0054094

H0994

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

OCT 2000 RECEIVED

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B00-056
RFW#: 0008L388
SDG/SAF#: H0994/B00-056

W.O.#: 10985-001-001-9999-00
Date Received: 08-29-00

REVISION This narrative has been revised to include the soluble analysis of Barium.

RECEIVED DEC 05 2000 EDMC

METALS CASE NARRATIVE

1. This narrative covers the analyses of 4 water samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary. The nitric acid preserved bottles were filtered for soluble Barium analysis.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. The duplicate analyses for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

13. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

09-28-00
Date

jjw/m08-388r

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 00082388

Leaching Procedure: __1310 __1311 __1312 __Other:_____

CLP Metals __ Digestion and __ Analysis Methods: __ILM03.0 __ILM04.0

Metals Digestion Methods: X 3005A __3010A __3015 __3020A __3050B __3051 __200.7 __SS17
__Other: _____

Metals Analysis Methods

	SW846		EPA		STD MTD	EPA OSWR	USATHAMA
Aluminum	__6010B		__200.7				__99
Antimony	__6010B	__7041 [5]	__200.7	__204.2			__99
Arsenic	X 6010B	__7060A [5]	__200.7	__206.2	__3113B		__99
Barium	X 6010B		__200.7				__99
Beryllium	__6010B		__200.7				__99
Bismuth	__6010B [1]		__200.7 [1]			__1620	__99
Boron	__6010B		__200.7				__99
Cadmium	X 6010B	__7131A [5]	__200.7	__213.2			__99
Calcium	__6010B		__200.7				__99
Chromium	X 6010B	__7191 [5]	__200.7	__218.2			__SS17
Cobalt	__6010B		__200.7				__99
Copper	__6010B	__7211 [5]	__200.7	__220.2			__99
Iron	__6010B		__200.7				__99
Lead	X 6010B	__7421 [5]	__200.7	__239.2	__3113B		__99
Lithium	__6010B	__7430 [4]	__200.7			__1620	__99
Magnesium	__6010B		__200.7				__99
Manganese	__6010B		__200.7				__99
Mercury	X 7470A [3]	__7471A [3]	__245.1 [2]	__245.5 [2]			__99
Molybdenum	__6010B		__200.7				__99
Nickel	__6010B		__200.7				__99
Potassium	__6010B	__7610 [4]	__200.7	__258.1 [4]			__99
Rare Earths	__6010B [1]		__200.7 [1]			__1620	__99
Selenium	X 6010B	__7740 [5]	__200.7	__270.2	__3113B		__99
Silicon	__6010B [1]		__200.7			__1620	__99
Silica	__6010B		__200.7			__1620	__99
Silver	X 6010B	__7761 [5]	__200.7	__272.2			__99
Sodium	__6010B	__7770 [4]	__200.7	__273.1 [4]			__99
Strontium	__6010B		__200.7				__99
Thallium	__6010B	__7841 [5]	__200.7	__279.2__200.9			__99
Tin	__6010B		__200.7				__99
Titanium	__6010B		__200.7				__99
Uranium	__6010B [1]		__200.7 [1]			__1620	__99
Vanadium	__6010B		__200.7				__99
Zinc	__6010B		__200.7				__99
Zirconium	__6010B [1]		__200.7 [1]			__1620	__99

Other:_____ Method:_____

L-WI-033/M-11/99

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LCS = Laboratory Control Sample.
NC = Not calculated.

ANALYTICAL METAL METHODS

1. Not included in the method element list.

2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).

3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).

4. Flame AA.

5. Graphite Furnace AA.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/28/00

CLIENT: TNU-HANFORD B00-056 RECRA LOT #: 0008L388

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B103C7	Silver, Total	2.6	u	UG/L	2.6	1.0
		Arsenic, Total	29.2	u	UG/L	29.2	1.0
		Barium, Total	16200		UG/L	2.5	1.0
		Cadmium, Total	4.8	u	UG/L	4.8	1.0
		Chromium, Total	4.4		UG/L	3.5	1.0
		Mercury, Total	0.10	u	UG/L	0.10	1.0
		Lead, Total	22.1	u	UG/L	22.1	1.0
		Selenium, Total	51.8	u	UG/L	51.8	1.0
-002	B103C8	Silver, Total	2.6	u	UG/L	2.6	1.0
		Arsenic, Total	29.2	u	UG/L	29.2	1.0
		Barium, Total	15800		UG/L	2.5	1.0
		Cadmium, Total	4.8	u	UG/L	4.8	1.0
		Chromium, Total	3.5	u	UG/L	3.5	1.0
		Mercury, Total	0.10	u	UG/L	0.10	1.0
		Lead, Total	22.1	u	UG/L	22.1	1.0
		Selenium, Total	51.8	u	UG/L	51.8	1.0
-003	B103C7	Barium, Soluble	16900		UG/L	2.5	1.0
-004	B103C8	Barium, Soluble	16800		UG/L	2.5	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/28/00

