	2154.41	0.458	0.015	0.420 -	0.549
GAW	201	BK	1.192	23.	2154.41	0.011	0.002	0.001 -	0.022
GRB	202	BK	1.192	789.	2154.42	0.366	0.013	0.312 -	0.447
GAW	202	BK	1.192	19.	2154.42	0.009	0.002	0.004 -	0.023
GRB	203	BK	1.192	999.	2154.41	0.464	0.015	0.401 -	0.535
GAW	203	BK	1.192	49.	2154.41	0.023	0.003	0.004 -	0.040
GRB	204	BK	1.192	873.	2154.41	0.405	0.014	0.283 -	0.481

GAW	204	BK	1.192	26.	2154.41	0.012	0.002	-0.003	-	0.022	
GRB	205	BK	1.196	700.	2148.97	0.326	0.012	0.255	-	0.399	
GAW	205	BK	1.196	20.	2148.97	0.009	0.002	-0.004	-	0.027	
GRB	206	BK	1.196	976.	2148.97	0.454	0.015	0.399	-	0.492	
GAW	206	BK	1.196	18.	2148.97	0.008	0.002	-0.003	-	0.019	
GRB	207	BK	1.196	947.	2148.97	0.441	0.014	0.379	-	0.608	
GAW	207	BK	1.196	37.	2148.97	0.017	0.003	-0.015	-	0.066	
GRB	208	BK	1.196	1000.	2148.97	0.465	0.015	0.378	-	0.619	
GAW	208	BK	1.196	47.	2148.97	0.022	0.003	0.011	-	0.048	
GRB	213	BK	1.191	987.	2156.30	0.458	0.015	0.409	-	0.565	
GAW	213	BK	1.191	31.	2156.30	0.014	0.003	0.003	-	0.041	
GRB	214	BK	1.191	1180.	2156.30	0.547	0.016	0.422	-	0.690	
GAW	214	BK	1.191	23.	2156.30	0.011	0.002	-0.005	-	0.028	
GRB	215	BK	1.191	907.	2156.30	0.421	0.014	0.345	-	0.485	
GAW	215	BK	1.191	27.	2156.30	0.013	0.002	0.001	-	0.031	
GRB	216	BK	1.191	961.	2156.30	0.446	0.014	0.397	-	0.478	
GAW	216	BK	1.191	23.	2156.30	0.011	0.002	0.008	-	0.032	
GRB	209	SF	2.756	91111.	10.00	1.017	0.003	0.977	-	1.037	
GRB	210	SF	2.756	93577.	10.00	1.005	0.003	0.968	-	1.028	
GRB	211	SF	2.756	98718.	10.00	0.994	0.003	0.960	-	1.019	
GRB	212	SF	2.756	94932.	10.00	1.002	0.003	0.965	-	1.025	
GRB	213	SF	2.756	94667.	10.00	1.010	0.003	0.968	-	1.061	
GRB	214	SF	2.756	91112.	10.00	1.009	0.003	0.964	-	1.045	
GRB	215	SF	2.756	95560.	10.00	0.994	0.003	0.974	-	1.034	
GRB	216	SF	2.756	94339.	10.00	1.000	0.003	0.978	-	1.039	
GRB	205	SF	2.756	89378.	10.00	0.998	0.003	0.980	-	1.041	
GRB	206	SF	2.756	92666.	10.00	0.999	0.003	0.975	-	1.036	
GRB	207	SF	2.756	91382.	10.00	0.991	0.003	0.967	-	1.027	
GRB	208	SF	2.756	101198.	10.00	0.984	0.003	0.965	-	1.025	
GRB	201	SF	2.774	88723.	10.00	0.995	0.003	0.964	-	1.023	
GRB	202	SF	2.774	91546.	10.00	0.989	0.003	0.963	-	1.022	
GRB	203	SF	2.774	95702.	10.00	0.986	0.003	0.958	-	1.018	
GRB	204	SF	2.774	72881.	10.00	0.988	0.004	0.961	-	1.021	
GRB	101	BK	0.000	2424.	2467.32	0.982	0.020	0.997	-	1.164	FAIL
GAW	101	BK	0.000	264.	2467.32	0.107	0.007	0.088	-	0.148	
GRB	102	BK	0.000	3778.	2467.32	1.531	0.025	1.486	-	1.657	
GAW	102	BK	0.000	205.	2467.32	0.083	0.006	0.061	-	0.131	
GRB	103	BK	0.000	3014.	2467.32	1.222	0.022	1.010	-	1.266	
GAW	103	BK	0.000	289.	2467.32	0.117	0.007	0.061	-	0.148	
GRB	104	BK	0.000	2638.	2467.32	1.069	0.021	0.992	-	1.130	
GAW	104	BK	0.000	208.	2467.32	0.084	0.006	0.054	-	0.104	
GRB	105	BK	0.000	3143.	2468.06	1.273	0.023	1.176	-	1.410	
GAW	105	BK	0.000	163.	2468.06	0.066	0.005	0.041	-	0.095	
GRB	106	BK	0.000	3843.	2468.06	1.557	0.025	1.397	-	1.717	
GAW	106	BK	0.000	248.	2468.06	0.100	0.006	0.018	-	0.148	
GRB	107	BK	0.000	2523.	2468.06	1.022	0.020	0.867	-	1.166	
GAW	107	BK	0.000	178.	2468.06	0.072	0.005	-0.001	-	0.181	
GRB	108	BK	0.000	2558.	2468.06	1.036	0.020	0.905	-	1.174	
GAW	108	BK	0.000	195.	2468.06	0.079	0.006	0.025	-	0.149	
GRB	109	BK	0.000	2607.	2467.97	1.056	0.021	0.910	-	1.176	
GAW	109	BK	0.000	140.	2467.97	0.057	0.005	0.053	-	0.087	
GRB	110	BK	0.000	3301.	2467.97	1.338	0.023	1.248	-	1.515	
GAW	110	BK	0.000	191.	2467.97	0.077	0.006	0.048	-	0.123	
GRB	111	BK	0.000	2656.	2467.97	1.076	0.021	0.931	-	1.138	
GAW	111	BK	0.000	276.	2467.97	0.112	0.007	0.078	-	0.160	
GRB	112	BK	0.000	2934.	2467.97	1.189	0.022	1.128	-	1.327	
GAW	112	BK	0.000	201.	2467.97	0.081	0.006	0.047	-	0.124	
GRB	113	BK	0.000	2417.	2468.38	0.979	0.020	0.877	-	1.138	
GAW	113	BK	0.000	289.	2468.38	0.117	0.007	0.083	-	0.153	
GRB	114	BK	0.000	2545.	2468.38	1.031	0.020	0.960	-	1.156	
GAW	114	BK	0.000	199.	2468.38	0.081	0.006	0.060	-	0.134	
GRB	115	BK	0.000	2444.	2468.38	0.990	0.020	0.844	-	1.172	

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GAW	115	BK	0.000	278.	2468.38	0.113	0.007	0.082	-	0.146	
GRB	116	BK	0.000	2503.	2468.38	1.014	0.020	0.922	-	1.078	
GAW	116	BK	0.000	164.	2468.38	0.066	0.005	0.031	-	0.118	
GRB	109	BK	2.694	1679.	1695.01	0.991	0.024	0.908	-	1.184	
GAW	109	BK	2.694	104.	1695.01	0.061	0.006	0.053	-	0.085	
GRB	110	BK	2.694	2300.	1695.01	1.357	0.028	1.245	-	1.524	
GAW	110	BK	2.694	165.	1695.01	0.097	0.008	0.047	-	0.125	
GRB	111	BK	2.694	1846.	1695.01	1.089	0.025	0.927	-	1.145	
GAW	111	BK	2.694	198.	1695.01	0.117	0.008	0.076	-	0.163	
GRB	112	BK	2.694	1998.	1695.01	1.179	0.026	1.135	-	1.328	
GAW	112	BK	2.694	126.	1695.01	0.074	0.007	0.051	-	0.124	
GRB	101	BK	2.694	1658.	1694.53	0.978	0.024	0.995	-	1.170	FAIL
GAW	101	BK	2.694	196.	1694.53	0.116	0.008	0.086	-	0.149	
GRB	102	BK	2.694	2561.	1694.53	1.511	0.030	1.480	-	1.658	
GAW	102	BK	2.694	153.	1694.53	0.090	0.007	0.061	-	0.133	
GRB	103	BK	2.694	1960.	1694.53	1.157	0.026	1.004	-	1.264	
GAW	103	BK	2.694	176.	1694.53	0.104	0.008	0.061	-	0.151	
GRB	104	BK	2.694	1745.	1694.53	1.030	0.025	0.987	-	1.132	
GAW	104	BK	2.694	129.	1694.53	0.076	0.007	0.061	-	0.101	
GRB	105	BK	2.694	2108.	1695.07	1.244	0.027	1.169	-	1.417	
GAW	105	BK	2.694	107.	1695.07	0.063	0.006	0.040	-	0.094	
GRB	106	BK	2.694	2472.	1695.07	1.458	0.029	1.407	-	1.721	
GAW	106	BK	2.694	121.	1695.07	0.071	0.006	0.014	-	0.151	
GRB	107	BK	2.694	1612.	1695.07	0.951	0.024	0.901	-	1.151	
GAW	107	BK	2.694	128.	1695.07	0.076	0.007	-0.004	-	0.187	
GRB	108	BK	2.694	1746.	1695.07	1.030	0.025	0.926	-	1.168	
GAW	108	BK	2.694	120.	1695.07	0.071	0.006	0.023	-	0.153	
GRB	113	BK	2.694	1672.	1695.28	0.986	0.024	0.882	-	1.144	
GAW	113	BK	2.694	201.	1695.28	0.119	0.008	0.096	-	0.146	
GRB	114	BK	2.694	1761.	1695.28	1.039	0.025	0.955	-	1.163	
GAW	114	BK	2.694	131.	1695.28	0.077	0.007	0.059	-	0.136	
GRB	115	BK	2.694	1614.	1695.28	0.952	0.024	0.875	-	1.117	
GAW	115	BK	2.694	172.	1695.28	0.101	0.008	0.083	-	0.147	
GRB	116	BK	2.694	1674.	1695.28	0.987	0.024	0.922	-	1.071	
GAW	116	BK	2.694	110.	1695.28	0.065	0.006	0.029	-	0.120	
LBG	1	BK	2.566	610.	1053.70	0.579	0.023	0.289	-	1.002	
LBG	2	BK	2.566	515.	1053.70	0.489	0.022	0.284	-	0.824	
LBG	3	BK	2.566	513.	1053.70	0.487	0.021	0.302	-	0.717	
LBG	4	BK	2.566	760.	1053.70	0.721	0.026	0.647	-	0.811	
LBG	9	BK	2.566	600.	1053.70	0.569	0.023	0.442	-	0.882	
LBG	10	BK	2.566	591.	1053.70	0.561	0.023	0.441	-	0.755	
LBG	11	BK	2.566	587.	1053.70	0.557	0.023	0.434	-	0.638	
LBG	12	BK	2.566	689.	1053.70	0.654	0.025	0.545	-	0.724	
LBG	13	BK	2.566	483.	1053.70	0.458	0.021	0.437	-	0.658	
LBG	14	BK	2.566	632.	1053.70	0.600	0.024	0.523	-	0.695	
LBG	15	BK	2.566	889.	1053.70	0.844	0.028	0.592	-	0.800	FAIL
LBG	16	BK	2.566	695.	1053.70	0.660	0.025	0.360	-	0.870	
MEW	19	BK	2.533	13476.	1101.20	12.238	0.105	12.582	-	13.988	FAIL
GAW	17	BK	2.532	164.	1102.40	0.149	0.012	0.075	-	0.222	
GAW	21	BK	2.532	4820.	1102.40	4.372	0.063	-0.242	-	0.544	FAIL
2PI	22	BK	2.532	66.	1102.40	0.060	0.007	0.135	-	0.235	FAIL
GAW	24	BK	2.532	81.	1102.40	0.073	0.008	0.028	-	0.106	
GRB	201	BK	3.914	509.	1105.88	0.460	0.020	0.413	-	0.550	
GAW	201	BK	3.914	13.	1105.88	0.012	0.003	0.001	-	0.021	
GRB	202	BK	3.914	414.	1105.88	0.374	0.018	0.312	-	0.448	
GAW	202	BK	3.914	24.	1105.88	0.022	0.004	0.003	-	0.023	
GRB	203	BK	3.914	466.	1105.88	0.421	0.020	0.407	-	0.533	
GAW	203	BK	3.914	30.	1105.88	0.027	0.005	0.007	-	0.039	
GRB	204	BK	3.914	405.	1105.88	0.366	0.018	0.296	-	0.481	
GAW	204	BK	3.914	11.	1105.88	0.010	0.003	-0.002	-	0.022	
GRB	205	BK	3.915	334.	1104.20	0.302	0.017	0.255	-	0.396	
GAW	205	BK	3.915	7.	1104.20	0.006	0.002	-0.004	-	0.027	

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GRB	206	BK	3.915	464.	1104.20	0.420	0.020	0.400	-	0.494	
GAW	206	BK	3.915	9.	1104.20	0.008	0.003	-0.003	-	0.019	
GRB	207	BK	3.915	505.	1104.20	0.457	0.020	0.409	-	0.548	
GAW	207	BK	3.915	20.	1104.20	0.018	0.004	0.003	-	0.040	
GRB	208	BK	3.915	511.	1104.20	0.463	0.020	0.373	-	0.621	
GAW	208	BK	3.915	29.	1104.20	0.026	0.005	0.010	-	0.047	
GRB	209	BK	3.913	472.	1107.00	0.426	0.020	0.361	-	0.547	
GAW	209	BK	3.913	24.	1107.00	0.022	0.004	0.006	-	0.056	
GRB	210	BK	3.913	401.	1107.00	0.362	0.018	0.357	-	0.424	
GAW	210	BK	3.913	22.	1107.00	0.020	0.004	-0.007	-	0.028	
GRB	211	BK	3.913	472.	1107.00	0.426	0.020	0.274	-	0.658	
GAW	211	BK	3.913	29.	1107.00	0.026	0.005	0.005	-	0.032	
GRB	212	BK	3.913	436.	1107.00	0.394	0.019	0.348	-	0.449	
GAW	212	BK	3.913	14.	1107.00	0.013	0.003	-0.008	-	0.034	
GRB	213	BK	3.913	523.	1106.72	0.473	0.021	0.408	-	0.552	
GAW	213	BK	3.913	29.	1106.72	0.026	0.005	0.002	-	0.038	
GRB	214	BK	3.913	606.	1106.72	0.548	0.022	0.421	-	0.685	
GAW	214	BK	3.913	11.	1106.72	0.010	0.003	-0.005	-	0.027	
GRB	215	BK	3.913	460.	1106.72	0.416	0.019	0.345	-	0.484	
GAW	215	BK	3.913	14.	1106.72	0.013	0.003	0.000	-	0.032	
GRB	216	BK	3.913	470.	1106.72	0.425	0.020	0.412	-	0.471	
GAW	216	BK	3.913	18.	1106.72	0.016	0.004	0.004	-	0.033	
GRB	101	BK	3.916	1042.	1101.38	0.946	0.029	1.006	-	1.168	FAIL
GAW	101	BK	3.916	115.	1101.38	0.104	0.010	0.085	-	0.149	
GRB	102	BK	3.916	1648.	1101.38	1.496	0.037	1.461	-	1.670	
GAW	102	BK	3.916	94.	1101.38	0.085	0.009	0.060	-	0.133	
GRB	103	BK	3.916	1281.	1101.38	1.163	0.032	1.004	-	1.268	
GAW	103	BK	3.916	111.	1101.38	0.101	0.010	0.061	-	0.149	
GRB	104	BK	3.916	1156.	1101.38	1.050	0.031	0.980	-	1.135	
GAW	104	BK	3.916	75.	1101.38	0.068	0.008	0.062	-	0.096	
GRB	105	BK	3.916	1373.	1101.72	1.246	0.034	1.154	-	1.417	
GAW	105	BK	3.916	84.	1101.72	0.076	0.008	0.040	-	0.092	
GRB	106	BK	3.916	1670.	1101.72	1.516	0.037	1.366	-	1.724	
GAW	106	BK	3.916	77.	1101.72	0.070	0.008	0.013	-	0.151	
GRB	107	BK	3.916	1075.	1101.72	0.976	0.030	0.873	-	1.164	
GAW	107	BK	3.916	83.	1101.72	0.075	0.008	-0.006	-	0.188	
GRB	108	BK	3.916	1038.	1101.72	0.942	0.029	0.955	-	1.150	FAIL
GAW	108	BK	3.916	95.	1101.72	0.086	0.009	0.020	-	0.154	
GRB	109	BK	3.916	1170.	1101.72	1.062	0.031	0.894	-	1.190	
GAW	109	BK	3.916	77.	1101.72	0.070	0.008	0.051	-	0.086	
GRB	110	BK	3.916	1499.	1101.72	1.361	0.035	1.241	-	1.514	
GAW	110	BK	3.916	91.	1101.72	0.083	0.009	0.046	-	0.128	
GRB	111	BK	3.916	1160.	1101.72	1.053	0.031	0.929	-	1.161	
GAW	111	BK	3.916	123.	1101.72	0.112	0.010	0.078	-	0.156	
GRB	112	BK	3.916	1321.	1101.72	1.199	0.033	1.116	-	1.333	
GAW	112	BK	3.916	90.	1101.72	0.082	0.009	0.048	-	0.122	
GRB	113	BK	3.916	1076.	1101.87	0.977	0.030	0.884	-	1.143	
GAW	113	BK	3.916	122.	1101.87	0.111	0.010	0.096	-	0.146	
GRB	114	BK	3.916	1138.	1101.87	1.033	0.031	0.953	-	1.155	
GAW	114	BK	3.916	96.	1101.87	0.087	0.009	0.052	-	0.139	
GRB	115	BK	3.916	1081.	1101.87	0.981	0.030	0.863	-	1.121	
GAW	115	BK	3.916	111.	1101.87	0.101	0.010	0.081	-	0.142	
GRB	116	BK	3.916	1051.	1101.87	0.954	0.029	0.937	-	1.063	
GAW	116	BK	3.916	69.	1101.87	0.063	0.008	0.027	-	0.121	
LBG	1	SF	4.688	32303.	12.49	1.004	0.006	0.965	-	1.034	
LBG	2	SF	4.688	35048.	12.49	1.006	0.005	0.966	-	1.037	
LBG	3	SF	4.688	28150.	12.49	0.990	0.006	0.954	-	1.013	
LBG	4	SF	4.688	27193.	12.49	1.010	0.006	0.982	-	1.042	
LBG	9	SF	4.688	35429.	12.49	1.006	0.005	0.973	-	1.033	
LBG	10	SF	4.688	35995.	12.49	0.997	0.005	0.889	-	1.038	
LBG	11	SF	4.688	30801.	12.49	0.997	0.006	0.961	-	1.021	
LBG	12	SF	4.688	31093.	12.49	0.985	0.006	0.947	-	1.005	