CLIENT: TMU-HANFORD B00-056 RECRA LOT #: 0008L388

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L1522-MB1	Silver, Total	3.1		UG/L	2.6	1.0
		Arsenic, Total	29.2	u	UG/L	29.2	1.0
		Barium, Total	2.5	u	UG/L	2.5	1.0
		Cadmium, Total	4.8	u	UG/L	4.8	1.0
		Chromium, Total	3.5	u	UG/L	3.5	1.0
		Lead, Total	22.1	u	UG/L	22.1	1.0
		Selenium, Total	51.8	u	UG/L	51.8	1.0
BLANK1	00C0286-MB1	Mercury, Total	0.10	u	UG/L	0.10	1.0
BLANK1	99L1575-MB1	Barium, Soluble	2.5	u	UG/L	2.5	1.0

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INORGANICS ACCURACY REPORT 09/28/00

CLIENT: TNU-HANFORD B00-056 RECRA LOT #: 0008L388

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B103C7	Silver, Total	52.1	2.6 u	50.0	104.2	1.0
		Arsenic, Total	2010	29.2 u	2000	100.7	1.0
		Barium, Total	18300	16200	2000	104.7*	1.0
		Cadmium, Total	45.8	4.8 u	50.0	91.6	1.0
		Chromium, Total	202	4.4	200	98.9	1.0
		Mercury, Total	0.98	0.10u	1.0	98.1	1.0
		Lead, Total	522	22.1 u	500	104.3	1.0
		Selenium, Total	2020	51.8 u	2000	101.1	1.0
-004	B103C8	Barium, Soluble	18600	16800	2000	90.7*	1.0

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INORGANICS PRECISION REPORT 09/28/00

CLIENT: TNU-HANFORD B00-056 RECRA LOT #: 0008L388

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B103C7	Silver, Total	2.6 u	2.6 u	NC	1.0
		Arsenic, Total	29.2 u	29.2 u	NC	1.0
		Barium, Total	16200	16600	2.6	1.0
		Cadmium, Total	4.8 u	4.8 u	NC	1.0
		Chromium, Total	4.4	3.5 u	NC	1.0
		Mercury, Total	0.10u	0.10u	NC	1.0
		Lead, Total	22.1 u	22.1 u	NC	1.0
		Selenium, Total	51.8 u	51.8 u	NC	1.0
-004REP	B103C8	Barium, Soluble	16800	16500	1.9	1.0

NC 200 MW 9/28/00 correction

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 09/28/00

CLIENT: TNU-HANFORD B00-056 RECRA LOT #: 000SL388

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	99L1522-LC1	Silver, LCS	500	500	UG/L	100.1
		Arsenic, LCS	10000	10000	UG/L	100.1
		Barium, LCS	5130	5000	UG/L	102.6
		Cadmium, LCS	248	250	UG/L	99.3
		Chromium, LCS	504	500	UG/L	100.9
		Lead, LCS	2540	2500	UG/L	101.6
		Selenium, LCS	9950	10000	UG/L	99.5
LCS1	00C0286-LC1	Mercury, LCS	5.1	5.0	UG/L	102.9
LCS1	99L1575-LC1	Barium, LCS	5200	5000	UG/L	104.0

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B00-056

DATE RECEIVED: 08/29/00 RFW LOT # :0008L388

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B103C7						
SILVER, TOTAL	001	W	99L1522	08/25/00	08/31/00	09/01/00
SILVER, TOTAL	001 REP	W	99L1522	08/25/00	08/31/00	09/01/00
SILVER, TOTAL	001 MS	W	99L1522	08/25/00	08/31/00	09/01/00
ARSENIC, TOTAL	001	W	99L1522	08/25/00	08/31/00	09/01/00
ARSENIC, TOTAL	001 REP	W	99L1522	08/25/00	08/31/00	09/01/00
ARSENIC, TOTAL	001 MS	W	99L1522	08/25/00	08/31/00	09/01/00
BARIUM, TOTAL	001	W	99L1522	08/25/00	08/31/00	09/01/00
BARIUM, TOTAL	001 REP	W	99L1522	08/25/00	08/31/00	09/01/00
BARIUM, TOTAL	001 MS	W	99L1522	08/25/00	08/31/00	09/01/00
CADMIUM, TOTAL	001	W	99L1522	08/25/00	08/31/00	09/01/00
CADMIUM, TOTAL	001 REP	W	99L1522	08/25/00	08/31/00	09/01/00
CADMIUM, TOTAL	001 MS	W	99L1522	08/25/00	08/31/00	09/01/00
CHROMIUM, TOTAL	001	W	99L1522	08/25/00	08/31/00	09/01/00
CHROMIUM, TOTAL	001 REP	W	99L1522	08/25/00	08/31/00	09/01/00
CHROMIUM, TOTAL	001 MS	W	99L1522	08/25/00	08/31/00	09/01/00
MERCURY, TOTAL	001	W	00C0286	08/25/00	09/08/00	09/11/00
MERCURY, TOTAL	001 REP	W	00C0286	08/25/00	09/08/00	09/11/00
MERCURY, TOTAL	001 MS	W	00C0286	08/25/00	09/08/00	09/11/00
LEAD, TOTAL	001	W	99L1522	08/25/00	08/31/00	09/01/00
LEAD, TOTAL	001 REP	W	99L1522	08/25/00	08/31/00	09/01/00
LEAD, TOTAL	001 MS	W	99L1522	08/25/00	08/31/00	09/01/00
SELENIUM, TOTAL	001	W	99L1522	08/25/00	08/31/00	09/01/00
SELENIUM, TOTAL	001 REP	W	99L1522	08/25/00	08/31/00	09/01/00
SELENIUM, TOTAL	001 MS	W	99L1522	08/25/00	08/31/00	09/01/00
B103C8						
SILVER, TOTAL	002	W	99L1522	08/25/00	08/31/00	09/01/00
ARSENIC, TOTAL	002	W	99L1522	08/25/00	08/31/00	09/01/00
BARIUM, TOTAL	002	W	99L1522	08/25/00	08/31/00	09/01/00
CADMIUM, TOTAL	002	W	99L1522	08/25/00	08/31/00	09/01/00
CHROMIUM, TOTAL	002	W	99L1522	08/25/00	08/31/00	09/01/00
MERCURY, TOTAL	002	W	00C0286	08/25/00	09/08/00	09/11/00
LEAD, TOTAL	002	W	99L1522	08/25/00	08/31/00	09/01/00
SELENIUM, TOTAL	002	W	99L1522	08/25/00	08/31/00	09/01/00

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B00-056

DATE RECEIVED: 08/29/00 RFW LOT # :0008L388

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B103C7						
BARIUM, SOLUBLE	003	W	99L1575	08/25/00	09/21/00	09/22/00
B103C8						
BARIUM, SOLUBLE	004	W	99L1575	08/25/00	09/21/00	09/22/00
BARIUM, SOLUBLE	004 REP	W	99L1575	08/25/00	09/21/00	09/22/00
BARIUM, SOLUBLE	004 MS	W	99L1575	08/25/00	09/21/00	09/22/00

LAB QC:

SILVER LABORATORY	LC1 BS	W	99L1522	N/A	08/31/00	09/01/00
SILVER, TOTAL	MB1	W	99L1522	N/A	08/31/00	09/01/00
ARSENIC LABORATORY	LC1 BS	W	99L1522	N/A	08/31/00	09/01/00
ARSENIC, TOTAL	MB1	W	99L1522	N/A	08/31/00	09/01/00
BARIUM LABORATORY	LC1 BS	W	99L1522	N/A	08/31/00	09/01/00
BARIUM, TOTAL	MB1	W	99L1522	N/A	08/31/00	09/01/00
CADMIUM LABORATORY	LC1 BS	W	99L1522	N/A	08/31/00	09/01/00
CADMIUM, TOTAL	MB1	W	99L1522	N/A	08/31/00	09/01/00
CHROMIUM LABORATORY	LC1 BS	W	99L1522	N/A	08/31/00	09/01/00
CHROMIUM, TOTAL	MB1	W	99L1522	N/A	08/31/00	09/01/00
MERCURY LABORATORY	LC1 BS	W	00C0286	N/A	09/08/00	09/11/00
MERCURY, TOTAL	MB1	W	00C0286	N/A	09/08/00	09/11/00
LEAD LABORATORY	LC1 BS	W	99L1522	N/A	08/31/00	09/01/00
LEAD, TOTAL	MB1	W	99L1522	N/A	08/31/00	09/01/00
SELENIUM LABORATORY	LC1 BS	W	99L1522	N/A	08/31/00	09/01/00
SELENIUM, TOTAL	MB1	W	99L1522	N/A	08/31/00	09/01/00
BARIUM LABORATORY	LC1 BS	W	99L1575	N/A	09/21/00	09/22/00
BARIUM, SOLUBLE	MB1	W	99L1575	N/A	09/21/00	09/22/00

RECRA LabNet Use Only
00081388

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

(9) Met Dry

RECRA LabNet

Client TNU - HANFORD SAF# B00-056
Est. Final Proj. Sampling Date
Project # 10985-001-001-9999-00
Project Contact/Phone #
RECRA Project Manager OJ
QC Spec Del Std TAT 7 day
Date Rec'd 8-29-00 Date Due 9-5-00
Account #

Refrigerator #											3			3		3		
#/Type Container	Liquid										1AG			1PL		1PL		
	Solid																	
Volume	Liquid										500			125		125		
	Solid																	
Preservatives											HNO3			—		—		
ANALYSES REQUESTED →		ORGANIC									INORG							
		VOA	BNA	Pest/PCB	Herb						Metal	CN						
														RA		NO2, NO3, SULFATE	IC ANIONS	
		RECRA LabNet Use Only																
							MBASO		MRCPATC					HPI		ICP CATIONS		