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LBG	13	SF	4.688	29484.	12.49	1.042	0.006	1.013	-	1.076
LBG	14	SF	4.688	25154.	12.49	1.066	0.007	1.050	-	1.117
LBG	15	SF	4.688	29619.	12.49	1.028	0.006	1.002	-	1.066
LBG	16	SF	4.688	29576.	12.49	1.043	0.006	1.003	-	1.065
MEW	19	SF	4.688	567458.	12.49	1.041	0.001	0.983	-	1.044
GRB	209	SF	4.693	92502.	10.00	1.002	0.003	0.978	-	1.039
GRB	210	SF	4.693	94559.	10.00	0.994	0.003	0.968	-	1.028
GRB	211	SF	4.693	99482.	10.00	0.986	0.003	0.960	-	1.020
GRB	212	SF	4.693	95424.	10.00	0.997	0.003	0.967	-	1.026
GRB	213	SF	4.693	94912.	10.00	1.008	0.003	0.969	-	1.056
GRB	214	SF	4.693	93195.	10.00	0.987	0.003	0.965	-	1.042
GRB	215	SF	4.693	94882.	10.00	1.001	0.003	0.972	-	1.032
GRB	216	SF	4.693	94134.	10.00	1.002	0.003	0.976	-	1.037
GRB	205	SF	4.693	88651.	10.00	1.006	0.003	0.979	-	1.039
GRB	206	SF	4.693	91816.	10.00	1.008	0.003	0.975	-	1.035
GRB	207	SF	4.693	91311.	10.00	0.992	0.003	0.966	-	1.026
GRB	208	SF	4.693	100170.	10.00	0.995	0.003	0.964	-	1.024
GAW	209	SF	4.724	33938.	10.00	1.004	0.005	0.972	-	1.033
GAW	210	SF	4.724	34616.	10.00	0.982	0.005	0.960	-	1.019
GAW	211	SF	4.724	34633.	10.00	0.979	0.005	0.955	-	1.014
GAW	212	SF	4.724	34845.	10.00	0.971	0.005	0.951	-	1.010
GAW	213	SF	4.724	33875.	10.00	0.988	0.005	0.960	-	1.038
GAW	214	SF	4.724	34534.	10.00	0.991	0.005	0.971	-	1.031
GAW	215	SF	4.724	34295.	10.00	0.995	0.005	0.961	-	1.057
GAW	216	SF	4.724	34222.	10.00	0.993	0.005	0.966	-	1.031
GAW	201	SF	4.724	31953.	10.00	1.011	0.006	0.985	-	1.046
GAW	202	SF	4.724	33557.	10.00	1.022	0.006	0.979	-	1.040
GAW	203	SF	4.724	33754.	10.00	0.997	0.005	0.971	-	1.031
GAW	204	SF	4.724	33986.	10.00	0.999	0.005	0.963	-	1.022
GAW	205	SF	4.724	33397.	10.00	1.044	0.006	1.012	-	1.074
GAW	206	SF	4.724	29181.	10.00	1.042	0.006	1.004	-	1.066
GAW	207	SF	4.724	33387.	10.00	1.019	0.006	0.975	-	1.036
GAW	208	SF	4.724	35039.	10.00	0.991	0.005	0.962	-	1.022
GRB	101	SF	4.726	91788.	10.00	0.989	0.003	0.961	-	1.020
GRB	102	SF	4.726	94672.	10.00	0.986	0.003	0.954	-	1.018
GRB	103	SF	4.726	98064.	10.00	0.995	0.003	0.965	-	1.025
GRB	104	SF	4.726	74864.	10.00	0.991	0.004	0.955	-	1.014
GRB	105	SF	4.726	90950.	10.00	1.016	0.003	0.984	-	1.045
GRB	106	SF	4.726	94804.	10.00	1.015	0.003	0.987	-	1.048
GRB	107	SF	4.726	92852.	10.00	1.008	0.003	0.974	-	1.035
GRB	108	SF	4.726	101153.	10.00	1.017	0.003	0.978	-	1.039
GRB	109	SF	4.726	96984.	10.00	0.987	0.003	0.971	-	1.032
GRB	110	SF	4.726	96929.	10.00	1.002	0.003	0.969	-	1.029
GRB	111	SF	4.726	103657.	10.00	0.982	0.003	0.959	-	1.019
GRB	112	SF	4.726	100370.	10.00	0.981	0.003	0.956	-	1.015
GRB	113	SF	4.726	98405.	10.00	1.008	0.003	0.974	-	1.035
GRB	114	SF	4.726	94463.	10.00	1.003	0.003	0.969	-	1.029
GRB	115	SF	4.726	99299.	10.00	0.991	0.003	0.962	-	1.021
GRB	116	SF	4.726	96202.	10.00	1.008	0.003	0.971	-	1.031
GAW	101	SF	4.715	42063.	10.00	0.997	0.005	0.968	-	1.028
GAW	102	SF	4.715	44567.	10.00	1.001	0.005	0.970	-	1.030
GAW	103	SF	4.715	43990.	10.00	0.990	0.005	0.964	-	1.024
GAW	104	SF	4.715	44154.	10.00	1.003	0.005	0.967	-	1.027
GAW	105	SF	4.715	44834.	10.00	1.011	0.005	0.972	-	1.032
GAW	106	SF	4.715	39679.	10.00	0.998	0.005	0.972	-	1.032
GAW	107	SF	4.715	43472.	10.00	1.011	0.005	0.971	-	1.031
GAW	108	SF	4.715	44831.	10.00	1.003	0.005	0.970	-	1.030
GAW	109	SF	4.715	44316.	10.00	0.997	0.005	0.969	-	1.029
GAW	110	SF	4.715	44330.	10.00	1.002	0.005	0.971	-	1.031
GAW	111	SF	4.715	44475.	10.00	0.988	0.005	0.965	-	1.025
GAW	112	SF	4.715	44061.	10.00	1.001	0.005	0.971	-	1.031
GAW	113	SF	4.715	43203.	10.00	1.009	0.005	0.977	-	1.037

GAW	114	SF	4.715	44013.	10.00	1.010	0.005	0.981	-	1.042	
GAW	115	SF	4.715	43994.	10.00	1.000	0.005	0.978	-	1.039	
GAW	116	SF	4.715	43671.	10.00	1.009	0.005	0.976	-	1.036	
LBG	15	BK	4.715	161.	228.00	0.706	0.056	0.586	-	0.803	
MEW	19	BK	4.787	4304.	355.30	12.114	0.185	12.703	-	13.757	FAIL
GAW	17	SF	4.913	753635.	174.50	7.482	0.009	3.116	-	3.308	FAIL
GAW	21	SF	4.913	506617.	174.50	10.905	0.015	3.575	-	3.796	FAIL
GAW	24	SF	4.913	609309.	174.50	7.816	0.010	2.866	-	3.044	FAIL
GAW	17	SF	5.036	54078.	5.37	3.207	0.014	3.111	-	3.303	
GAW	21	SF	5.036	46165.	5.37	3.677	0.017	3.575	-	3.796	
GAW	24	SF	5.036	49962.	5.37	2.932	0.013	2.865	-	3.042	

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Golder Associates Inc.

4104-148th Avenue, NE
Redmond, WA 98052
Telephone (206) 883-0777
Fax (206) 882-5498

Golder Associates

May 19, 1993

Our ref: 923-E018
S/O/2263

Westinghouse Hanford Company
Hanford Analytical Services Management
345 Hills, MSIN H4-29
Richland, Washington 99352

ATTENTION: Ms. Brianna Colley

RE: COLUMBIA RIVER SEDIMENT DATA VALIDATION, TASK ORDER S93-18, TRANSMITTAL OF DATA VALIDATION PACKAGES

Dear Ms. Colley:

Enclosed are three radiochemistry analytical data package including associated data validation documentation for the referenced project. The data packages included in this shipment are:

- B07NC8-TMA-355
- B07NB6-TMA-351
- B07NF9-TMA-354

The validation documentation is located at the front of the data package folder.

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Kent M. Angelos
Task Manager

for

Donald M. Caldwell
Project Director

Enclosures

cc: Steve Weiss, WHC
P.K. Brockman, SAIC-Kennewick

9613492.8778

MEMORANDUM

TO: Columbia River Sediment Project QA Record April 8, 1993

FR: Christina Jensen, Golder Associates Inc.

RE: Inorganics Analysis Data Validation Summary for B07NC8-TMA-355

INTRODUCTION

This memo presents the results of data validation on data package B07NC8-TMA-355 consisting of nine sediment samples submitted for inorganics analysis. The samples were analyzed by TMA/Skinner & Sherman using CLP protocols. A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA
B07NC8	11/20/92	SEDIMENT
B07ND1	11/20/92	SEDIMENT
B07ND9	11/20/92	SEDIMENT
B07NF3	11/20/92	SEDIMENT
B07NF4	11/20/92	SEDIMENT
B07NF5	11/20/92	SEDIMENT
B07NF6	11/20/92	SEDIMENT
B07NF7	11/20/92	SEDIMENT
B07NF8	11/20/92	SEDIMENT

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (Bechtold 1992). Attachments 1 through 4 to this memo provide the data validation supporting documentation and a summary of the validated results.

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met with the exception of the percent difference (%D) for zinc which was exceeded for the serial dilution. Therefore, associated sample results were qualified as estimated (J).

Accuracy. Goals for accuracy were met with the exception of arsenic, antimony and manganese spike recoveries and arsenic, selenium, thallium and lead GFAA analytical spike recoveries.

Sample Result Verification. All sample results were supported in the raw data with no data correction necessary.

Detection Limits. Detection limit goals were met for all analyses.

Completeness. The data package was complete for all requested analyses. A total of nine samples were validated in this data set with a total of 207 determinations reported. Out of

the 207 determinations reported, all determinations were deemed valid which results in a completeness of 100 percent. This completeness percentage meets the work plan objectives of 90%.

MAJOR DEFICIENCIES

There were no major deficiencies identified requiring rejection of the data.

MINOR DEFICIENCIES

Blanks

Cobalt, silver and vanadiun were detected in the laboratory blanks. Sample results have been qualified undetected (U) as follows, since sample concentrations were less than five times the associated blank concentrations:

ANALYTE	SAMPLE
Cobalt	B07NC8 B07ND1
Silver	B07ND9
Vanadium	B07ND9

Matrix Spike

Arsenic, antimony and manganese spike results exceeded the QC limits of 75% to 125% with results qualified as estimated (J for detects or UJ).

GFAA Analytical Spikes

The analytical spike percent recoveries exceeded the QC limits of 85% to 115% for the following samples and analytes and the associated sample results have been qualified as estimated (J for detects, UJ for nondetects):

Sample	Analyte
B07ND1	Arsenic
B07ND9, B07NF7	Selenium
B07NC8, B07ND1, B07ND9, B07NF3, B07NF4, B07NF5, B07NF6, B07NF7, B07NF8	Thallium
B07NF5, B07NC8	Lead

Method of Standard Addition (MSA)

An MSA was performed for sample B07ND1 for arsenic which was not necessary. The reported concentration was corrected to reflect the originally detected sample value.

The MSA correlation coefficients for arsenic analysis of samples B07NF8 and B07NF5 were <0.995, therefore results were qualified as estimated (J).

REFERENCES

WHC, 1993, Westinghouse Hanford Company, Validation of Columbia River Sediment Data, Statement of Work, Revision 0, January 1993. Westinghouse Hanford Company, Richland, Washington.

Bechtold, 1992, Westinghouse Hanford Company, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 1, 1992. Westinghouse Hanford Company, Richland, Washington.

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9613492.6782

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the analyte was analyzed for and detected. The value reported is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). The data are usable for decision making purposes.

U - Indicates the analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.

UJ - Indicates the analyte was analyzed for and not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.

J - Indicates the analyte was analyzed for and detected. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

UR - Indicates the analyte was analyzed for and not detected; however, due to an identified quality control deficiency the data are unusable.

R - Indicates the analyte was analyzed and detected; however, due to an identified quality control deficiency the data are unusable.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B07NC8	REVIEWER: cj	DATE: 3/31/93	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
As	J	B07NF8, B07NF5	MSA r < .995
Co	U	B07NC8, B07ND1	Blank Contam.
V	U	B07NC8	↓
Ag	U	B07ND9	↓
As	J or UJ	all	SSR Spk out
Sb	J or UJ	all	↓
Mn	J	all	↓
Zn	J or UJ	all	Serial dilu %D out
As	1.89	B07ND1	MSA not needed, original value reported
Se	J or UJ	B07ND9, B07NF8	GFAA Anal. Spk out
As	J or UJ	B07ND1	↓
Pb	J or UJ	B07NC8, B07NF5	↓
Tl	J or UJ	B07NC8, B07ND1	↓
↓	↓	B07ND9, B07NF3	↓
		B07NF4, B07NF5	
		B07NF6, B07NF7	
		B07NF8	

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ATTACHMENT 3

AS QUALIFIED DATA SUMMARY

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NC8

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-01S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	387			P	
7440-36-0	Antimony	3.2	~~U~~	N	P	UJ
7440-38-2	Arsenic	0.57	~~B~~	N	F	BJ
7440-39-3	Barium	8.0	B		P	
7440-41-7	Beryllium	0.08	U		P	
7440-43-9	Cadmium	0.19	U		P	
7440-70-2	Calcium	127	B		P	
7440-47-3	Chromium	0.85	U		P	
7440-48-4	Cobalt	0.60	~~B~~		P	U
7440-50-8	Copper	1.3	B		P	
7439-89-6	Iron	1940			P	
7439-92-1	Lead	1.7	—	W	F	J
7439-95-4	Magnesium	61.8	B		P	
7439-96-5	Manganese	42.1	—	N	P	J
7439-97-6	Mercury	0.04	U		CV	
7440-02-0	Nickel	1.0	U		P	
7440-09-7	Potassium	76.6	B		P	
7782-49-2	Selenium	0.58	U		F	
7440-22-4	Silver	0.47	U		P	
7440-23-5	Sodium	22.4	B		P	
7440-28-0	Thallium	0.26	~~U~~	W	F	UJ
7440-62-2	Vanadium	1.8	~~B~~		P	U
7440-66-6	Zinc	7.1	—	E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

gj 3/31/93

002

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B07ND1

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-02S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 67.7

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4720			P	Q
7440-36-0	Antimony	4.7	~~U~~	N	P	UJ
7440-38-2	Arsenic	1.89 ~~0.54~~	~~U~~	+N	F	J
7440-39-3	Barium	58.3			P	
7440-41-7	Beryllium	0.11	U		P	
7440-43-9	Cadmium	0.28	U		P	
7440-70-2	Calcium	2140			P	
7440-47-3	Chromium	47.6			P	
7440-48-4	Cobalt	6.4	~~B~~		P	U
7440-50-8	Copper	10.2			P	
7439-89-6	Iron	9700			P	
7439-92-1	Lead	9.0			F	
7439-95-4	Magnesium	2630			P	
7439-96-5	Manganese	220	—	N	P	J
7439-97-6	Mercury	0.07	U		CV	
7440-02-0	Nickel	12.6			P	
7440-09-7	Potassium	819	B		P	
7782-49-2	Selenium	0.82	U		F	
7440-22-4	Silver	0.70	U		P	
7440-23-5	Sodium	114	B		P	
7440-28-0	Thallium	0.37	~~U~~	W	F	UJ
7440-62-2	Vanadium	23.4			P	
7440-66-6	Zinc	83.1	—	E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS AND WOOD

q 3/31/93

FORM I - IN ILM02.1

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND9

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-03S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 81.9

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	3650			P	
7440-36-0	Antimony	3.8	~~U~~	N	P	UJ
7440-38-2	Arsenic	1.6	~~B~~	N	F	BJ
7440-39-3	Barium	45.8			P	
7440-41-7	Beryllium	0.09	U		P	
7440-43-9	Cadmium	0.22	U		P	
7440-70-2	Calcium	1850			P	
7440-47-3	Chromium	50.6			P	
7440-48-4	Cobalt	4.6	B		P	
7440-50-8	Copper	7.0			P	
7439-89-6	Iron	8690			P	
7439-92-1	Lead	7.3			F	
7439-95-4	Magnesium	2210			P	
7439-96-5	Manganese	100	—	N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	9.3			P	
7440-09-7	Potassium	640	B		P	
7782-49-2	Selenium	0.67	~~U~~	W	F	UJ
7440-22-4	Silver	0.78	~~B~~		P	U
7440-23-5	Sodium	96.6	B		P	
7440-28-0	Thallium	0.30	~~U~~	W	F	UJ
7440-62-2	Vanadium	19.1			P	
7440-66-6	Zinc	73.1	—	E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS AND WOOD

S 3/3/93

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF3

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-04S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 67.6

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5670			P	
7440-36-0	Antimony	4.8	~~U~~	N	P	UJ
7440-38-2	Arsenic	1.2	~~B~~	N	F	BJ
7440-39-3	Barium	50.4	B		P	
7440-41-7	Beryllium	0.11	U		P	
7440-43-9	Cadmium	0.28	U		P	
7440-70-2	Calcium	2960			P	
7440-47-3	Chromium	65.2			P	
7440-48-4	Cobalt	5.4	B		P	
7440-50-8	Copper	11.5			P	
7439-89-6	Iron	10900			P	
7439-92-1	Lead	19.3			F	
7439-95-4	Magnesium	3400			P	
7439-96-5	Manganese	110		N	P	J
7439-97-6	Mercury	0.07	U		CV	
7440-02-0	Nickel	11.2	B		P	
7440-09-7	Potassium	789	B		P	
7782-49-2	Selenium	0.82	U		F	
7440-22-4	Silver	0.71	U		P	
7440-23-5	Sodium	167	B		P	
7440-28-0	Thallium	0.37	~~U~~	W	F	UJ
7440-62-2	Vanadium	28.2			P	
7440-66-6	Zinc	159		E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

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005

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NF4

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-05S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 85.7

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7460			P	
7440-36-0	Antimony	3.9	~~U~~	N	P	UJ
7440-38-2	Arsenic	1.2	~~B~~	N	F	BJ
7440-39-3	Barium	71.8			P	
7440-41-7	Beryllium	0.09	U		P	
7440-43-9	Cadmium	0.23	U		P	
7440-70-2	Calcium	3110			P	
7440-47-3	Chromium	131			P	
7440-48-4	Cobalt	7.3	B		P	
7440-50-8	Copper	19.2			P	
7439-89-6	Iron	14100			P	
7439-92-1	Lead	39.2			F	
7439-95-4	Magnesium	3950			P	
7439-96-5	Manganese	140		N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	15.2			P	
7440-09-7	Potassium	1150			P	
7782-49-2	Selenium	0.63	U		F	
7440-22-4	Silver	0.57	U		P	
7440-23-5	Sodium	145	B		P	
7440-28-0	Thallium	0.28	~~U~~	W	F	UJ
7440-62-2	Vanadium	34.8			P	
7440-66-6	Zinc	192		E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

G 3/31/93

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WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF5

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-06S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 80.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7470			P	
7440-36-0	Antimony	4.2	~~U~~	N	P	UJ
7440-38-2	Arsenic	9.4		N	F	J
7440-39-3	Barium	70.9			P	
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.30	B		P	
7440-70-2	Calcium	3480			P	
7440-47-3	Chromium	15.0			P	
7440-48-4	Cobalt	7.2	B		P	
7440-50-8	Copper	24.7			P	
7439-89-6	Iron	15400			P	
7439-92-1	Lead	57.7		S	F	J
7439-95-4	Magnesium	4540			P	
7439-96-5	Manganese	189		N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	15.6			P	
7440-09-7	Potassium	1100	B		P	
7782-49-2	Selenium	0.70	U		F	
7440-22-4	Silver	0.62	U		P	
7440-23-5	Sodium	138	B		P	
7440-28-0	Thallium	0.31	~~U~~	W	F	UJ
7440-62-2	Vanadium	28.9			P	
7440-66-6	Zinc	226		E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NF6

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-07S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 77.4

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5990			P	
7440-36-0	Antimony	4.2	~~U~~	N	P	UJ
7440-38-2	Arsenic	1.9	~~B~~	N	F	BJ
7440-39-3	Barium	57.0			P	
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.25	U		P	
7440-70-2	Calcium	2760			P	
7440-47-3	Chromium	13.2			P	
7440-48-4	Cobalt	6.4	B		P	
7440-50-8	Copper	9.9			P	
7439-89-6	Iron	12600			P	
7439-92-1	Lead	5.8			F	
7439-95-4	Magnesium	4060			P	
7439-96-5	Manganese	160		N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	13.1			P	
7440-09-7	Potassium	836	B		P	
7782-49-2	Selenium	0.72	U		F	
7440-22-4	Silver	0.63	U		P	
7440-23-5	Sodium	102	B		P	
7440-28-0	Thallium	0.32	~~U~~	W	F	UJ
7440-62-2	Vanadium	23.8			P	
7440-66-6	Zinc	43.7		E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

g 3/31/93

008

FORM I - IN ILM02.1

9613492.8793

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NF7

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-08S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 77.4

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	4790			P	
7440-36-0	Antimony	4.0	~~U~~	N	P	UJ
7440-38-2	Arsenic	2.4		N	F	J
7440-39-3	Barium	33.1	B		P	
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.65	B		P	
7440-70-2	Calcium	3640			P	
7440-47-3	Chromium	14.8			P	
7440-48-4	Cobalt	6.3	B		P	
7440-50-8	Copper	20.4			P	
7439-89-6	Iron	14900			P	
7439-92-1	Lead	15.3			F	
7439-95-4	Magnesium	3440			P	
7439-96-5	Manganese	160		N	P	J
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	12.4			P	
7440-09-7	Potassium	565	B		P	
7782-49-2	Selenium	0.69	U		F	
7440-22-4	Silver	0.59	U		P	
7440-23-5	Sodium	208	B		P	
7440-28-0	Thallium	0.35	~~B~~	W	F	BJ
7440-62-2	Vanadium	40.3			P	
7440-66-6	Zinc	151		E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts:

Comments:

gj 3/31/93

C-005

FORM I - IN ILM02.1

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF8

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

Lab Code: SKINER Case No.: N2-11-191SAS No.: SDG No.: B07NC8

Matrix (soil/water): SOIL Lab Sample ID: 12020-09S

Level (low/med): LOW Date Received: 12/01/92

% Solids: 82.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5040			P	
7440-36-0	Antimony	4.0	~~U~~	N	P	UJ
7440-38-2	Arsenic	5.8		+N	F	J
7440-39-3	Barium	51.0			P	
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.62	B		P	
7440-70-2	Calcium	3300			P	
7440-47-3	Chromium	11.2			P	
7440-48-4	Cobalt	6.3	B		P	
7440-50-8	Copper	20.6			P	
7439-89-6	Iron	13200			P	
7439-92-1	Lead	27.0			F	
7439-95-4	Magnesium	3290			P	
7439-96-5	Manganese	263		N	P	J
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	11.0			P	
7440-09-7	Potassium	659	B		P	
7782-49-2	Selenium	0.69	~~U~~		F	UJ
7440-22-4	Silver	0.59	~~U~~		P	UJ
7440-23-5	Sodium	213	~~B~~		P	B (no qualifier) 03/31/93
7440-28-0	Thallium	0.56	~~B~~	W	F	BJ
7440-62-2	Vanadium	27.6			P	
7440-66-6	Zinc	205		E	P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

03/31/93

010

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ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

9613492.8796

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Columbia River Sediments	REVIEWER: G	DATE: 3/31/93
LABORATORY: Skinner / Sherman	CASE: B07NC8-TMF335	SDG: B07NC8
SAMPLES/MATRIX:	N2-11-1915A8	
Soils B07NC8, B07ND1, B07ND9, B07NF3, B07NF4, B07NF5,		
B07NF6, B07NF7, B07NF8		

1. COMPLETENESS AND CONTRACT COMPLIANCE

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

Data Package Item	Present?: Yes	No	N/A
Case Narrative	✓		
Cover Page	✓		
Traffic Reports	✓		
Sample Data			
Inorganic Analysis Data Sheets	✓		
Standards Data			
Initial and Continuing Calibration Verification	✓		
CRDL Standard for AA and ICP	✓		
QC Summary			
Blanks	✓		
ICP Interference Check Summary	✓		
Spike Sample Recovery	✓		
Post-Digestion Spike Sample Recovery	✓		
Duplicate	✓		
Laboratory Control Sample	✓		
Standard Addition Results	✓		
ICP Serial Dilutions	✓		
Instrument Detection Limits	✓		
ICP Interelement Correction Factors	✓		
ICP Linear Ranges	✓		
Preparation Log	✓		
Analysis Run Log	✓		
Raw Data			
ICP Raw Data	✓	✓	See Data See next
Furnace AA Raw Data	✓		
Mercury Raw Data	✓		
Cyanide Raw Data		✓	not requested
Additional Data			
Internal laboratory chain-of-custody	✓		
Laboratory Sample Preparation Records	✓		

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

2. HOLDING TIMES

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

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

3. INITIAL CALIBRATIONS

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

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

Was a midrange cyanide standard distilled? Yes No N/A Cn not analyzed

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

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

See note (2)

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

Are there calculation errors? Yes No N/A

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

5. ICP INTERFERENCE CHECK SAMPLE

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

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

Are there calculation errors? Yes No N/A

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

6. LABORATORY BLANKS

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

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

7. FIELD BLANKS

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

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

8. MATRIX SPIKE SAMPLE ANALYSIS

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

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

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

9. LABORATORY CONTROL SAMPLE

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

Are there calculation errors? Yes No N/A

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

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

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

10. PERFORMANCE AUDIT ANALYSES

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

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

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

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

12. ICP SERIAL DILUTION

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

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

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

13. FIELD DUPLICATE SAMPLES

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

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

14. FIELD SPLIT SAMPLES

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

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

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

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

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

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

Does the RSD for the rerun fall within the control limits? Yes No ~~N/A~~ 3/31

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

See comment (3)

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

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

17. ANALYTE QUANTITATION AND DETECTION LIMITS

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

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

18. OVERALL ASSESSMENT AND SUMMARY

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

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

COMMENTS (attach additional sheets as necessary):

~~(1) Silicon Data missing from package~~ ok cj 3/31/93

(2) Hg ICV out (110%) but not analyzed for this sample set, no qualification necessary

(3) laboratory did not need to do an ~~analytical~~ MSA on sample B07ND1, original sample result reported on form 1.

~~(4) B07DF4 lab should have done an MSA~~ cj 3/31/93 ok.

HOLDING TIME SUMMARY - FORM B-1

SDG: B07NC8	REVIEWER: C Jensen	DATE: 3/31/93	PAGE 1 OF ___
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B07NC8	metals	11/20/92	12/7/92	12/7/92	17	17 & 48	none
B07ND1							
B07ND9							
B07NF3							
B07NF4							
B07NF5							
B07NF6							
B07NF7							
B07NF8							

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BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B07NC8	REVIEWER: C Jensen	DATE: 3/31/93	PAGE 1 OF ___
COMMENTS:			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
Blank	Cobalt	0.071			ug/L	0.19		B07NC8	U
Blank	Cobalt	0.071			ug/L	0.19		B07ND1	U
↓	Vanadium	0.0028			ug/L	0.014		B07NC8	U
↓	Silver	0.029			ug/L	0.145		B07ND9	U

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ACCURACY DATA SUMMARY - FORM B-4

SDG: B07NC8	REVIEWER: C. Jensen	DATE: 3/31/93	PAGE 1 OF 2	
COMMENTS:				
SAMPLE ID	**COMPOUND**	**% RECOVERY**	**SAMPLE(S) AFFECTED**	**QUALIFIER REQUIRED**
B07NF8S	Arsenic	68.7	B07NC8, B07ND1 B07NF9, B07NF3	J or UJ
↓	↓	↓	B07NF4, B07NF5	↓
↓	↓	↓	B07NF8 B07NF6, B07NF7	↓
↓	Antimony	72.7	all	J or UJ
↓	Manganese	213.3	all	J
B07ND1	Arsenic	75.04	B07ND1	J or UJ
B07ND9	Selenium	118.74	B07ND9	J or UJ
B07NF8	Selenium	82.67	B07NF7	J or UJ
B07NC8	Lead	117.94	B07NC8	UJ or J
B07NC8	Thallium	123.23	B07NC8	J or UJ
B07ND1	Thallium	116.89	B07ND1	J or UJ
B07ND9	Thallium	121.11	B07ND9	J or UJ
B07NF3	Thallium	123.23	B07NF3	J or UJ
B07NF4	Thallium	121.11	B07NF4	J or UJ
B07NF5	Lead	51.90	B07NF5	J or UJ
B07NF5	Thallium	129.57	B07NF5	J or UJ
B07NF6	Thallium	119	B07NF6	J or UJ
B07NF7	Thallium	124.22	B07NF7	J or UJ
B07NF8	Thallium	122.07	B07NF8	J or UJ
B07NF8	Arsenic	—	B07NF8	↑

MSA < .995

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PRECISION DATA SUMMARY - FORM B-5

SDG: B07NK8	REVIEWER C Jensen	DATE: 4/9/93	PAGE 1 OF 1
COMMENTS:			

COMPOUND	SAMPLE ID:	SAMPLE ID:	~~RPD~~ %D	SAMPLES AFFECTED	QUALIFIER
Zinc	B07NF8L	–	145	all	J
(results were 750 x the IDL)					

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FEDEX PRIORITY OVERNIGHT THU

emp# 9481 14APR93

Trk# 588 8690 823

PSCA

99352-WA-US

82PSC

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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

June 1, 1993

Ms. Jeanette Duncan
Westinghouse Hanford Company
Hanford Analytical Services Management
P.O. Box 1970
Richland WA 99352

Dear Ms. Duncan:

Enclosed are the standard factors and background data that you requested for TMA data packages 7136, 7131, 7116, and 7106. The counter QC information for alpha counting you requested is already contained in the data packages.

Please call if you have any further questions.

Yours sincerely,

N. Joseph Verville

N. Joseph Verville
Asst. Manager TMA/Norcal
Nuclear Projects

Enclosures: SF/backgrounds 7136, 7131, 7116, 7106

JUN 1993
RECEIVED
K. M. Pool

Additional missing data identified as of 4/16/93:

ANALYSIS	DETECTOR ID	MISSING DATA
Data Package ID: B07NC8-TMA-355 Lab Reporting Group: 7131 Lab: TMA/Norcal Project: Columbia River Sediment		
GROSS ALPHA/BETA	all detectors used for sample analysis	All SF and BK continuing calibration QC status
STRONTIUM-90	all detectors used for sample analysis	All SF and BK continuing calibration QC status
URANIUM (isotopic)	all detectors used for sample analysis	All SF and BK continuing calibration QC status
PLUTONIUM (isotopic)	SS28, SS29, SS30, SS31, SS32, SS34, SS35, SS27, SS37, SS38, SS39, SS40, SS41, SS42, SS44, SS46, SS47, SS48	QC Status is not recorded on "Aspec Eff Summary Sheet"
AMERICIUM (isotopic)	SS32, SS33, SS34, SS35, SS36, SS37, SS38, SS39, SS40, SS41, SS42, SS43, SS44, SS46, SS49, SS50	QC Status is not recorded on "Aspec Eff Summary Sheet"

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****

Gross Counter Q.C. Status 03:43:50 10-FEB-93

****

WED

Status at this time

Detector		SF	GMT	BK	GMT	BK4.75	GMT	BK6.49	
LBG	1	0.949	40.	0.559	40.	0.930FC	290.	0.663	214.
LBG	2	0.997	40.	0.544	40.	0.692	290.	0.705	214.
LBG	3	0.982	40.	0.491	40.	0.553	290.	0.479	214.
LBG	4	1.014	40.	0.739	40.	0.791	290.	0.768	214.
LBG	5	1.071NG	99.	0.270	40.	0.854	185.	0.578	281.
LBG	6	1.024NG	77.	0.412	40.	0.770	185.	0.665	281.
LBG	9	1.026	40.	0.538	40.	0.576	290.	0.587	214.
LBG	10	1.041	40.	0.543	40.	0.711	290.	0.620	214.
LBG	11	0.990	40.	0.530	40.	0.599	185.	0.564	214.
LBG	12	0.970	40.	0.641	40.	0.692	185.	0.599	214.
LBG	13	1.054	40.	0.510	40.	0.822	185.	0.564	214.
LBG	14	1.094	40.	0.578	40.	0.736	185.	0.623	214.
LBG	15	1.032	40.	0.650	40.	0.762	290.	0.785	214.
LBG	16	1.022	40.	0.551	40.	0.622	290.	0.589	214.
GAW	17	3.215	40.	0.137NG	41.	0.000	0.	0.000	0.
MEW	19	1.024	40.	12.768	40.	0.666	123.	0.777	123.
GAW	21	3.632NG	41.	0.046	40.	0.000	0.	0.000	0.
2PI	22	2.182	40.	0.132	40.	0.000	0.	0.000	0.
GAW	23	3.208	90.	0.018	32.	0.000	0.	0.000	0.
GAW	24	2.958	40.	0.065	40.	0.000	0.	0.000	0.
2PI	25	2.083	118.	1.520FC	8.	0.000	0.	0.000	0.
2PI	26	2.326	118.	0.171FC	8.	0.000	0.	0.000	0.
LSC	4	0.000	0.	0.000	0.	0.000	0.	0.000	0.
LSC	5	0.000	0.	0.000	0.	0.000	0.	0.000	0.
VLB	1	1.100	190.	0.289	190.	0.000	0.	0.000	0.
VLB	2	1.130	190.	0.246	190.	0.000	0.	0.000	0.
VLB	3	1.105FC	190.	0.236	190.	0.000	0.	0.000	0.
VLB	4	1.109	190.	0.291	190.	0.000	0.	0.000	0.
VLB	5	1.057	190.	0.219	190.	0.000	0.	0.000	0.
VLB	6	1.068	190.	0.246	190.	0.000	0.	0.000	0.
VLB	7	1.091	190.	0.196	190.	0.000	0.	0.000	0.
VLB	8	1.213	190.	0.251	190.	0.000	0.	0.000	0.
GAW	101	0.998	40.	0.125	40.	0.000	0.	0.000	0.
GAW	102	1.003	40.	0.089	40.	0.000	0.	0.000	0.
GAW	103	0.991	40.	0.099	40.	0.000	0.	0.000	0.
GAW	104	1.002	40.	0.068NG	40.	0.000	0.	0.000	0.
GAW	105	1.002	40.	0.067	40.	0.000	0.	0.000	0.
GAW	106	1.002	40.	0.071	40.	0.000	0.	0.000	0.
GAW	107	0.999	40.	0.079	40.	0.000	0.	0.000	0.
GAW	108	0.998	40.	0.071	40.	0.000	0.	0.000	0.
GAW	109	0.997	40.	0.061	40.	0.000	0.	0.000	0.
GAW	110	1.002	40.	0.080	40.	0.000	0.	0.000	0.
GAW	111	0.994	40.	0.122	40.	0.000	0.	0.000	0.
GAW	112	0.999	40.	0.076	40.	0.000	0.	0.000	0.
GAW	113	1.007	40.	0.103	40.	0.000	0.	0.000	0.
GAW	114	1.004	40.	0.086	40.	0.000	0.	0.000	0.
GAW	115	1.006	40.	0.112	40.	0.000	0.	0.000	0.
GAW	116	1.004	40.	0.079	40.	0.000	0.	0.000	0.
GRB	101	0.990	40.	1.044	40.	0.000	0.	0.000	0.
GRB	102	0.987	40.	1.464	40.	0.000	0.	0.000	0.
GRB	103	0.990	40.	1.078	40.	0.000	0.	0.000	0.
GRB	104	0.989	40.	1.005	40.	0.000	0.	0.000	0.
GRB	105	1.011	40.	1.261NG	40.	0.000	0.	0.000	0.
GRB	106	1.015	40.	1.482	40.	0.000	0.	0.000	0.