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected															
S - Soil	001	B103C7			W	8/25/00	0830								1			1		1		
SE - Sediment	002	1 8			1	1	0900								1			1		1		
SO - Solid	003	B103C7			W	8/25/00	0830						✓									
SL - Sludge	004	1 8			1	1	0900						✓									
W - Water																						
O - Oil																						
A - Air																						
DS - Drum Solids																						
DL - Drum Liquids																						
L - EP/TCLP Leachate																						
WI - Wipe																						
X - Other																						
F - Fish																						

Special Instructions: Saf B00-056

DATE/REVISIONS:
1. Run Matrix QC
9/26/00 2. 003, 004 added for Soluble Ba
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
[signature]	[signature]	8/29/00	0930

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL REWRITTEN		

RECRA LabNet Use Only

Samples were: 1) Shipped ✓ or Hand Delivered
Airbill # [illegible]
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times Y or (N)

COC Tape was: 1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 4.5 C

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES: 4235 7953 8544

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-056-001	Page 1 of 1

Collector: R.B. Kerkow	Company Contact: J. Fancher	Telephone No.: 373-9123	Project Coordinator: TRENT, SJ
Price Code: 7J	Data Turnaround: 7 day		
Project Designation: 100-NR-1 TSD Sites R. A. Sampling - Water	Sampling Location: 120-N-2 pond WATER	SAF No.: B00-056	Air Quality ☐
Ice Chest No.: SM1-127 (1of1)	Field Logbook No.: EL-1524	COA: R1325N2600	Method of Shipment: FEDEX
Shipped To: ~~TMA~~/RECRA RK 8/24/00	Offsite Property No.		Bill of Lading/Air Bill No.: 4235 7953 8544

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples stored in Ref.# 2C at the 3728 Shipping Facility on 8/25/00. Collector not available to relinquish samples on 8/28/00 for shipment. RT 8:28 00

Samples originated in non Rad controlled area. <2000 dpm/g. TAS Taken for project info only

Preservation	None	Cool 4C	HNO3 to pH <2	HNO3 to pH <2						
Type of Container	P	P	G	G/P						
No. of Container(s)	1 RK 8/24/00	1	1 RK 8/24/00	2						
Volume	~~60mL~~ 125mL	125mL	~~250mL~~ 500mL	1L						
SAMPLE ANALYSIS	pH (Water) - 9040	IC Anions - 300.0 (Nitrate, Nitrite, Sulfate)	See item (1) in Special Instructions.	See item (2) in Special Instructions. RK 8/24/00					TIETO: STLRL	TIETO: RCF

Sample No.	Matrix *	Sample Date	Sample Time										
B103C7	WATER	8-25-00	0830	X	X	X	X	RK 8/25/00			B103C9	B103C5	1
B103C8	WATER	8-25-00	0900	X	X	X	X	RK 8/25/00			B103D0	B103C6	2

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
RB Kerkow RB KERKOW	8/25/00 1700	REF 2C	8/25/00 1700
Removed Ref 2C 8.28.00	0730	R. Thorson 8.28.00	0730
R. Thorson 8.28.00	1470	FEDEX	
Fed Ex	8/29/00 0930	Kelly Hemming	8/29/00 0930

SPECIAL INSTRUCTIONS

Lab COA: R1325N-2F00

(1) ICP Metals - 6010A (TAL) (Barium, Cadmium, Chromium, Silver); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium); Mercury - 7470 - (CV)

~~(2) Gross Alpha; Gross Beta; Gamma Spectroscopy (Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Isotopic Plutonium; Americium-241; Strontium-89,90 - Total Sr; Nickel-63~~ RK 8/24/00

DELETE: ISOTOPIC Am^{241}, $Sr^{89,90}$ - TOTAL Sr, Ni^{63}. RK 8/24/00

Matrix *

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Temp 4-5

H0994

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H0994 was composed of two water samples designated under SAF No. B00-056 with a Project Designation of: 100-NR-1 TSD Sites R.A. Sampling-Water.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Thermo Retec Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on September 9, 2000.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analyses

No problems were encountered during the course of the analyses.

2.2 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.3 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

SEP 2000
RECEIVED

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

SAMPLE SUMMARY

SDG 7733
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG H0994

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B103C7	120-N-2 Pond	WATER		R008220-01	B00-056	B00-056-001	08/25/00 08:30
B103C8	120-N-2 Pond	WATER		R008220-02	B00-056	B00-056-001	08/25/00 09:00
Method Blank		WATER		R008220-04	B00-056		
Lab Control Sample		WATER		R008220-03	B00-056		
Duplicate (R008220-01)	120-N-2 Pond	WATER		R008220-05	B00-056		08/25/00 08:30

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

QC SUMMARY

SDG 7733
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG H0994

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	DAYS SINCE COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7733	B00-056-001	B103C7	WATER				08/30/00	5	R008220-01	7733-001
		B103C8	WATER				08/30/00	5	R008220-02	7733-002
		Method Blank	WATER						R008220-04	7733-004
		Lab Control Sample	WATER						R008220-03	7733-003
		Duplicate (R008220-01)	WATER				08/30/00	5	R008220-05	7733-005