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GRB	107	1.006	40.	0.977	40.	0.000	0.	0.000	0.
GRB	108	1.007	40.	0.966	40.	0.000	0.	0.000	0.
GRB	109	0.999	40.	0.962	40.	0.000	0.	0.000	0.
GRB	110	0.995	40.	1.367	40.	0.000	0.	0.000	0.
GRB	111	0.987	40.	0.987	40.	0.000	0.	0.000	0.
GRB	112	0.987	40.	1.203	40.	0.000	0.	0.000	0.
GRB	113	1.006	40.	0.979	40.	0.000	0.	0.000	0.
GRB	114	1.001	40.	0.991	40.	0.000	0.	0.000	0.
GRB	115	0.995	40.	0.926	40.	0.000	0.	0.000	0.
GRB	116	1.005	40.	0.998	40.	0.000	0.	0.000	0.
GAW	201	1.020	39.	0.016	38.	0.000	0.	0.000	0.
GAW	202	1.015	39.	0.014	38.	0.000	0.	0.000	0.
GAW	203	0.998	39.	0.025	38.	0.000	0.	0.000	0.
GAW	204	0.994	39.	0.020	38.	0.000	0.	0.000	0.
GAW	205	1.043	39.	0.013	38.	0.000	0.	0.000	0.
GAW	206	1.039	39.	0.011	38.	0.000	0.	0.000	0.
GAW	207	1.013	39.	0.016	38.	0.000	0.	0.000	0.
GAW	208	0.999	39.	0.056	38.	0.000	0.	0.000	0.
GAW	209	1.004	39.	0.036	38.	0.000	0.	0.000	0.
GAW	210	0.990	39.	0.016	38.	0.000	0.	0.000	0.
GAW	211	0.987	39.	0.077	38.	0.000	0.	0.000	0.
GAW	212	0.983	39.	0.024	38.	0.000	0.	0.000	0.
GAW	213	0.986	39.	0.027	39.	0.000	0.	0.000	0.
GAW	214	0.982	39.	0.021	38.	0.000	0.	0.000	0.
GAW	215	1.002	39.	0.037	38.	0.000	0.	0.000	0.
GAW	216	0.994	39.	0.027	38.	0.000	0.	0.000	0.
GRB	201	0.995	40.	0.479NG	38.	0.000	0.	0.000	0.
GRB	202	0.991	40.	0.426	38.	0.000	0.	0.000	0.
GRB	203	0.990	40.	0.475	38.	0.000	0.	0.000	0.
GRB	204	0.991	40.	0.427	38.	0.000	0.	0.000	0.
GRB	205	1.005	40.	0.371	38.	0.000	0.	0.000	0.
GRB	206	1.002	40.	0.498	38.	0.000	0.	0.000	0.
GRB	207	0.995	40.	0.455	38.	0.000	0.	0.000	0.
GRB	208	0.996	40.	0.610	38.	0.000	0.	0.000	0.
GRB	209	1.004	40.	0.531	38.	0.000	0.	0.000	0.
GRB	210	0.997	40.	0.420	38.	0.000	0.	0.000	0.
GRB	211	0.995	40.	0.864	38.	0.000	0.	0.000	0.
GRB	212	0.998	40.	0.499	38.	0.000	0.	0.000	0.
GRB	213	0.999	40.	0.507NG	39.	0.000	0.	0.000	0.
GRB	214	0.999	40.	0.536	38.	0.000	0.	0.000	0.
GRB	215	1.012	40.	0.411	38.	0.000	0.	0.000	0.
GRB	216	1.007	40.	0.440	38.	0.000	0.	0.000	0.

Recent Q.C. counts

Detector		QC	Date	Gross Counts	Min.	Q.C. Value	Sigma	Control limits	
LBG	1	BK	40.363	366.	461.20	0.794	0.041	0.443 - 0.659	FAIL
LBG	2	BK	40.363	263.	461.20	0.570	0.035	0.359 - 0.723	
LBG	3	BK	40.363	280.	461.20	0.607	0.036	0.302 - 0.682	
LBG	4	BK	40.363	368.	461.20	0.798	0.042	0.641 - 0.829	
LBG	5	BK	40.078	0.	871.10	0.000	0.000	0.284 - 0.442	FAIL
LBG	6	BK	40.078	0.	871.10	0.000	0.000	0.663 - 0.944	
LBG	9	BK	40.363	280.	461.20	0.607	0.036	0.373 - 0.704	
LBG	10	BK	40.363	267.	461.20	0.579	0.035	0.377 - 0.722	
LBG	11	BK	40.363	280.	461.20	0.607	0.036	0.471 - 0.605	FAIL
LBG	12	BK	40.363	304.	461.20	0.659	0.038	0.566 - 0.709	
LBG	13	BK	40.363	200.	461.20	0.434	0.031	0.418 - 0.613	
LBG	14	BK	40.363	270.	461.20	0.585	0.036	0.480 - 0.673	
LBG	15	BK	40.363	296.	461.20	0.642	0.037	0.446 - 0.857	
LBG	16	BK	40.363	275.	461.20	0.596	0.036	0.424 - 0.691	
MEW	19	BK	40.318	7008.	525.60	13.333	0.159	11.841 - 13.521	

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GRB	101	BK	40.329	527.	506.83	1.040	0.045	0.923	-	1.160	
GAW	101	BK	40.329	51.	506.83	0.101	0.014	0.094	-	0.160	
GRB	102	BK	40.329	750.	506.83	1.480	0.054	1.311	-	1.623	
GAW	102	BK	40.329	31.	506.83	0.061	0.011	0.057	-	0.127	
GRB	103	BK	40.329	546.	506.83	1.077	0.046	0.970	-	1.189	
GAW	103	BK	40.329	45.	506.83	0.089	0.013	0.060	-	0.144	
GRB	104	BK	40.329	490.	506.83	0.967	0.044	0.905	-	1.104	
GAW	104	BK	40.329	49.	506.83	0.097	0.014	0.047	-	0.090	FAIL
GRB	105	BK	40.329	599.	507.00	1.181	0.048	1.185	-	1.344	FAIL
GAW	105	BK	40.329	24.	507.00	0.047	0.010	0.023	-	0.120	
GRB	106	BK	40.329	773.	507.00	1.525	0.055	1.341	-	1.621	
GAW	106	BK	40.329	24.	507.00	0.047	0.010	0.041	-	0.109	
GRB	107	BK	40.329	507.	507.00	1.000	0.044	0.839	-	1.119	
GAW	107	BK	40.329	44.	507.00	0.087	0.013	0.047	-	0.112	
GRB	108	BK	40.329	495.	507.00	0.976	0.044	0.846	-	1.099	
GAW	108	BK	40.329	31.	507.00	0.061	0.011	0.045	-	0.098	
GRB	109	BK	40.329	483.	506.95	0.953	0.043	0.845	-	1.092	
GAW	109	BK	40.329	23.	506.95	0.045	0.009	0.034	-	0.093	
GRB	110	BK	40.329	666.	506.95	1.314	0.051	1.223	-	1.536	
GAW	110	BK	40.329	37.	506.95	0.073	0.012	0.062	-	0.106	
GRB	111	BK	40.329	501.	506.95	0.988	0.044	0.876	-	1.113	
GAW	111	BK	40.329	57.	506.95	0.112	0.015	0.091	-	0.157	
GRB	112	BK	40.329	577.	506.95	1.138	0.047	1.122	-	1.303	
GAW	112	BK	40.329	31.	506.95	0.061	0.011	0.048	-	0.111	
GRB	113	BK	40.329	508.	507.04	1.002	0.044	0.810	-	1.170	
GAW	113	BK	40.329	54.	507.04	0.107	0.014	0.063	-	0.141	
GRB	114	BK	40.329	528.	507.04	1.041	0.045	0.885	-	1.097	
GAW	114	BK	40.329	38.	507.04	0.075	0.012	0.035	-	0.140	
GRB	115	BK	40.329	486.	507.04	0.959	0.043	0.764	-	1.092	
GAW	115	BK	40.329	53.	507.04	0.105	0.014	0.081	-	0.146	
GRB	116	BK	40.329	490.	507.04	0.966	0.044	0.886	-	1.114	
GAW	116	BK	40.329	29.	507.04	0.057	0.011	0.051	-	0.112	
GAW	17	BK	40.318	288.	530.70	0.543	0.032	0.060	-	0.206	FAIL
GAW	21	BK	40.318	33.	530.70	0.062	0.011	-0.011	-	0.098	
2PI	22	BK	40.318	77.	530.70	0.145	0.017	-0.055	-	0.315	
GAW	24	BK	40.318	29.	530.70	0.055	0.010	0.025	-	0.108	
LBG	1	SF	40.687	36643.	13.28	0.941	0.005	0.921	-	0.978	
LBG	2	SF	40.687	37786.	13.28	0.992	0.005	0.967	-	1.027	
LBG	3	SF	40.687	30398.	13.28	0.974	0.006	0.953	-	1.012	
LBG	4	SF	40.687	28924.	13.28	1.010	0.006	0.986	-	1.047	
LBG	5	BK	40.078	0.	889.10	0.000	0.000	0.288	-	0.447	FAIL
LBG	6	BK	40.078	0.	889.10	0.000	0.000	-0.442	-	1.728	
LBG	9	SF	40.687	36829.	13.28	1.028	0.005	0.995	-	1.056	
LBG	10	SF	40.687	36611.	13.28	1.042	0.005	1.011	-	1.073	
LBG	11	SF	40.687	32988.	13.28	0.990	0.005	0.959	-	1.019	
LBG	12	SF	40.687	33593.	13.28	0.969	0.005	0.941	-	0.999	
LBG	13	SF	40.687	31127.	13.28	1.050	0.006	1.024	-	1.087	
LBG	14	SF	40.687	26332.	13.28	1.083	0.007	1.061	-	1.127	
LBG	15	SF	40.687	31104.	13.28	1.041	0.006	1.001	-	1.063	
LBG	16	SF	40.687	31997.	13.28	1.024	0.006	0.992	-	1.054	
MEW	19	SF	40.687	613443.	13.16	1.014	0.001	0.994	-	1.056	
GRB	209	SF	40.694	92198.	10.00	1.005	0.003	0.974	-	1.035	
GRB	210	SF	40.694	94221.	10.00	0.998	0.003	0.966	-	1.026	
GRB	211	SF	40.694	98370.	10.00	0.997	0.003	0.964	-	1.024	
GRB	212	SF	40.694	95369.	10.00	0.998	0.003	0.968	-	1.028	
GRB	213	SF	40.694	98153.	10.00	0.974	0.003	0.916	-	1.080	
GRB	214	SF	40.694	93155.	10.00	0.987	0.003	0.965	-	1.035	
GRB	215	SF	40.694	95945.	10.00	0.990	0.003	0.915	-	1.107	
GRB	216	SF	40.694	94443.	10.00	0.999	0.003	0.931	-	1.085	
GRB	201	SF	40.694	88821.	10.00	0.994	0.003	0.966	-	1.026	
GRB	202	SF	40.694	91295.	10.00	0.992	0.003	0.961	-	1.020	
GRB	203	SF	40.694	95308.	10.00	0.990	0.003	0.961	-	1.020	

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GRB	204	SF		40.694	72722.	10.00	0.990	0.004	0.962	-	1.021	
GRB	205	SF		40.694	89258.	10.00	0.999	0.003	0.976	-	1.036	
GRB	206	SF		40.694	92235.	10.00	1.003	0.003	0.972	-	1.032	
GRB	207	SF		40.694	90844.	10.00	0.997	0.003	0.965	-	1.025	
GRB	208	SF		40.694	100083.	10.00	0.995	0.003	0.966	-	1.026	
GAW	101	SF		40.703	42334.	10.00	0.991	0.005	0.969	-	1.029	
GAW	102	SF		40.703	44291.	10.00	1.007	0.005	0.972	-	1.033	
GAW	103	SF		40.703	43929.	10.00	0.991	0.005	0.962	-	1.022	
GAW	104	SF		40.703	44398.	10.00	0.998	0.005	0.972	-	1.032	
GAW	105	SF		40.703	44673.	10.00	1.014	0.005	0.971	-	1.031	
GAW	106	SF		40.703	39374.	10.00	1.005	0.005	0.971	-	1.031	
GAW	107	SF		40.703	44118.	10.00	0.996	0.005	0.970	-	1.030	
GAW	108	SF		40.703	44776.	10.00	1.004	0.005	0.968	-	1.028	
GAW	109	SF		40.703	44075.	10.00	1.003	0.005	0.967	-	1.027	
GAW	110	SF		40.703	44375.	10.00	1.001	0.005	0.973	-	1.033	
GAW	111	SF		40.703	44324.	10.00	0.992	0.005	0.964	-	1.024	
GAW	112	SF		40.703	43857.	10.00	1.006	0.005	0.969	-	1.029	
GAW	113	SF		40.703	43097.	10.00	1.011	0.005	0.977	-	1.037	
GAW	114	SF		40.703	43848.	10.00	1.014	0.005	0.974	-	1.034	
GAW	115	SF		40.703	43220.	10.00	1.018	0.005	0.974	-	1.034	
GAW	116	SF		40.703	43710.	10.00	1.008	0.005	0.974	-	1.034	
GRB	109	SF		40.727	96525.	10.00	0.992	0.003	0.970	-	1.030	
GRB	110	SF		40.727	97076.	10.00	1.000	0.003	0.965	-	1.024	
GRB	111	SF		40.727	102817.	10.00	0.990	0.003	0.957	-	1.016	
GRB	112	SF		40.727	99188.	10.00	0.992	0.003	0.956	-	1.015	
GRB	113	SF		40.727	98456.	10.00	1.008	0.003	0.976	-	1.036	
GRB	114	SF		40.727	94668.	10.00	1.001	0.003	0.971	-	1.031	
GRB	115	SF		40.727	98630.	10.00	0.997	0.003	0.965	-	1.025	
GRB	116	SF		40.727	96025.	10.00	1.010	0.003	0.974	-	1.034	
GRB	101	SF		40.727	91639.	10.00	0.991	0.003	0.960	-	1.020	
GRB	102	SF		40.727	95253.	10.00	0.980	0.003	0.958	-	1.018	
GRB	103	SF		40.727	98452.	10.00	0.991	0.003	0.960	-	1.020	
GRB	104	SF		40.727	74924.	10.00	0.990	0.004	0.959	-	1.018	
GRB	105	SF		40.727	91205.	10.00	1.013	0.003	0.981	-	1.042	
GRB	106	SF		40.727	95123.	10.00	1.012	0.003	0.986	-	1.047	
GRB	107	SF		40.727	93156.	10.00	1.005	0.003	0.976	-	1.036	
GRB	108	SF		40.727	102122.	10.00	1.008	0.003	0.977	-	1.037	
GAW	17	SF		40.725	597410.	59.34	3.210	0.004	3.119	-	3.312	
GAW	21	SF		40.725	519520.	59.34	3.611	0.005	3.474	-	3.744	
2PI	22	SF		40.725	474816.	59.34	2.183	0.003	2.118	-	2.249	
GAW	24	SF		40.725	549216.	59.34	2.949	0.004	2.870	-	3.048	
LBG	1	BK		40.725	154.	238.50	0.646	0.052	0.443	-	0.659	
LBG	5	BK		40.078	0.	1168.80	0.000	0.000	0.323	-	0.390	
LBG	6	BK		40.078	0.	1168.80	0.000	0.000	-0.714	-	1.785	
LBG	11	BK		40.725	116.	238.50	0.486	0.045	0.467	-	0.609	
GAW	17	BK		40.767	49.	184.10	0.266	0.038	0.060	-	0.206	FAIL
LSC	5	Ni	LSC	40.483	507.	100.00	5.070	0.225	4.671	-	6.783	
LSC	5	H	DST	41.362	316.	100.00	3.160	0.178	3.322	-	3.833	FAIL
GAW	21	SF		41.024	77558.	9.53	3.885	0.014	3.477	-	3.732	FAIL
GAW	21	SF		41.167	523166.	38.93	2.352	0.003	3.477	-	3.741	FAIL
GAW	17	BK		40.767	407.	614.60	0.662	0.033	0.063	-	0.208	FAIL
GAW	21	SF		41.194	4438.	10.68	76.052	1.142	3.478	-	3.750	FAIL
GAW	21	SF		41.202	89349.	10.81	3.826	0.013	3.478	-	3.750	FAIL
GAW	21	SF		41.211	128704.	15.80	3.880	0.011	3.489	-	3.757	FAIL
GAW	17	BK		41.196	23.	102.80	0.224	0.047	0.069	-	0.210	FAIL

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MEMORANDUM

TO: Columbia River Sediment Project QA Record May 12, 1993

FR: Christina Jensen, Golder Associates Inc. CJ

RE: Radiochemical Analysis Data Validation Summary for B07NC8-TMA-355

INTRODUCTION

This memo presents the results of data validation on data package B07NC8-TMA-355 consisting of 20 sediment samples submitted for radiochemical analysis. The samples were analyzed by TMA/NORCAL laboratory using routine laboratory protocols. A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA
B07NC8	11/20/92	SEDIMENT
B07ND1	11/20/92	SEDIMENT
B07ND4	11/19/92	SEDIMENT
B07ND5	11/19/92	SEDIMENT
B07ND6	11/19/92	SEDIMENT
B07ND7	11/19/92	SEDIMENT
B07ND8	11/19/92	SEDIMENT
B07ND9	11/20/92	SEDIMENT
B07NF0	11/19/92	SEDIMENT
B07NF1	11/19/92	SEDIMENT
B07NF2	11/19/92	SEDIMENT
B07NF3	11/20/92	SEDIMENT
B07NF4	11/20/92	SEDIMENT
B07NF5	11/20/92	SEDIMENT
B07NF6	11/20/92	SEDIMENT
B07NF7	11/20/92	SEDIMENT
B07NF8	11/20/92	SEDIMENT
B07NG0	11/21/92	SEDIMENT
B07NG1	11/21/92	SEDIMENT
B07NG2	11/21/92	SEDIMENT

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (Bechtold 1992). Attachments 1 through 4 to this memo provide the data validation supporting documentation and a summary of the validated results.

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met with the exception of cesium-137, europium-152 and europium-154 as summarized in "Minor Deficiencies".

Accuracy. Goals for accuracy were met with the exception of tracer recoveries and LCS recoveries as summarized in "Major Deficiencies".

Sample Result Verification. All sample results were supported in the raw data with no data correction necessary.

Detection Limits. Detection limit goals were met for all analyses.

Completeness. The data package was complete for all requested analyses.

A total of twenty (20) samples were validated in this data set with a total of 440 determinations reported. Out of the 440 determinations reported a total of 414 determinations were deemed valid which results in a completeness of 94 percent. This completeness percentage meets the work plan objectives of 90%.

MAJOR DEFICIENCIES

Tracer Yields

The plutonium-242 tracer recovery was below the 30% control limit for samples B07NF5 and B07NF6. Therefore, the associated sample results for plutonium 238, 239/240 have been qualified as unusable (R for detects, UR for non-detects).

The americium-243 tracer recovery was below the 30% control limit for samples B07NF6 and B07ND9. Therefore, the associated sample results for americium-241 have been qualified as unusable (R for detects, UR for non-detects).

Laboratory Control Sample

The LCS recovery for uranium-235 exceeded the control limit. The associated results have been qualified as unusable (R for detects, UR for non-detects).

MINOR DEFICIENCIES

Replicate Sample

The replicate sample relative percent difference (RPD) for cesium-137, europium-152 and europium-154 exceeded the control limits. Therefore, associated sample results have been qualified as estimated (J for detects, UJ for non-detects).

REFERENCES

WHC, 1993, Westinghouse Hanford Company, Validation of Columbia River Sediment Data, Statement of Work, Revision 0, January 1993. Westinghouse Hanford Company, Richland, Washington.

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

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

U - Indicates the analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.

UJ - Indicates the analyte was analyzed for and not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.

J - Indicates the analyte was analyzed for and detected. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

UR - Indicates the analyte was analyzed for and not detected; however, due to an identified quality control deficiency the data are unusable.

R - Indicates the analyte was analyzed and detected; however, due to an identified quality control deficiency the data are unusable.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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DATA QUALIFICATION SUMMARY - FORM B-7

SDG: 7131	REVIEWER: CJ	DATE: 5/18/93	PAGE 1 OF 1
COMMENTS: Radiochemistry			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Plutonium 239/240	R or UR	B07NF5, B07NF6	yield < 30%
Americium-241	R or UR	B07NF6, B07ND9	yield < 30%
Uranium 235	R or UR	all	LCS is 157%
Cesium-137	J or UJ	all	RPD is 92%
Europium-152	J or UJ	all	RPD is 84%
Europium-154	J or UJ	all	RPD is 96%

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ATTACHMENT 3

AS QUALIFIED DATA SUMMARY

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N211152-09

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NC8

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-09
Dept sample id 7131-009
Received 11/25/92
% moisture 0.1

Client sample id B07NC8
Matrix SOIL
Collected 11/20/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	0.58	3.6	5	10	U	80A
Gross Beta	Beta	27	4.7	5	10		80B
Uranium 233/234		0.16	0.14	0.2	0.3	U	U
Uranium 235	15117-96-1	0	0.054	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.18	0.14	0.2	0.3	U	U
Plutonium 238	13981-16-3	0.005	0.022	0.04	0.05	U	PU
Plutonium 239/240		0.027	0.022	0.03	0.05	U	PU
Americium 241	14596-10-2	-0.014	0.045	0.09	0.05	U	AM
Strontium 90	10098-97-2	0.014	0.086	0.1		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	22	1.1				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	~~U~~ UJ	GAM
Europium 152	14683-23-9	U		0.09	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.06	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.28	0.070				GAM
Thorium 228	14274-82-9	0.55	0.084				GAM
Thorium 232	7440-29-1	0.51	0.22				GAM

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Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8822

N211152-10

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND1

SDG 7131
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-10
Dept sample id 7131-010
Received 11/25/92
% moisture 22.5
Client sample id B07ND1
Matrix SOIL
Collected 11/20/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	6.7	4.0	4	10	J	80A
Gross Beta	Beta	13	4.3	6	10		80B
Uranium 233/234		0.59	0.22	0.1	0.3		U
Uranium 235	15117-96-1	0.061	0.082	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.44	0.18	0.1	0.3		U
Plutonium 238	13981-16-3	0.003	0.032	0.06	0.05	U	PU
Plutonium 239/240		0.013	0.019	0.04	0.05	U	PU
Americium 241	14596-10-2	0.013	0.022	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.66	1.2	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	12	0.85				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	~~U~~ UJ	GAM
Europium 152	14683-23-9	U		0.09	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.06	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.51	0.099				GAM
Thorium 228	14274-82-9	1.1	0.087				GAM
Thorium 232	7440-29-1	0.75	0.19				GAM

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Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8823

N211152-04

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND4

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-04
Dept sample id 7131-004
Received 11/24/92
% moisture 20.2

Client sample id B07ND4
Matrix SOIL
Collected 11/19/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	4.9	3.7	4	10	J	80A
Gross Beta	Beta	17	4.1	5	10		80B
Uranium 233/234		0.58	0.22	0.2	0.3		U
Uranium 235	15117-96-1	-0.021	0.042	0.2	0.3	~~U~~ UK	U
Uranium 238	7440-61-1	0.68	0.23	0.1	0.3		U
Plutonium 238	13981-16-3	-0.011	0.015	0.05	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Americium 241	14596-10-2	0	0.027	0.06	0.05	U	AM
Strontium 90	10098-97-2	-0.47	1.4	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.0				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.18	0.052		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	0.56	0.065		0.05	— J	GAM
Europium 152	14683-23-9	0.22	0.073		0.1	— J	GAM
Europium 154	15585-10-1	U		0.1	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.46	0.066				GAM
Thorium 228	14274-82-9	0.50	0.076				GAM
Thorium 232	7440-29-1	0.58	0.19				GAM

cjs 5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

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N211152-05

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND5

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-05	Client sample id	B07ND5
Dept sample id	7131-005	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	23.5	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	2.9	3.2	4	10	U	80A
Gross Beta	Beta	20	4.4	6	10		80B
Uranium 233/234		0.49	0.22	0.2	0.3		U
Uranium 235	15117-96-1	0.051	0.052	0.2	0.3	~~U~~ UL	U
Uranium 238	7440-61-1	0.36	0.18	0.2	0.3		U
Plutonium 238	13981-16-3	-0.008	0.017	0.04	0.05	U	PU
Plutonium 239/240		0.006	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.016	0.04	0.05	U	AM
Strontium 90	10098-97-2	0.068	0.091	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.1				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.41	0.073		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	0.74	0.075		0.05	— J	GAM
Europium 152	14683-23-9	0.48	0.089		0.1	— J	GAM
Europium 154	15585-10-1	U		0.2	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.42	0.11				GAM
Thorium 228	14274-82-9	0.46	0.048				GAM
Thorium 232	7440-29-1	0.50	0.21				GAM

CJS 7/16/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
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Version	2.23
Report date	03/11/93

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N211152-06

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND6

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-06	Client sample id	B07ND6
Dept sample id	7131-006	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	4.4	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	6.2	3.8	4	10	J	80A
Gross Beta	Beta	14	4.4	6	10		80B
Uranium 233/234		0.29	0.18	0.2	0.3	J	U
Uranium 235	15117-96-1	0.035	0.070	0.3	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.49	0.24	0.2	0.3		U
Plutonium 238	13981-16-3	0.002	0.014	0.03	0.05	U	PU
Plutonium 239/240		0.002	0.010	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.009	0.009	0.03	0.05	U	AM
Strontium 90	10098-97-2	0	0.98	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	1.0				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.10	0.046		0.05	~~—~~ J	GAM
Europium 152	14683-23-9	U		0.1	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.07	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.58	0.10				GAM
Thorium 228	14274-82-9	0.88	0.076				GAM
Thorium 232	7440-29-1	0.84	0.18				GAM

CJ 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-07

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND7

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-07
Dept sample id 7131-007
Received 11/24/92
% moisture 19.8

Client sample id B07ND7
Matrix SOIL
Collected 11/19/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	4.5	3.5	4	10	J	80A
Gross Beta	Beta	13	3.9	5	10		80B
Uranium 233/234		0.44	0.20	0.1	0.3		U
Uranium 235	15117-96-1	0.023	0.092	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.44	0.20	0.1	0.3		U
Plutonium 238	13981-16-3	-0.007	0.011	0.03	0.05	U	PU
Plutonium 239/240		0.005	0.007	0.01	0.05	U	PU
Americium 241	14596-10-2	0.007	0.019	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.076	0.46	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.1				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.19	0.065		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.62	0.069		0.05	~~-~~ J	GAM
Europium 152	14683-23-9	0.25	0.077		0.1	~~-~~ J	GAM
Europium 154	15585-10-1	U		0.2	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.48	0.087				GAM
Thorium 228	14274-82-9	0.53	0.055				GAM
Thorium 232	7440-29-1	0.50	0.16				GAM

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Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
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9613492.8827

N211152-08

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND8

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-08
Dept sample id 7131-008
Received 11/24/92
% moisture 1.1

Client sample id B07ND8
Matrix SOIL
Collected 11/19/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	7.5	4.8	5	10	J	80A
Gross Beta	Beta	18	4.2	5	10		80B
Uranium 233/234		0.46	0.21	0.2	0.3		U
Uranium 235	15117-96-1	0.024	0.048	0.2	0.3	~~U~~ UL	U
Uranium 238	7440-61-1	0.46	0.21	0.2	0.3		U
Plutonium 238	13981-16-3	0.005	0.026	0.05	0.05	U	PU
Plutonium 239/240		0	0.011	0.03	0.05	U	PU
Americium 241	14596-10-2	0.014	0.023	0.04	0.05	U	AM
Strontium 90	10098-97-2	0	1.0	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	17	1.2				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	~~U~~ UJ	GAM
Europium 152	14683-23-9	U		0.09	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.06	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.50	0.095				GAM
Thorium 228	14274-82-9	0.69	0.058				GAM
Thorium 232	7440-29-1	0.89	0.23				GAM

CJ 5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8828

N211152-11

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07ND9

SDG 7131
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-11
Dept sample id 7131-011
Received 11/25/92
% moisture 21.7
Client sample id B07ND9
Matrix SOIL
Collected 11/20/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	4.7	4.0	5	10	U	80A
Gross Beta	Beta	14	3.9	5	10		80B
Uranium 233/234		0.45	0.27	0.4	0.3		U
Uranium 235	15117-96-1	0.039	0.079	0.3	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.26	0.20	0.2	0.3	J	U
Plutonium 238	13981-16-3	-0.023	0.020	0.06	0.05	U	PU
Plutonium 239/240		0	0.007	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.027	0.043	0.1	0.05	~~U~~ UR	AM
Strontium 90	10098-97-2	-0.011	0.42	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	12	0.48				GAM
Iron 59		U		0.1	0.05	U	GAM
Chromium 51	14392-02-0	U		0.8		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Zinc 65	17982-39-3	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Cesium 134	17967-70-9	U		0.04		U	GAM
Cesium 137	10045-97-3	0.031	0.017		0.05	~~J~~ J	GAM
Europium 152	14683-23-9	U		0.05	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.03	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.52	0.045				GAM
Thorium 228	14274-82-9	0.82	0.030				GAM
Thorium 232	7440-29-1	0.79	0.077				GAM

cj 5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8829

N211152-01

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF0

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-01	Client sample id	B07NF0
Dept sample id	7131-001	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	55.4	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	8.7	5.5	6	10	J	80A
Gross Beta	Beta	12	3.9	5	10		80B
Uranium 233/234		0.84	0.32	0.2	0.3		U
Uranium 235	15117-96-1	0.030	0.060	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.69	0.27	0.2	0.3		U
Plutonium 238	13981-16-3	0.005	0.021	0.04	0.05	U	PU
Plutonium 239/240		0.003	0.016	0.03	0.05	U	PU
Americium 241	14596-10-2	0.012	0.018	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.10	0.52	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	8.4	1.0				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.33	0.098		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	0.56	0.067		0.05	— J	GAM
Europium 152	14683-23-9	0.41	0.11		0.1	— J	GAM
Europium 154	15585-10-1	U		0.3	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.55	0.12				GAM
Thorium 228	14274-82-9	0.84	0.12				GAM
Thorium 232	7440-29-1	0.71	0.26				GAM
Manganese 54		0.057	0.034				GAM

cj 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
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N211152-02

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF1

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-02	Client sample id	B07NF1
Dept sample id	7131-002	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	23.3	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	5.7	4.0	5	10	J	80A
Gross Beta	Beta	9.0	4.2	6	10	J	80B
Uranium 233/234		0.44	0.23	0.2	0.3		U
Uranium 235	15117-96-1	0.066	0.067	0.3	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.44	0.23	0.2	0.3		U
Plutonium 238	13981-16-3	-0.010	0.026	0.06	0.05	U	PU
Plutonium 239/240		0.013	0.013	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.007	0.021	0.04	0.05	U	AM
Strontium 90	10098-97-2	0.11	0.094	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	12	0.96				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	0.20	0.058		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.48	0.066		0.05	— J	GAM
Europium 152	14683-23-9	0.35	0.087		0.1	— J	GAM
Europium 154	15585-10-1	U		0.2	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.54	0.097				GAM
Thorium 228	14274-82-9	0.91	0.10				GAM
Thorium 232	7440-29-1	0.74	0.18				GAM

gj 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-03

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF2

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-03	Client sample id	B07NF2
Dept sample id	7131-003	Matrix	SOIL
Received	11/24/92	Collected	11/19/92
% moisture	31.3	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	1.7	5.1	8	10	U	80A
Gross Beta	Beta	12	4.0	5	10		80B
Uranium 233/234		0.37	0.18	0.1	0.3		U
Uranium 235	15117-96-1	0.021	0.043	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.58	0.22	0.1	0.3		U
Plutonium 238	13981-16-3	0.018	0.018	0.02	0.05	U	PU
Plutonium 239/240		0.018	0.018	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.005	0.42	0.2		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	0.95				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		3		U	GAM
Cobalt 60	10198-40-0	0.089	0.061		0.05		GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	1.3	0.094		0.05	J	GAM
Europium 152	14683-23-9	0.90	0.14		0.1	J	GAM
Europium 154	15585-10-1	U		0.4	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.61	0.091				GAM
Thorium 228	14274-82-9	0.95	0.086				GAM
Thorium 232	7440-29-1	0.93	0.23				GAM

cj 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-12

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF3

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-12	Client sample id	B07NF3
Dept sample id	7131-012	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	26.0	Chain of custody id	199806 226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	2.2	5.3	8	10	U	80A
Gross Beta	Beta	13	4.2	6	10		80B
Uranium 233/234		0.57	0.21	0.1	0.3		U
Uranium 235	15117-96-1	0.061	0.082	0.2	0.3	~~U~~ UL	U
Uranium 238	7440-61-1	0.52	0.21	0.1	0.3		U
Plutonium 238	13981-16-3	0.009	0.025	0.04	0.05	U	PU
Plutonium 239/240		0	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.003	0.021	0.05	0.05	U	AM
Strontium 90	10098-97-2	0	0.96	0.1		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.55				GAM
Iron 59		U		0.2	0.05	U	GAM
Chromium 51	14392-02-0	U		0.9		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	17982-39-3	U		0.08		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Cesium 134	17967-70-9	U		0.03		U	GAM
Cesium 137	10045-97-3	0.058	0.022		0.05	~~U~~ J	GAM
Europium 152	14683-23-9	U		0.05	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.03	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.58	0.051				GAM
Thorium 228	14274-82-9	1.0	0.036				GAM
Thorium 232	7440-29-1	0.95	0.11				GAM