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

SDG 7733
Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford
Contract TRC-SBB-207925
Case no SDG H0994

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Alpha Spectroscopy												
PU	WATER	Plutonium, Isotopic in Water	6952-020	5.0	2			1	1	1/1		
Gas Proportional Counting												
93A	WATER	Gross Alpha in Water	6952-020	20.0	2			1	1	1/1		
93B	WATER	Gross Beta in Water	6952-020	15.0	2			1	1	1/1		
Gamma Scan												
GAM	WATER	Gamma Emitters	6952-020	15.0	2			1	1	1/1		

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

WORK SUMMARY

SDG 7733
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG H0994

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B103C7			R008220-01	7733-001	93A/93		09/02/00	09/09/00	MCM	Gross Alpha in Water
120-N-2 Pond		WATER	08/25/00	7733-001	93B/93		09/02/00	09/09/00	MCM	Gross Beta in Water
B00-056-001	B00-056		08/30/00	7733-001	GAM		08/31/00	09/09/00	MCM	Gamma Emitters
				7733-001	PU		08/31/00	09/09/00	MCM	Plutonium, Isotopic in Water
B103C8			R008220-02	7733-002	93A/93		09/02/00	09/09/00	MCM	Gross Alpha in Water
120-N-2 Pond		WATER	08/25/00	7733-002	93B/93		09/02/00	09/09/00	MCM	Gross Beta in Water
B00-056-001	B00-056		08/30/00	7733-002	GAM		08/30/00	09/09/00	MCM	Gamma Emitters
				7733-002	PU		08/31/00	09/09/00	MCM	Plutonium, Isotopic in Water
Method Blank			R008220-04	7733-004	93A/93		09/02/00	09/09/00	MCM	Gross Alpha in Water
		WATER		7733-004	93B/93		09/02/00	09/09/00	MCM	Gross Beta in Water
	B00-056			7733-004	GAM		09/06/00	09/09/00	MCM	Gamma Emitters
				7733-004	PU		08/31/00	09/09/00	MCM	Plutonium, Isotopic in Water
Lab Control Sample			R008220-03	7733-003	93A/93		09/02/00	09/09/00	MCM	Gross Alpha in Water
		WATER		7733-003	93B/93		09/02/00	09/09/00	MCM	Gross Beta in Water
	B00-056			7733-003	GAM		08/31/00	09/09/00	MCM	Gamma Emitters
				7733-003	PU		08/31/00	09/09/00	MCM	Plutonium, Isotopic in Water
Duplicate (R008220-01)			R008220-05	7733-005	93A/93		09/02/00	09/09/00	MCM	Gross Alpha in Water
120-N-2 Pond		WATER	08/25/00	7733-005	93B/93		09/02/00	09/09/00	MCM	Gross Beta in Water
	B00-056		08/30/00	7733-005	GAM		09/05/00	09/09/00	MCM	Gamma Emitters
				7733-005	PU		09/04/00	09/09/00	MCM	Plutonium, Isotopic in Water

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
93A/93	B00-056	Gross Alpha in Water	900.0_ALPHABETA_GPC	2			1	1	1	5
93B/93	B00-056	Gross Beta in Water	900.0_ALPHABETA_GPC	2			1	1	1	5
GAM	B00-056	Gamma Emitters	GAMMA_GS	2			1	1	1	5
PU	B00-056	Plutonium, Isotopic in Water	PUISO_PLATE_AEA	2			1	1	1	5
TOTALS				8			4	4	4	20

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 09/09/00

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0994

R008220-04

Method Blank

METHOD BLANK

SDG	7733	Client/Case no	Hanford	SDG H0994	
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925		
Lab sample id	R008220-04	Client sample id	Method Blank		
Dept sample id	7733-004	Material/Matrix		WATER	
		SAF No	B00-056		

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	0.654	2.4	4.5	3.0	U	93A
Gross Beta	12587-47-2	0.477	6.2	10	4.0	U	93B
Plutonium 238	13981-16-3	-0.277	0.28	1.3	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.138	0.28	1.1	1.0	U	PU
Potassium 40	13966-00-2	U		480		U	GAM
Cobalt 60	10198-40-0	U		25	25	U	GAM
Cesium 137	10045-97-3	U		29	15	U	GAM
Radium 226	13982-63-3	U		51		U	GAM
Radium 228	15262-20-1	U		110		U	GAM
Europium 152	14683-23-9	U		66	50	U	GAM
Europium 154	15585-10-1	U		95	50	U	GAM
Europium 155	14391-16-3	U		87	50	U	GAM
Thorium 228	14274-82-9	U		34		U	GAM
Thorium 232	TH-232	U		110		U	GAM
Uranium 235	15117-96-1	U		110		U	GAM
Uranium 238	U-238	U		3400		U	GAM
Americium 241	14596-10-2	U		190		U	GAM