GS 1/8/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-13

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF4

SDG 7131
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-13
Dept sample id 7131-013
Received 11/25/92
% moisture 21.1
Client sample id B07NF4
Matrix SOIL
Collected 11/20/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	8.1	5.2	6	10	J	80A
Gross Beta	Beta	16	4.0	5	10		80B
Uranium 233/234		0.84	0.27	0.1	0.3		U
Uranium 235	15117-96-1	0.085	0.086	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	1.1	0.31	0.1	0.3		U
Plutonium 238	13981-16-3	-0.013	0.019	0.04	0.05	U	PU
Plutonium 239/240		0	0.004	0.01	0.05	U	PU
Americium 241	14596-10-2	-0.006	0.022	0.05	0.05	U	AM
Strontium 90	10098-97-2	0.041	0.22	0.8		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.51				GAM
Iron 59		U		0.2	0.05	U	GAM
Chromium 51	14392-02-0	U		1		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Zinc 65	17982-39-3	U		0.08		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Cesium 134	17967-70-9	U		0.03		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	~~U~~ UJ	GAM
Europium 152	14683-23-9	U		0.05	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.04	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.70	0.049				GAM
Thorium 228	14274-82-9	1.4	0.046				GAM
Thorium 232	7440-29-1	1.1	0.12				GAM

DS 1/8/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

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N211152-14

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF5

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-14	Client sample id	B07NF5
Dept sample id	7131-014	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	20.3	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS Q	TEST
Gross Alpha	Alpha	8.3	3.9	4	10	J	80A
Gross Beta	Beta	16	4.0	5	10		80B
Uranium 233/234		0.85	0.29	0.2	0.3		U
Uranium 235	15117-96-1	0.054	0.055	0.2	0.3	~~U~~ UL	U
Uranium 238	7440-61-1	0.54	0.24	0.2	0.3		U
Plutonium 238	13981-16-3	0.011	0.057	0.1	0.05	~~U~~ UL	PU
Plutonium 239/240		0.011	0.011	0.04	0.05	~~U~~ UL	PU
Americium 241	14596-10-2	-0.002	0.010	0.02	0.05	U	AM
Strontium 90	10098-97-2	0	0.86	0.7		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	16	1.1				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.5		U	GAM
Cesium 134	17967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	~~U~~ UJ	GAM
Europium 152	14683-23-9	U		0.1	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.07	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.78	0.11				GAM
Thorium 228	14274-82-9	1.3	0.076				GAM
Thorium 232	7440-29-1	1.2	0.22				GAM

CJ 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-15

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF6

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-15	Client sample id	B07NF6
Dept sample id	7131-015	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	23.6	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	6.1	4.1	5	10	J	80A
Gross Beta	Beta	14	3.9	5	10		80B
Uranium 233/234		0.53	0.19	0.1	0.3		U
Uranium 235	15117-96-1	0.018	0.036	0.1	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.74	0.22	0.1	0.3		U
Plutonium 238	13981-16-3	-0.079	0.054	0.1	0.05	~~U~~ UR	PU
Plutonium 239/240		0.007	0.026	0.05	0.05	~~U~~ UR	PU
Americium 241	14596-10-2	0.028	0.042	0.08	0.05	~~U~~ UR	AM
Strontium 90	10098-97-2	-0.017	0.51	0.9		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.1				GAM
Iron 59		U		0.4	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Zinc 65	17982-39-3	U		0.2		U	GAM
Ruthenium 106	13967-48-1	U		0.6		U	GAM
Cesium 134	17967-70-9	U		0.08		U	GAM
Cesium 137	10045-97-3	0.082	0.060		0.05	— J	GAM
Europium 152	14683-23-9	U		0.1	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.08	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	1.2	0.14				GAM
Thorium 228	14274-82-9	2.5	0.091				GAM
Thorium 232	7440-29-1	2.5	0.24				GAM

gj 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-16

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF7

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-16	Client sample id	B07NF7
Dept sample id	7131-016	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	23.5	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	8.4	4.2	4	10	J	80A
Gross Beta	Beta	15	4.0	5	10		80B
Uranium 233/234		1.0	0.31	0.2	0.3		U
Uranium 235	15117-96-1	0.024	0.049	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.58	0.21	0.2	0.3		U
Plutonium 238	13981-16-3	0.011	0.023	0.05	0.05	U	PU
Plutonium 239/240		0.014	0.011	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.005	0.011	0.02	0.05	U	AM
Strontium 90	10098-97-2	-0.27	0.32	0.9		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.92				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	~~U~~ UJ	GAM
Europium 152	14683-23-9	U		0.1	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.06	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.63	0.091				GAM
Thorium 228	14274-82-9	1.3	0.077				GAM
Thorium 232	7440-29-1	1.0	0.19				GAM

gj 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-17

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NF8

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-17	Client sample id	B07NF8
Dept sample id	7131-017	Matrix	SOIL
Received	11/25/92	Collected	11/20/92
% moisture	21.4	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	7.5	4.0	3	10	J	80A
Gross Beta	Beta	16	4.0	5	10		80B
Uranium 233/234		1.0	0.24	0.09	0.3		U
Uranium 235	15117-96-1	0.072	0.058	0.1	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.80	0.21	0.09	0.3		U
Plutonium 238	13981-16-3	-0.028	0.022	0.06	0.05	U	PU
Plutonium 239/240		0.003	0.017	0.03	0.05	U	PU
Americium 241	14596-10-2	0.006	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	-0.39	0.92	0.8		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	12	0.86				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.14	0.051		0.05	~~-~~ J	GAM
Europium 152	14683-23-9	U		0.09	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.06	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.60	0.088				GAM
Thorium 228	14274-82-9	1.1	0.063				GAM
Thorium 232	7440-29-1	0.99	0.20				GAM

OJ 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8838

N211152-18

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NG0

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-18	Client sample id	B07NG0
Dept sample id	7131-018	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	32.0	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	5.2	4.4	5	10	J	80A
Gross Beta	Beta	13	4.3	6	10		80B
Uranium 233/234		0.53	0.21	0.2	0.3		U
Uranium 235	15117-96-1	0	0.049	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.57	0.21	0.2	0.3		U
Plutonium 238	13981-16-3	0.005	0.024	0.04	0.05	U	PU
Plutonium 239/240		0.005	0.009	0.02	0.05	U	PU
Americium 241	14596-10-2	0.004	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	0.25	1.2	0.9		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.0				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.8		U	GAM
Cesium 134	17967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	0.27	0.056		0.05	— J	GAM
Europium 152	14683-23-9	U		0.09	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.06	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.71	0.073				GAM
Thorium 228	14274-82-9	0.91	0.062				GAM
Thorium 232	7440-29-1	0.89	0.20				GAM

gj 5/14/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

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N211152-19

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NG1

SDG	7131	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211152-19	Client sample id	B07NG1
Dept sample id	7131-019	Matrix	SOIL
Received	12/02/92	Collected	11/22/92
% moisture	28.6	Chain of custody id	199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	2.7	4.4	6	10	U	80A
Gross Beta	Beta	14	3.9	5	10		80B
Uranium 233/234		0.45	0.23	0.2	0.3		U
Uranium 235	15117-96-1	0.081	0.11	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0.67	0.24	0.2	0.3		U
Plutonium 238	13981-16-3	0.006	0.024	0.05	0.05	U	PU
Plutonium 239/240		-0.003	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0.007	0.014	0.02	0.05	U	AM
Strontium 90	10098-97-2	0	0.45	0.8		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	0.82				GAM
Iron 59		U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	0.11	0.035		0.05	~~-~~ J	GAM
Europium 152	14683-23-9	U		0.09	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.06	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.66	0.080				GAM
Thorium 228	14274-82-9	1.1	0.072				GAM
Thorium 232	7440-29-1	0.91	0.16				GAM

gj 5/18/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	03/11/93

9613492.8840

N211152-20

TMA NORCAL
REPORTING GROUP 7131

DATA SHEET

B07NG2

SDG 7131
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-20
Dept sample id 7131-020
Received 12/02/92
% moisture 20.5
Client sample id B07NG2
Matrix SOIL
Collected 11/22/92
Chain of custody id 199806_226

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS Q	TEST
Gross Alpha	Alpha	15	4.8	3	10		80A
Gross Beta	Beta	16	4.3	5	10		80B
Uranium 233/234		0.98	0.30	0.1	0.3		U
Uranium 235	15117-96-1	0.13	0.086	0.2	0.3	~~U~~ UL	U
Uranium 238	7440-61-1	0.68	0.23	0.1	0.3		U
Plutonium 238	13981-16-3	0.003	0.007	0.02	0.05	U	PU
Plutonium 239/240		0.002	0.007	0.01	0.05	U	PU
Americium 241	14596-10-2	-0.004	0.012	0.03	0.05	U	AM
Strontium 90	10098-97-2	0.40	0.26	0.9		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	15	0.75				GAM
Iron 59		U		0.2	0.05	U	GAM
Chromium 51	14392-02-0	U		2		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	17982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	17967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	~~U~~ UJ	GAM
Europium 152	14683-23-9	U		0.08	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.06	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	0.95	0.090				GAM
Thorium 228	14274-82-9	1.9	0.085				GAM
Thorium 232	7440-29-1	1.5	0.18				GAM

gj 5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8841

N211152-22

TMA NORCAL
REPORTING GROUP 7131

REAGENT BLANK

Reagent Blank

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-22
Dept sample id 7131-022

Matrix SOIL
Material

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	4.2	5.5	7	10	U	80A
Gross Beta	Beta	0.53	3.2	5	10	U	80B
Uranium 233/234		0.023	0.093	0.2	0.3	U	U
Uranium 235	15117-96-1	-0.028	0.056	0.2	0.3	~~U~~ UR	U
Uranium 238	7440-61-1	0	0.046	0.2	0.3	U	U
Plutonium 238	13981-16-3	-0.012	0.041	0.08	0.05	U	PU
Plutonium 239/240		0	0.008	0.03	0.05	U	PU
Americium 241	14596-10-2	-0.022	0.020	0.04	0.05	U	AM
Strontium 90	10098-97-2	-0.096	0.98	0.8		U	Y
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		0.1		U	GAM
Iron 59		U		0.03	0.05	U	GAM
Chromium 51	14392-02-0	U		0.09		U	GAM
Cobalt 60	10198-40-0	U		0.01	0.05	U	GAM
Zinc 65	17982-39-3	U		0.02		U	GAM
Ruthenium 106	13967-48-1	U		0.1		U	GAM
Cesium 134	17967-70-9	U		0.01		U	GAM
Cesium 137	10045-97-3	U		0.01	0.05	~~U~~ UJ	GAM
Europium 152	14683-23-9	U		0.02	0.1	~~U~~ UJ	GAM
Europium 154	15585-10-1	U		0.01	0.1	~~U~~ UJ	GAM
Radium 226	13982-67-7	U		0.03		U	GAM
Thorium 228	14274-82-9	U		0.02		U	GAM
Thorium 232	7440-29-1	U		0.05		U	GAM

gs/10/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8842

N211152-26

TMA NORCAL
REPORTING GROUP 7131

REAGENT BLANK

Reagent Blank

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-26
Dept sample id 7131-026

Matrix SOIL
Material

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Plutonium 238	13981-16-3	-0.003	0.020	0.04	0.05	U	PU
Plutonium 239/240		-0.007	0.014	0.04	0.05	U	PU
GAMMA SCAN ANALYTES							

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.23
Report date 03/11/93

9613492.8843

N211152-21

TMA NORCAL

REPORTING GROUP 7131

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-21
Dept sample id 7131-021

Matrix SOIL
Material

PARAMETER	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ADDED pCi/G	2σ ERR pCi/G	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	200	22	7	10		80A	198	7.9	101	65-135	
Gross Beta	100	8.1	6	10		80B	120	4.8	83	77-123	
Uranium 233/234	5.5	1.0	0.2	0.3		U	5.21	0.21	106	69-131	
Uranium 235	0.37	0.23	0.2	0.3		U	0.236	0.019	157	-48-248	
Uranium 238	5.6	1.1	0.2	0.3		U	5.21	0.21	108	67-133	
Plutonium 238	0.022	0.036	0.07	0.05	U	PU	0	0			
Plutonium 239/240	1.0	0.16	0.06	0.05		PU	1.04	0.042	96	74-126	
Americium 241	0.95	0.18	0.1	0.05		AM	1.04	0.042	91	73-127	
Strontium 90	15	2.4	0.8			Y	15.1	0.60	99	71-129	
GAMMA SCAN ANALYTES											
Potassium 40	U		0.3		U	GAM					
Iron 59	U		0.05	0.05	U	GAM					
Chromium 51	U		0.1		U	GAM					
Cobalt 60	0.22	0.034		0.05		GAM	0.246	0.010	89	70-130	
Zinc 65	U		0.05		U	GAM					
Ruthenium 106	U		0.2		U	GAM					
Cesium 134	U		0.02		U	GAM					
Cesium 137	0.17	0.027		0.05		GAM	0.165	0.007	103	65-135	
Europium 152	U		0.03	0.1	U	GAM					
Europium 154	U		0.02	0.1	U	GAM					
Radium 226	U		0.03		U	GAM					
Thorium 228	U		0.02		U	GAM					
Thorium 232	U		0.09		U	GAM					

gj 5/19/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 03/11/93

9613492.8844

N211152-25

TMA NORCAL

REPORTING GROUP 7131

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211152-25
Dept sample id 7131-025

Matrix SOIL
Material

PARAMETER	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ADDED pCi/G	2σ ERR pCi/G	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Plutonium 238	-0.009	0.019	0.05	0.05	U	PU	0	0			
Plutonium 239/240	0.93	0.13	0.03	0.05		PU	0.900	0.036	103	76-124	
GAMMA SCAN ANALYTES											

LAB CONTROL SAMPLES
Page 2
SUMMARY DATA SECTION
Page 15

5/18/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.23
Report date 03/11/93

9613492.8845

N211152-23

TMA NORCAL

REPORTING GROUP 7131

REPLICATE

B07NF0

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N211152-23
Dept sample id 7131-023

ORIGINAL
Lab sample id N211152-01
Dept sample id 7131-001
Received 11/24/92
% moisture 55.4

Client sample id B07NF0
Matrix SOIL
Collected 11/19/92
Chain of custody id 199806 226

PARAMETER	REPLICATE pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS Q	TEST	ORIGINAL pCi/G	2σ ERR (COUNT)	MDA pCi/G	QUALI-FIERS Q	RPD %	3σ PRO TOT LIMI
Gross Alpha	4.5	6.4	9	10	U	80A	8.7	5.5	6	J	64	197
Gross Beta	8.6	3.7	5	10	J	80B	12	3.9	5		33	85
Uranium 233/234	1.1	0.36	0.2	0.3		U	0.84	0.32	0.2		27	76
Uranium 235	0	0.065	0.3	0.3	~~U~~ UL	U	0.030	0.060	0.2	~~U~~ UL	-	
Uranium 238	0.59	0.28	0.2	0.3		U	0.69	0.27	0.2		16	92
Plutonium 238	-0.005	0.014	0.03	0.05	U	PU	0.005	0.021	0.04	U	-	
Plutonium 239/240	0.007	0.014	0.02	0.05	U	PU	0.003	0.016	0.03	U	-	
Americium 241	0.008	0.021	0.04	0.05	U	AM	0.012	0.018	0.03	U	-	
Strontium 90	-0.35	1.1	0.9		U	Y	-0.10	0.52	0.2	U	-	
GAMMA SCAN ANALYTES												

gjs 7/19/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.23
Report date 03/11/93

9613492.8846

N211152-24

TMA NORCAL

REPORTING GROUP 7131

REPLICATE

B07NF1

SDG 7131
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N211152-24
Dept sample id 7131-024

ORIGINAL
Lab sample id N211152-02
Dept sample id 7131-002
Received 11/24/92
% moisture 23.3

Client sample id B07NF1
Matrix SOIL
Collected 11/19/92
Chain of custody id 199806 226

PARAMETER	REPLICATE pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	Q	TEST	ORIGINAL pCi/G	2σ ERR (COUNT)	MDA pCi/G	QUALI-FIERS	Q	RPD %	3σ TOT	PROT LIMIT
GAMMA SCAN ANALYTES															
Potassium 40	10	2.0					GAM	12	0.96				18	45	
Iron 59	U		1	0.05	U		GAM	U		0.3	U		-		
Chromium 51	U		7		U		GAM	U		2	U		-		
Cobalt 60	0.22	0.10		0.05			GAM	0.20	0.058				10	89	
Zinc 65	U		0.5		U		GAM	U		0.2	U		-		
Ruthenium 106	U		1		U		GAM	U		0.5	U		-		
Cesium 134	U		0.2		U		GAM	U		0.06	U		-		
Cesium 137	1.3	0.22		0.05			GAM	0.48	0.066				92	53	
Europium 152	0.86	0.28		0.1			GAM	0.35	0.087				84	80	
Europium 154	0.57	0.19		0.1			GAM	U		0.2	U		96	113	
Radium 226	0.60	0.31					GAM	0.54	0.097				11	91	
Thorium 228	0.87	0.27					GAM	0.91	0.10				4	58	
Thorium 232	U		0.8		U		GAM	0.74	0.18				8	163	

CJS 11/10/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.23
Report date 03/11/93

9613492.8847

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

9613492.8848

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

PROJECT: Columbia Rvr. Sediments	VALIDATOR: cy	DATE: 4/15/93
LABORATORY: TMA - Norcal	DATA PACKAGE: B07NC8-TMA-355	
SAMPLES/MATRIX: Sediments: B07NC8, B07ND1, B07ND4, B07ND5, B07ND6, B07ND7, B07ND8, B07ND9, B07NF0, B07NF1, B07NF2, B07NF3, B07NF4, B07NF5, B07NF6, B07NF7, B07NF8, B07NG0, B07NG1, B07NG2 (20)		

1. Completeness

1.1 Completeness Checklist (Complete the appropriate checklist for each analysis type and attach). Not required for Col River Sed Data.

2. Calibration

2.1 Initial Calibration

Was instrument calibrated within specified time period or annually? Yes No N/A

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

Was each detector used for the associated data calibrated? Yes No N/A

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

Are calibration standards NIST traceable or equivalent? Yes No N/A

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

Were calibration standards expired? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

2.2 Continuing Calibration

Is check source identified by activity and radionuclides? Yes No N/A

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

Has check source been counted daily? Yes No N/A

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

Are check source counts within ±3S control limits? Yes No N/A

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

Have background counts been performed at least weekly and before and after all field and QC samples associated with the SDG? Yes No N/A

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

Are background counts within ±3S control limits? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

3. Blanks

Have reagent/method/field blanks been analyzed with the SDG? Yes No N/A

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

Are positive results reported in the reagent/method/field blanks? Yes No N/A

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

Can blank results be verified/calculated properly? Yes No N/A

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

5. Radiometric and Gravimetric Yields

Were spikes/tracers/chemical yields analyzed in each SDG and/or sample as appropriate for the analytical method? Yes No N/A

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

Was a field blank used for the spike/tracer/chemical yield analysis? Yes No N/A

If YES, note in the validation narrative.

Is spike/tracer/chemical yield recovery within the limits of 30-105% for sample results <4X the spike activity? Yes No N/A

Verify the spike recoveries and qualify associated results as follows:

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

Comments: Yields are <30% for the following:

Pu 238/239/240 – 29% for B07NF5
23% for B07NF6

Am 241 21% for B07NF5
29% for B07ND9

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

6. Duplicate Samples and Analyses

Has at least one duplicate analysis been performed for every 10 samples in the SDG? See comment — Yes (No) N/A

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

Has the field blank been used for duplicate or MS/MSD analysis? Yes (No) N/A

Are RPD values ≤35% for results >5X the LLD and within ±2X the LLD for results <5X the LLD? See comment — Yes (No) N/A

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

Comments: (1) One duplicate was analyzed for 20 samples - no qualification of the data is necessary.

(2) Cesium-137, Eu-152 and Eu-154 RPDs were out (92%), (84%) (96%) respectively, when sample values were 75X for RDL. All results were qualified as J or UJ.

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

7. Laboratory Control Samples

Are LCS results within the control limits of 80-120% — Yes (No) N/A

If NO, qualify results as follows:

%R:	<50%	50-79%	>120%
Results < LLD:	R	UJ	R
Results > LLD:	R	J	R

Has at least one LCS been analyzed with the SDG? — (Yes) No N/A

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

Comments: The LCS for U-235 is 154 %R so all results were qualified as R

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

8. Holding Times

Have all samples/analyses been completed within 5 half-lives or 180 days, whichever comes first? (Yes) No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9. Method Specific and Other Quality Control

9.1 Gas Proportional Counters

Are field and QC sample preparations outside the range of the self absorption curves? Yes No N/A

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

Are initial detector efficiencies <20%? Yes No N/A

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

Have statistical tests been performed routinely (at least weekly)? Yes No N/A

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

Have stability verifications been performed after each gas change? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.2 Alpha Spectroscopy

Has detector system been calibrated across the energy range of interest? Yes No N/A

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

Is detector resolution adequate to identify each peak centroid? Yes No N/A

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

Is resolution at least 20 keV FWHM? Yes No N/A

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

Do check source efficiencies agree within 5% of initial calibration efficiencies or are they within the control limits or ±3S of the mean? Yes No N/A

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

Was each sample spiked with a tracer? Yes No N/A

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

Are tracer recoveries within the control limits of 30 to 105%? Yes No N/A

If NO, qualify all results as follows:

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

Comments: Pu yields out for B07NF5 + B07NF6

Am Tracer % R out for B07NF6 & B07ND9

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.3 Gamma Spectroscopy

Does efficiency calibration approximate a smooth semi-log curve? Yes No N/A

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

Have geometry or matrix factors been accounted for in all analyses? Yes No N/A

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

Does the detector calibration cover the energy range of interest and at least 0 to 2 MeV? Yes No N/A

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

Is resolution of the detector system adequate and less than 5 FWHM? Yes No N/A

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

Comments:

9.4 Alpha Emitting Radium Isotopes

Have single radium isotopes (Ra-223, Ra-224, Ra-226) been reported? Yes No N/A

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

Can time from sample precipitation to counting be verified? Yes No N/A

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

Have barium interferences been identified and accounted for? Yes No N/A

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

Has counting efficiency for Ra-226 been determined for each SDG? Yes No N/A

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

Have blanks been analyzed with each group to check for possible radium contamination in the reagents? Yes No N/A

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

If sample was preserved at collection has analysis been completed within 180 days or 5 half-lives? Yes No N/A

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

If samples were not preserved, were samples received within 5 days of sampling? Yes No N/A

- Were samples preserved at the laboratory upon receipt? Yes No N/A
- Were samples held after preservation for at least 16 days? Yes No N/A

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

Comments:_____

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.5 Radium 226 Analysis using Scintillation (Lucas) Cell Counting

Is calibration data present and can it be associated with the samples? Yes No N/A

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

Was the counting system calibrated each day that samples were analyzed? Yes No N/A

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

Was the counting system calibrated after replacing the scintillation cell? Yes No N/A

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

Were blanks analyzed with each sample group to check for radium contamination in reagents? Yes No N/A

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

If sample was preserved at collection has analysis been completed within 180 days or 5 half-lives? Yes No N/A

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

If samples were not preserved, were samples received within 5 days of sampling? Yes No N/A

- Were samples preserved at the laboratory upon receipt? Yes No N/A
- Were samples held after preservation for at least 16 days? Yes No N/A

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

Comments:_____

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.6 Tritium Analysis by Liquid Scintillation Counting

Do calibration standard matrices match the sample matrices? Yes No N/A

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

Has at least one calibration standard been processed with the samples? Yes No N/A

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

Have results for counting efficiency determination been provided? Yes No N/A

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

Do tritium levels in the blanks exceed the MDA? Yes No N/A

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

Have blanks been analyzed with each sample run to check for potential contamination in the chemical reagents? Yes No N/A

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

Comments:

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.7 Fluorometric Analysis of Uranium

Has the laboratory provided evidence that cation and anion interferences are negligible for the matrix or that matrix interferences have been accounted for? Yes No N/A

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

Has the laboratory provided a description of the method of fusion standardization or provided data supporting fusion standardization? Yes No N/A

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

Was calibration performed immediately prior to sample analysis? Yes No N/A

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

Comments:

9613492.8062

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Comments:

9613492.8863

Golder Associates

SUBJECT Calcs B07NC8-TMA-355

Job No. 923-E018 | Made by C Jensen | Date 4/26/93

Ref. | Checked | Sheet 1 of 6

Reviewed

Gross α+β

α	β
B07NF0 cpm $\frac{.217-(.006\times1.149)}{1-(.006\times.284)}=.2105$	$\frac{1.149-(.284\times.217)}{1-(.006\times.284)}=1.02$
pCi dpm/spl = .2105/2.22×.110×.1 = 86185	1.0892/2.22×.415×.1 = 11
MDA = $\frac{4.66\times\sqrt{\frac{.2105}{100}}}{2.22\times.110\times.1}=8.7552$	$\frac{4.66\times\sqrt{\frac{1.0892}{100}}}{2.22\times.415\times.1}=5.2788$
B07NF1 cpm = $\frac{.169-(.006\times.886)}{1-(.006\times.2732)}=.164$	$\frac{.886-(.273\times.169)}{1-(.006\times.2732)}=.841$
pCi dpm/spl .164/2.22×.129×.1 = 5.72	.8412/2.22×.419×.1 = 9.043
MDA $\frac{4.66\times\sqrt{\frac{.164}{100}}}{2.22\times.129\times.1}=6.5897$	$\frac{4.66\times\sqrt{\frac{.8412}{100}}}{2.22\times.419\times.1}=4.5$
B07NF2 cpm = $\frac{.042-(.006\times1.128)}{1-(.006\times.312)}=.0353$	$\frac{1.128-(.312\times.042)}{1-(.006\times.312)}=1.1170$
pCi dpm/spl = .0353/2.22×.09×.1 = 1.7667	1.117/2.22×.408×.1 = 12.3
MDA = $\frac{4.66\times\sqrt{\frac{.0353}{100}}}{2.22\times.09\times.1}=4.382$	$\frac{4.66\times\sqrt{\frac{1.117}{100}}}{2.22\times.408\times.1}=5.43$
B07ND4 cpm = $\frac{.155-(.006\times1.606)}{1-(.006\times.2693)}=.1456$	$\frac{1.606-(.269\times.155)}{1-(.006\times.269)}=1.56$
pCi dpm/spl = .1456/2.22×.135×.1 = 4.8592	1.5668/2.22×.42×.1 = 1
MDA = $\frac{4.66\times\sqrt{\frac{.1456}{100}}}{2.22\times.135\times.1}=5.9331$	$\frac{4.66\times\sqrt{\frac{1.5668}{100}}}{2.22\times.42\times.1}=6.25$
LCS $\frac{3.397-(.006\times10.257)}{1-(.006\times.333)}=3.346$	$\frac{10.257-(.333\times3.397)}{1-(.006\times.333)}=$
pCi dpm/spl = 3.346/2.22×.076×1.0 = ~~15.61~~ 19.83	9.144/2.22×.405×1 = 10.
MDA = $\frac{4.66\sqrt{\frac{3.346}{100}}}{2.22\times.076\times1.0}=5.0.52$	$\frac{4.66\times\sqrt{\frac{9.144}{100}}}{2.22\times.405}=1.5673$

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Golder Associates

SUBJECT	B07NC8-TMA-355	
Job No. / Ref.	Made by C Jusan / Checked / Reviewed	Date 4/26/93 / Sheet 2 of 6

Gross α + β contd.

Blank

α

cpm $\frac{.067-(.006\times.071)}{1-(.006\times.344)} = .0667$

β

$\frac{.071-(.344\times.067)}{1-(.006\times.344)} = .04$

pCi/spl .0667 / 2.22 x .072 = .4173

.0481 / 2.22 x .403 = .05

MDA =

$\frac{4.66\times\sqrt{\frac{.0667}{100}}}{2.22\times.072} = .7529$

$\frac{4.66\times\sqrt{\frac{.0481}{100}}}{2.22\times.403} = .1142$

Replicate cpm $\frac{.074-(.006\times.789)}{1-(.006\times.35)} = .0694$

$\frac{.789-(.35\times.006)}{1-(.006\times.35)} = .78$

pCi/spl = .0694/2.22 x .07 x .1 = 4.4667

.7886/2.22 x .402 x .1 = 8.9

MDA =

$\frac{4.66\times\sqrt{\frac{.0694}{100}}}{2.22\times.07\times.1} = 7.8998$

$\frac{4.66\times\sqrt{\frac{.7886}{100}}}{2.22\times.402\times.1} = 4.63$

Sr-90 calc.

B07NF0 product = .5957

dpm/g = -.13217 x 1.759 = -.2325

-.2325/2.22 = -.1047

MDA = $\frac{4.66\times\sqrt{\frac{.5586}{622.1}}\times1.759}{2.22\times.5957} = .1856$

B07NF1 prod = .8575

dpm/g = .13663 x 1.759 = .2403/2.22 = .1082

MDA = $\frac{4.66\sqrt{\frac{.5438}{622.1}}\times1.759}{2.22\times.8575} = .12$

B07NF2 prod = .8101

dpm/g = -.0063106 x 1.759 = -.0111

MDA = $\frac{4.66\times\sqrt{\frac{.4912}{622.1}}\times1.759}{2.22\times.8101} =$

B07ND4 prod = .7976

dpm/g = -.58815 x 1.759 = -1.0346

-1.0346/2.22 = -.4660

MDA = $\frac{4.66\times\sqrt{\frac{.7388}{100}}\times1.759}{2.22\times.7976} = .3479$

LCS prod = .8759

dpm/spl 18.374 x 1.759 = 32.3199

32.3199/2.22 = 14.5585

MDA = $\frac{4.66\times\sqrt{\frac{.5096}{34.27}}\times1.759}{2.22\times.8759} =$

Blank prod = .8729 dpm/spl = -2.12

pCi/spl = -2.12 / 2.22 = -.9558

MDA = $\frac{4.66\sqrt{\frac{.5779}{100}}1.759}{2.22\times.8729} = .3216$

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Golder Associates

SUBJECT Calcs B07NC8-TMA-355		
Job No. 923-E018 Ref.	Made by Cjuran Checked Reviewed	Date 4/26/93 Sheet 3 of 6

Sr90 Calcs Contd

Replicate prod = ~~1.183~~ .8359

dpm/g = -.4359 x 1.759 = -.7667

-.7667 / 2.22 = -.3454

$MDA = \frac{4.66 \times \sqrt{\frac{.6502}{34.27}}}{2.22 \times .8359} = 1.759$ .6084

Uranium Calcs

B07NF0 U238 $\frac{28}{18.193} = .6933$ U235 $\frac{1}{18.193} = .0248$ U233 $\frac{34}{18.193} = .8448$

MDA $\frac{4.66 \times \sqrt{0}}{18.193 \times 2.22 \times 1} = .1154$ MDA .1154 MDA .1154

B07NF1 $\frac{16}{16.488} = .4371$ $\frac{2}{16.488} = .0546$ $\frac{16}{16.488} = .4371$

MDA $\frac{4.66\sqrt{0}}{16.488 \times 2.22 \times 1} = .4005$ MDA = .4005 MDA = .4005

B07NF2 $\frac{33}{25.679} = .5789$ $\frac{1}{25.679} = .0175$ $\frac{21}{25.679} = .3684$

MDA $\frac{4.66 \times \sqrt{0}}{25.679 \times 2.22 \times 1} = .0817$ MDA = .0817 $\frac{4.66\sqrt{1}}{25.679 \times 2.22 \times 1} = .0817$

B07ND4 $\frac{39}{25.774} = .6816$ $\frac{-1}{25.774} = -.0175$ $\frac{33}{25.774} = .5767$

MDA =

$\frac{4.66\sqrt{0}}{25.774 \times 2.22 \times 1} = .0814$ $\frac{4.66\sqrt{1}}{25.774 \times 2.22} = .0814$ $\frac{4.66\sqrt{2}}{25.774 \times 2.22} = 0.115$

LCS $\frac{240}{19.336} = 5.591$ $\frac{13}{19.336} = .3028$ $\frac{235}{19.336} = 5.4745$

MDA

$\frac{4.66\sqrt{0}}{19.336 \times 2.22} = .1086$ .1086 .1086

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SUBJECT Calcs B07NC8 ~~8~~ 355 - TMA

Job No. Ref. 923-E018 | Made by C Jusa | Checked | Reviewed | Date 4/26/93 | Sheet 4 of 6

~~Sr-90~~ Uranium Calcs cont'd

	U238	U235	U233
Blank pCi/gal	0	$\frac{-1}{19.431} = -.0232$	$\frac{1}{19.431} = .0232$
		$\frac{-1}{2.22}$	$\frac{1}{2.22}$
MDA	$\frac{4.66\sqrt{0}}{19.431 \times 2.22} = .108$	MDA = .108	MDA = .108
Replicate	$\frac{22}{\frac{16.684}{2.22}} = .594$	0	$\frac{40}{\frac{16.684}{2.22}} = 1.08$
MDA =	$\frac{4.66\sqrt{0}}{16.684 \times 2.22} = .1258$	MDA = .1258	MDA = .1258

	Pu239	Pu238
Plutonium B07NF0	$\frac{1}{\frac{172.36}{2.22}} = .0026$	$\frac{2}{\frac{172.36}{2.22}} = .0052$
MDA	$\frac{4.66 \times \sqrt{3}}{172.36 \times 2.22} = .0211$	$\frac{4.66\sqrt{9}}{172.36 \times 2.22} = .0365$
B07NF1	$\frac{4}{\frac{140.24}{2.22}} = .0128$	$\frac{-3}{\frac{140.24}{2.22}} = -.0096$
MDA	$\frac{4.66\sqrt{1}}{140.24 \times 2.22} = .015$	$\frac{4.66\sqrt{11}}{140.24 \times 2.22} = .0496$
B07NF2	$\frac{6}{\frac{149.30}{2.22}} = .0181$	$\frac{6}{\frac{149.30}{2.22}} = .0181$
MDA =	$\frac{4.66\sqrt{1}}{149.3 \times 2.22 \times 1} = .0141$	MDA = .0141
B07ND4	$\frac{0}{\frac{121.50}{2.22}} = 0$	$\frac{-3}{\frac{121.50}{2.22}} = -.0111$
MDA	$\frac{4.66\sqrt{1}}{121.5 \times 2.22} = .0173$	$\frac{4.66\sqrt{4}}{121.5 \times 2.22} = .0346$

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SUBJECT Calcs B07NC8-TMA-355

Job No. 923-E018 Ref. | Made by C Jensen Checked Reviewed | Date 4/27/92 Sheet 5 of 6