100-NR-1 TSD Sites R.A. Sampling-W

QC-BLANK 35661

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

R008220-03

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7733
Contact Melissa C. Mannion

Client/Case no Hanford SDG H0994
Case no TRC-SBB-207925

Lab sample id R008220-03
Dept sample id 7733-003

Client sample id Lab Control Sample
Material/Matrix WATER
SAF No B00-056

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	444	30	5.4	3.0		93A	430	17	103	67-133	70-130
Gross Beta	498	23	14	4.0		93B	488	20	102	75-125	70-130
Plutonium 238	136	12	1.1	1.0		PU	124	5.0	110	82-118	80-120
Plutonium 239/240	137	12	1.1	1.0		PU	132	5.3	104	83-117	80-120
Cobalt 60	515	29	15	25		GAM	488	20	106	74-126	80-120
Cesium 137	590	28	20	15		GAM	556	22	106	74-126	80-120

100-NR-1 TSD Sites R.A. Sampling-W

QC-LCS 35660

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

R008220-05

B103C7

DUPLICATE

SDG 7733

Contact Melissa C. Mannion

Client/Case no Hanford SDG H0994

Case no TRC-SBB-207925

DUPLICATE		ORIGINAL	
Lab sample id	R008220-05	Lab sample id	R008220-01
Dept sample id	7733-005	Dept sample id	7733-001
		Received	08/30/00

Client sample id B103C7

Location/Matrix 120-N-2 Pond WATER

Collected 08/25/00 08:30

Custody/SAF No B00-056-001 B00-056

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	33.6	8.7	6.1	3.0		93A	33.6	8.6	5.4		0	69
Gross Beta	55.8	11	14	4.0		93B	52.2	10	13		7	52
Plutonium 238	0	0.20	0.44	1.0	U	PU	-0.254	0.51	1.4	U	-	
Plutonium 239/240	0.099	0.20	0.33	1.0	U	PU	-0.127	0.25	0.97	U	-	
Potassium 40	U		94		U	GAM	U		260	U	-	
Cobalt 60	U		7.2	25	U	GAM	U		13	U	-	
Cesium 137	U		7.4	15	U	GAM	U		12	U	-	
Radium 226	U		14		U	GAM	U		22	U	-	
Radium 228	U		29		U	GAM	U		52	U	-	
Europium 152	U		19	50	U	GAM	U		30	U	-	
Europium 154	U		22	50	U	GAM	U		31	U	-	
Europium 155	U		14	50	U	GAM	U		37	U	-	
Thorium 228	U		14		U	GAM	U		22	U	-	
Thorium 232	U		29		U	GAM	U		52	U	-	
Uranium 235	U		30		U	GAM	U		54	U	-	
Uranium 238	U		800		U	GAM	U		1500	U	-	
Americium 241	U		23		U	GAM	U		84	U	-	

100-NR-1 TSD Sites R.A. Sampling-W

QC-DUP#1 35662

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 09/09/00

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0994

R008220-01 B103C7

DATA SHEET

SDG	7733	Client/Case no	Hanford SDG H0994
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R008220-01	Client sample id	B103C7
Dept sample id	7733-001	Location/Matrix	120-N-2 Pond WATER
Received	08/30/00	Collected	08/25/00 08:30
		Custody/SAF No	B00-056-001 B00-056

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	33.6	8.6	5.4	3.0		93A
Gross Beta	12587-47-2	52.2	10	13	4.0		93B
Plutonium 238	13981-16-3	-0.254	0.51	1.4	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.127	0.25	0.97	1.0	U	PU
Potassium 40	13966-00-2	U		260		U	GAM
Cobalt 60	10198-40-0	U		13	25	U	GAM
Cesium 137	10045-97-3	U		12	15	U	GAM
Radium 226	13982-63-3	U		22		U	GAM
Radium 228	15262-20-1	U		52		U	GAM
Europium 152	14683-23-9	U		30	50	U	GAM
Europium 154	15585-10-1	U		31	50	U	GAM
Europium 155	14391-16-3	U		37	50	U	GAM
Thorium 228	14274-82-9	U		22		U	GAM
Thorium 232	TH-232	U		52		U	GAM
Uranium 235	15117-96-1	U		54		U	GAM
Uranium 238	U-238	U		1500		U	GAM
Americium 241	14596-10-2	U		84		U	GAM

100-NR-1 TSD Sites R.A. Sampling-W

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/09/00

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0994

R008220-02 B103C8

DATA SHEET

SDG	7733	Client/Case no	Hanford SDG H0994
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R008220-02	Client sample id	B103C8
Dept sample id	7733-002	Location/Matrix	120-N-2 Pond WATER
Received	08/30/00	Collected	08/25/00 09:00
		Custody/SAF No	B00-056-001 B00-056

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	28.5	8.4	7.0	3.0		93A
Gross Beta	12587-47-2	63.0	9.9	11	4.0		93B
Plutonium 238	13981-16-3	-0.260	0.26	1.2	1.0	U	PU
Plutonium 239/240	PU-239/240	0.260	0.26	0.99	1.0	U	PU
Potassium 40	13966-00-2	U		230		U	GAM
Cobalt 60	10198-40-0	U		12	25	U	GAM
Cesium 137	10045-97-3	U		10	15	U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Radium 228	15262-20-1	U		48		U	GAM
Europium 152	14683-23-9	U		29	50	U	GAM
Europium 154	15585-10-1	U		33	50	U	GAM
Europium 155	14391-16-3	U		32	50	U	GAM
Thorium 228	14274-82-9	U		17		U	GAM
Thorium 232	TH-232	U		48		U	GAM
Uranium 235	15117-96-1	U		46		U	GAM
Uranium 238	U-238	U		1000		U	GAM
Americium 241	14596-10-2	U		76		U	GAM

100-NR-1 TSD Sites R.A. Sampling-W

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

Test PU	Matrix WATER
SDG 7733	
Contact Melissa C. Mannion	

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client	Hanford
Contract	TRC-SBB-207925
Contract	SDG H0994

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Plutonium 238		Plutonium 239/240	
Preparation batch 6952-020								
B103C7	R008220-01			7733-001	U		U	
B103C8	R008220-02			7733-002	U		U	
BLK (QC ID=35661)	R008220-04			7733-004	U		U	
LCS (QC ID=35660)	R008220-03			7733-003	ok		ok	
Duplicate (R008220-01)	R008220-05			7733-005	-	U	-	U
Nominal values and limits from method				RDLs (pCi/L)	1.0		1.0	
100-NR-1 TSD Sites R.A. Sampling-W								

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6952-020	2σ prep error 5.0 %				Reference Lab Notebook 6952 pg. 020											
B103C7	R008220-01			1.4	0.0500			88		207			6	08/31/00	08/31	SS-033
B103C8	R008220-02			1.2	0.0500			85		207			6	08/31/00	08/31	SS-034
BLK (QC ID=35661)	R008220-04			1.3	0.0500			84		207				08/31/00	08/31	SS-036
LCS (QC ID=35660)	R008220-03			1.1	0.0500			79		207				08/31/00	08/31	SS-035
Duplicate (R008220-01) (QC ID=35662)	R008220-05			0.44	0.0500			86		1081			10	08/31/00	09/04	SS-034
Nominal values and limits from method				1.0	0.0500			20-105		700	100		180			

PROCEDURES	REFERENCE	PUISO_PLATE_AEA
	CP-040	Environmental Water Dissolution, rev 3
	CP-940	Plutonium Separation and Purification, rev 2
	CP-008	Heavy Element Electroplating, rev 3

AVERAGES ± 2 SD	MDA	1.1	±	0.76
FOR 5 SAMPLES	YIELD	84	±	7

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

Test 93A Matrix WATER
SDG 7733
Contact Melissa C. Mannion

METHOD SUMMARY

GROSS ALPHA IN WATER
GAS PROPORTIONAL COUNTING

Client Hanford
Contract TRC-SBB-207925
Contract SDG H0994

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Gross Alpha
Preparation batch 6952-020					
B103C7	R008220-01	93		7733-001	33.6
B103C8	R008220-02	93		7733-002	28.5
BLK (QC ID=35661)	R008220-04	93		7733-004	U
LCS (QC ID=35660)	R008220-03	93		7733-003	ok
Duplicate (R008220-01)	R008220-05	93		7733-005	ok
Nominal values and limits from method 100-NR-1 TSD Sites R.A. Sampling-W				RDLs (pCi/L)	3.0

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6952-020 2σ prep error 20.0 % Reference Lab Notebook 6952 pg. 020																
B103C7	R008220-01	93		5.4	0.0500			20		100			8	09/01/00	09/02	GRB-114
B103C8	R008220-02	93		7.0	0.0500			22		100			8	09/01/00	09/02	GRB-115
BLK (QC ID=35661)	R008220-04	93		4.5	0.0500			21		100				09/01/00	09/02	GRB-105
LCS (QC ID=35660)	R008220-03	93		5.4	0.0500			20		100				09/01/00	09/02	GRB-116
Duplicate (R008220-01) (QC ID=35662)	R008220-05	93		6.1	0.0500			21		100			8	09/01/00	09/02	GRB-110
Nominal values and limits from method				3.0	0.0500			5-250		100			180			

PROCEDURES	REFERENCE	900.0_ALPHABETA_GPC
	CP-060	Soil Preparation, rev 2
	CP-070	Soil Dissolution, < 1.0g Aliquot, rev 3
	CP-170	Soil Preparation for Direct Gross Alpha and Gross Beta Counting, rev 2