Plutonium calcs cont'd

LCS Pu-239 | Pu-238

pCi/g $\frac{222}{\frac{100.29}{2.22}} = .9971$ | $\frac{5}{\frac{100.29}{2.22}} = .0225$

MDA $\frac{4.66\sqrt{4}}{100.29 \times 222 \times 1} = .0419$ | $\frac{4.66\sqrt{7}}{100.29 \times 2.22 \times 1} = .0554$

Blank = 0 | $\frac{-3}{\frac{108.73}{2.22}} = -.0124$

MDA = $\frac{4.66\sqrt{1}}{108.73 \times 222 \times 1} = .0193$ | $\frac{4.66\sqrt{12}}{108.73 \times 2.22 \times 1} = .0447$

Replicate

pCi/g $\frac{3}{\frac{199.96}{222}} = .0068$ | $\frac{-2}{\frac{199.96}{222}} = -.0045$

MDA = $\frac{4.66\sqrt{2}}{199.96 \times 2.22 \times 1} = .0148$ | $\frac{4.66\sqrt{3}}{199.96 \times 2.22 \times 1} = .0182$

Am241 B07NF0

pCi/g $\frac{4}{\frac{148.18}{2.22}} = .0122$ | MDA = $\frac{4.66\sqrt{5}}{148.18 \times 2.22 \times 1} = .0245$

B07NF1

pCi/g $\frac{-2}{\frac{130.62}{2.22}} = -.0069$ | MDA = $\frac{4.66\sqrt{4}}{130.62 \times 2.22 \times 1} = .0321$

B07NF2 $\frac{2}{\frac{226.92}{2.22}} = .004$ | MDA = $\frac{4.66\sqrt{5}}{226.92 \times 2.22 \times 1} = .0207$

B07ND4 0 | MDA = $\frac{4.66\sqrt{9}}{133.24 \times 2.22 \times 1} = .047$

LCS pCi/g $\frac{181}{\frac{85.599}{2.22}} = .9529$ | MDA = $\frac{4.66\sqrt{11}}{85.599 \times 2.22 \times 1} = .081$

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Golder Associates	SUBJECT Calcs B07NC8-TMA-355		
	Job No. Ref. 923-E018	Made by Checked Reviewed C Jensen	Date 4/27/93 Sheet 6 of 6

Am241 Calcs Cont'd

Blank

$$\frac{\frac{-9}{182.30}}{2.22} = -.0222 \qquad MDA = \frac{4.66\sqrt{10}}{182.3 \times 2.22 \times 1} = .0364$$

Replicate

$$\frac{\frac{4}{213.59}}{2.22} = .0084 \qquad MDA = \frac{4.66\sqrt{10}}{213.59 \times 2.22 \times 1} = .0311$$

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MEMORANDUM

TO: Columbia River Sediment Project QA Record April 9, 1993

FR: Christina Jensen, Golder Associates Inc.

RE: Inorganics Analysis Data Validation Summary for B07ND4-TMA-353

INTRODUCTION

This memo presents the results of data validation on data package B07ND4-TMA-353 consisting of eight sediment samples submitted for inorganics analysis. The samples were analyzed by TMA/Skinner & Sherman using CLP protocols. A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA
B07ND4	11/19/92	SEDIMENT
B07ND5	11/19/92	SEDIMENT
B07ND6	11/19/92	SEDIMENT
B07ND7	11/19/92	SEDIMENT
B07ND8	11/19/92	SEDIMENT
B07NF0	11/19/92	SEDIMENT
B07NF1	11/19/92	SEDIMENT
B07NF2	11/19/92	SEDIMENT

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (Bechtold 1992). Attachments 1 through 4 to this memo provide the data validation supporting documentation and a summary of the validated results.

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met with the exception of antimony spike recoveries and selenium and thallium GFAA analytical spike recoveries.

Sample Result Verification. All sample results were supported in the raw data with no data correction necessary.

Detection Limits. Detection limit goals were met for all analyses.

Completeness. The data package was complete for all requested analyses. A total of eight samples were validated in this data set with a total of 184 determinations reported. Out of the 184 determinations reported a total of 184 determinations were deemed valid which results in a completeness of 100 percent. This completeness percentage meets the work plan objectives of 90%.

MAJOR DEFICIENCIES

There were no major deficiencies identified requiring rejection of the data.

MINOR DEFICIENCIES

Blanks

Cadmium was detected in the laboratory blanks. Samples B07ND4, B07ND5, B07ND7, B07NF0, B07NF1 and B07NF2 have been qualified as undetected (U) since the concentrations were less than five times the associated blank concentrations.

Matrix Spike

Antimony spike results exceeded the QC limits of 75% to 125% with results qualified as estimated (J for detects, UJ for nondetects).

GFAA Analytical Spikes

The analytical spike percent recoveries exceeded the QC limits of 85% to 115% for the following samples and analytes and the associated sample results have been qualified as estimated (J for detects, UJ for nondetects):

Sample	Analyte
B07ND7, B07NF2	Selenium
B07NF1	Thallium

REFERENCES

WHC, 1993, Westinghouse Hanford Company, Validation of Columbia River Sediment Data, Statement of Work, Revision 0, January 1993. Westinghouse Hanford Company, Richland, Washington.

Bechtold, 1992, Westinghouse Hanford Company, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 1, 1992. Westinghouse Hanford Company, Richland, Washington.

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the analyte was analyzed for and detected. The value reported is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). The data are usable for decision making purposes.

U - Indicates the analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.

UJ - Indicates the analyte was analyzed for and not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.

J - Indicates the analyte was analyzed for and detected. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

UR - Indicates the analyte was analyzed for and not detected; however, due to an identified quality control deficiency the data are unusable.

R - Indicates the analyte was analyzed and detected; however, due to an identified quality control deficiency the data are unusable.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B07ND4	REVIEWER: [illegible]	DATE: 4/8/93	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Cadmium	U	B07ND4, B07ND5	Blank Contam.
↓	↓	B07ND7, B07NF0	↓
↓	↓	B07NF1, B07NF2	↓
Antimony	J or UJ	all	SSR out
Selenium	↓	B07ND7, B07NF2	GFAA Spike out
Thallium	↓	B07NF1	↓

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ATTACHMENT 3

AS QUALIFIED DATA SUMMARY

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND4

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-01S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 76.2

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5290			P	
7440-36-0	Antimony	4.1	~~U~~	N	P	UJ
7440-38-2	Arsenic	2.9	B		F	
7440-39-3	Barium	45.5	B		P	
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.33	~~B~~		P	U
7440-70-2	Calcium	3650			P	
7440-47-3	Chromium	10.3			P	
7440-48-4	Cobalt	5.4	B		P	
7440-50-8	Copper	26.0			P	
7439-89-6	Iron	13100			P	
7439-92-1	Lead	18.0		S	F	
7439-95-4	Magnesium	3800			P	
7439-96-5	Manganese	193			P	
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	10.0			P	
7440-09-7	Potassium	716	B		P	
7782-49-2	Selenium	3.4	U		F	
7440-22-4	Silver	0.61	U		P	
7440-23-5	Sodium	279	B		P	
7440-28-0	Thallium	0.30	U		F	
7440-62-2	Vanadium	27.9			P	
7440-66-6	Zinc	192			P	
	Cyanide				NR	

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

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FORM I - IN ILM02.0

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WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07ND5

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-02S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 79.7

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5740			P	
7440-36-0	Antimony	4.0	~~U~~	N	P	UJ
7440-38-2	Arsenic	3.5			F	
7440-39-3	Barium	50.9			P	
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.45	~~B~~		P	U
7440-70-2	Calcium	4020			P	
7440-47-3	Chromium	9.4			P	
7440-48-4	Cobalt	5.4	B		P	
7440-50-8	Copper	34.2			P	
7439-89-6	Iron	13100			P	
7439-92-1	Lead	21.6			F	
7439-95-4	Magnesium	3870			P	
7439-96-5	Manganese	251			P	
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	8.9	B		P	
7440-09-7	Potassium	736	B		P	
7782-49-2	Selenium	0.72	U		F	
7440-22-4	Silver	0.59	U		P	
7440-23-5	Sodium	339	B		P	
7440-28-0	Thallium	0.32	U		F	
7440-62-2	Vanadium	26.4			P	
7440-66-6	Zinc	216			P	
	Cyanide				NR	

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

cj 4/8/93

FORM I - IN ILM02.0

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND6

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-03S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 96.4

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5580			P	Q
7440-36-0	Antimony	3.3	~~U~~	N	P	UJ
7440-38-2	Arsenic	2.7			F	
7440-39-3	Barium	51.9			P	
7440-41-7	Beryllium	0.08	U		P	
7440-43-9	Cadmium	0.20	U		P	
7440-70-2	Calcium	9120			P	
7440-47-3	Chromium	10.6			P	
7440-48-4	Cobalt	5.1	B		P	
7440-50-8	Copper	20.7			P	
7439-89-6	Iron	13400			P	
7439-92-1	Lead	23.6			F	
7439-95-4	Magnesium	3840			P	
7439-96-5	Manganese	195			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	10.5			P	
7440-09-7	Potassium	653	B		P	
7782-49-2	Selenium	0.58	U		F	
7440-22-4	Silver	0.49	U		P	
7440-23-5	Sodium	224	B		P	
7440-28-0	Thallium	0.26	U		F	
7440-62-2	Vanadium	26.9			P	
7440-66-6	Zinc	144			P	
	Cyanide				NR	

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts: YES

Comments:
SHELLS

Cj 4/8/93

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WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07ND7

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-04S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 78.2

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

CAS No.	Analyte	Concentration	C	Q	M	
						Q
7429-90-5	Aluminum	6020			P	
7440-36-0	Antimony	4.2	~~U~~	N	P	UJ
7440-38-2	Arsenic	3.1			F	
7440-39-3	Barium	53.1			P	
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	0.39	~~B~~		P	U
7440-70-2	Calcium	3880			P	
7440-47-3	Chromium	12.9			P	
7440-48-4	Cobalt	6.0	B		P	
7440-50-8	Copper	27.5			P	
7439-89-6	Iron	14200			P	
7439-92-1	Lead	20.6		S	F	
7439-95-4	Magnesium	4230			P	
7439-96-5	Manganese	250			P	
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	12.6			P	
7440-09-7	Potassium	797	B		P	
7782-49-2	Selenium	0.66	~~U~~	W	F	UJ
7440-22-4	Silver	0.63	U		P	
7440-23-5	Sodium	299	B		P	
7440-28-0	Thallium	0.39	B		F	
7440-62-2	Vanadium	30.0			P	
7440-66-6	Zinc	203			P	
	Cyanide				NR	

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

gj 4/8/93

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WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07ND8

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-05S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 97.9

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5260			P	
7440-36-0	Antimony	3.4	~~U~~	N	P	UJ
7440-38-2	Arsenic	2.2			F	
7440-39-3	Barium	40.0	B		P	
7440-41-7	Beryllium	0.08	U		P	
7440-43-9	Cadmium	0.20	U		P	
7440-70-2	Calcium	2140			P	
7440-47-3	Chromium	9.2			P	
7440-48-4	Cobalt	4.0	B		P	
7440-50-8	Copper	6.9			P	
7439-89-6	Iron	11400			P	
7439-92-1	Lead	3.4			F	
7439-95-4	Magnesium	3690			P	
7439-96-5	Manganese	164			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	10.7			P	
7440-09-7	Potassium	563	B		P	
7782-49-2	Selenium	0.58	U		F	
7440-22-4	Silver	0.50	U		P	
7440-23-5	Sodium	103	B		P	
7440-28-0	Thallium	0.26	U		F	
7440-62-2	Vanadium	23.2			P	
7440-66-6	Zinc	26.8			P	
	Cyanide				NR	

Color Before: GREY Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF0

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-06S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 43.5

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7400			P	
7440-36-0	Antimony	7.5	~~U~~	N	P	UJ
7440-38-2	Arsenic	1.9	B		F	
7440-39-3	Barium	55.2	B		P	
7440-41-7	Beryllium	0.18	U		P	
7440-43-9	Cadmium	3.4	–		P	~~J~~ U
7440-70-2	Calcium	5070			P	
7440-47-3	Chromium	14.1			P	
7440-48-4	Cobalt	5.7	B		P	
7440-50-8	Copper	23.1			P	
7439-89-6	Iron	13900			P	
7439-92-1	Lead	32.0			F	
7439-95-4	Magnesium	3870			P	
7439-96-5	Manganese	181			P	
7439-97-6	Mercury	0.10	B		CV	
7440-02-0	Nickel	11.2	B		P	
7440-09-7	Potassium	962	B		P	
7782-49-2	Selenium	1.2	U		F	
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	364	B		P	
7440-28-0	Thallium	0.82	B		F	
7440-62-2	Vanadium	35.9			P	
7440-66-6	Zinc	377			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

cj 4/8/93

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WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B07NF1

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-07S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 78.8

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5220			P	
7440-36-0	Antimony	3.8	~~U~~	N	P	UJ
7440-38-2	Arsenic	2.0	B		F	
7440-39-3	Barium	52.8			P	
7440-41-7	Beryllium	0.11	B		P	
7440-43-9	Cadmium	1.1	~~B~~		P	~~J~~ U
7440-70-2	Calcium	3990			P	
7440-47-3	Chromium	47.0			P	
7440-48-4	Cobalt	8.8	B		P	
7440-50-8	Copper	15.9			P	
7439-89-6	Iron	17800			P	
7439-92-1	Lead	18.6			F	
7439-95-4	Magnesium	3700			P	
7439-96-5	Manganese	207			P	
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	7.9	B		P	
7440-09-7	Potassium	661	B		P	
7782-49-2	Selenium	0.69	U		F	
7440-22-4	Silver	0.81	~~B~~		P	J
7440-23-5	Sodium	213	B		P	
7440-28-0	Thallium	0.61	~~B~~	W	F	J
7440-62-2	Vanadium	44.4			P	
7440-66-6	Zinc	221			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B07NF2

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

Lab Code: SKINER Case No.: N2-11-183SAS No.: SDG No.: B07ND4

Matrix (soil/water): SOIL Lab Sample ID: 11332-08S

Level (low/med): LOW Date Received: 11/25/92

% Solids: 70.4

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	9680			P	
7440-36-0	Antimony	4.3	~~U~~	N	P	UJ
7440-38-2	Arsenic	4.4			F	
7440-39-3	Barium	89.3			P	
7440-41-7	Beryllium	0.10	U		P	
7440-43-9	Cadmium	1.7			P	~~J~~U
7440-70-2	Calcium	4470			P	
7440-47-3	Chromium	21.9			P	
7440-48-4	Cobalt	8.8	B		P	
7440-50-8	Copper	21.3			P	
7439-89-6	Iron	18500			P	
7439-92-1	Lead	27.3			F	
7439-95-4	Magnesium	5230			P	
7439-96-5	Manganese	209			P	
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	16.2			P	
7440-09-7	Potassium	1500			P	
7782-49-2	Selenium	0.78	~~U~~		F	UJ
7440-22-4	Silver	0.64	U		P	
7440-23-5	Sodium	237	B		P	
7440-28-0	Thallium	0.46	B		F	
7440-62-2	Vanadium	40.6			P	
7440-66-6	Zinc	257			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
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FORM I - IN ILM02.0

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ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Columbia River Sediments	REVIEWER: cj	DATE: 4/7/98
LABORATORY: TMB Skinner + Sherman	CASE: N2-11-183	SDG: B07ND4
SAMPLES/MATRIX: soils B07ND4, B07ND5, B07ND6, B07ND7, B07ND8, B07NF0, B07NF1, B07NF2, B07NF2D, B07NF2S		

1. COMPLETENESS AND CONTRACT COMPLIANCE

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

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

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

2. HOLDING TIMES

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

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

3. INITIAL CALIBRATIONS

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

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

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

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

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

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

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

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

5. ICP INTERFERENCE CHECK SAMPLE

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

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

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

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

6. LABORATORY BLANKS

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

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

7. FIELD BLANKS

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

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

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? 9/18/93 Yes No N/A

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

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

9. LABORATORY CONTROL SAMPLE

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

Are there calculation errors? Yes No N/A

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

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

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

10. PERFORMANCE AUDIT ANALYSES

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

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

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

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

12. ICP SERIAL DILUTION

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

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

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

13. FIELD DUPLICATE SAMPLES

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

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

14. FIELD SPLIT SAMPLES

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

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

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

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

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

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

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

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

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

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

17. ANALYTE QUANTITATION AND DETECTION LIMITS

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

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

18. OVERALL ASSESSMENT AND SUMMARY

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

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

HOLDING TIME SUMMARY - FORM B-1

SDG:	REVIEWER: C Jensen	DATE: 4/7/92	PAGE 1 OF 1
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
all	metals	11/19/92	12/21/92	1/07/93	32	< 6 mos	none
all	mercury	11/19/92	12/02/92	12/03/92	13	~~12/10~~ 4/17/93	none

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BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B07ND4 REVIEWER: C Jensen DATE: 4/8/93 PAGE 1 OF ___

COMMENTS:

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
Blank	Cadmium	.003			ug/L	.015		B07ND4	U
								B07ND5	
								B07ND7	
								B07NF0	
								B07NF1	
								B07NF2	

ACCURACY DATA SUMMARY - FORM B-4

SDG: B07ND4	REVIEWER: C Jensen	DATE: 4/8/93	PAGE 1 OF 1
COMMENTS:			

SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B07NF2S	Antimony	67.8	all	J or UJ
	Selenium	116.59	B07ND7	
	Selenium	116.58	B07NF2	
	cj 4/8/93 ~~Selenium~~ Thallium	116.79	B07NF1	

Furnace QC out.

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Trk# 588 8690 823

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