AVERAGES ± 2 SD FOR 5 SAMPLES	MDA	5.7	±	1.9
	RESIDUE	21	±	2

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

Test 93B	Matrix WATER
SDG 7733	
Contact Melissa C. Mannion	

METHOD SUMMARY

GROSS BETA IN WATER

GAS PROPORTIONAL COUNTING

Client Hanford	
Contract TRC-SBB-207925	
Contract SDG H0994	

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Gross Beta
Preparation batch 6952-020					
B103C7	R008220-01	93		7733-001	52.2
B103C8	R008220-02	93		7733-002	63.0
BLK (QC ID=35661)	R008220-04	93		7733-004	U
LCS (QC ID=35660)	R008220-03	93		7733-003	ok
Duplicate (R008220-01)	R008220-05	93		7733-005	ok
Nominal values and limits from method				RDLs (pCi/L)	4.0
100-NR-1 TSD Sites R.A. Sampling-W					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6952-020	2σ prep error 15.0 %			Reference Lab Notebook 6952 pg. 020												
B103C7	R008220-01	93		13	0.0500			20		100			8	09/01/00	09/02	GRB-114
B103C8	R008220-02	93		11	0.0500			22		100			8	09/01/00	09/02	GRB-115
BLK (QC ID=35661)	R008220-04	93		10	0.0500			21		100				09/01/00	09/02	GRB-105
LCS (QC ID=35660)	R008220-03	93		14	0.0500			20		100				09/01/00	09/02	GRB-116
Duplicate (R008220-01) (QC ID=35662)	R008220-05	93		14	0.0500			21		100			8	09/01/00	09/02	GRB-110
Nominal values and limits from method				4.0	0.0500			5-250		100			180			

PROCEDURES	REFERENCE	900.0_ALPHABETA_GPC
	CP-060	Soil Preparation, rev 2
	CP-070	Soil Dissolution, < 1.0g Aliquot, rev 3
	CP-170	Soil Preparation for Direct Gross Alpha and Gross Beta Counting, rev 2

AVERAGES ± 2 SD	MDA	12	± 3.6
FOR 5 SAMPLES	RESIDUE	21	± 2

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	09/09/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0994

Test GAM Matrix WATER
SDG 7733
Contact Melissa C. Mannion

METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Client Hanford
Contract TRC-SBB-207925
Contract SDG H0994

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Cobalt 60		Cesium 137	
Preparation batch 6952-020								
B103C7	R008220-01			7733-001	U		U	
B103C8	R008220-02			7733-002	U		U	
BLK (QC ID=35661)	R008220-04			7733-004	U		U	
LCS (QC ID=35660)	R008220-03			7733-003	ok		ok	
Duplicate (R008220-01)	R008220-05			7733-005	-	U	-	U
Nominal values and limits from method				RDLs (pCi/L)	25		15	

100-NR-1 TSD Sites R.A. Sampling-W

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6952-020 2σ prep error 15.0 % Reference Lab Notebook 6952 pg. 020																
B103C7	R008220-01			12	0.500					407			6	08/30/00	08/31	MB,05,00
B103C8	R008220-02			10	0.500					509			5	08/30/00	08/30	MB,05,00
BLK (QC ID=35661)	R008220-04			29	0.500					101				08/30/00	09/06	MB,05,00
LCS (QC ID=35660)	R008220-03			20	0.500					552				08/30/00	08/31	MB,05,00
Duplicate (R008220-01) (QC ID=35662)	R008220-05			7.4	0.500					401			11	08/30/00	09/05	01,04,00
Nominal values and limits from method				15	0.500					400			180			

PROCEDURES REFERENCE GAMMA_GS
CP-100 Ge(Li) Preparation for Commercial Samples, rev 2

AVERAGES ± 2 SD MDA 16 ± 18
FOR 5 SAMPLES YIELD ____ ± ____

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 09/09/00

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-056-001	Page 1 of 1

Collector: R.B. Kerkow	Company Contact: J. Fancher	Telephone No.: 373-9123	Project Coordinator: TRENT, SJ
Price Code: 7J	Data Turnaround: 7 day	Air Quality ☐	
Project Designation: 100-NR-1 TSD Sites R. A. Sampling - Water	Sampling Location: 120-N-2 pond WATER H0994 (7733)	SAF No.: B00-056	
Ice Chest No.: SRC99-010	Field Logbook No.: EL-1524	COA: R1325N2600	Method of Shipment: FEDEX
Shipped To: TMA/~~REGRA~~ RK 8/24/00	Offsite Property No.: A0000275		Bill of Lading/Air Bill No.: 4235 1953 8533

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples stored in Ref.# 82 at the 3728 Shipping Facility on 8/25/00 Collector not available to relinquish samples on 8/25/00 for shipment. RT 8-28-00

Preservation	None	Cool 4C	HNO3 to pH <2	HNO3 to pH <2						
Type of Container	P	P	G	G/P						
No. of Container(s)	1	1	1	2						
Volume	50mL	125mL	250mL	1L						

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	pH (Water) - 9040 RK 8/24/00	IC Anions - 300.0 (Nitrate, Nitrite, Sulfate) RK 8/24/00	See item (1) in Special Instructions. RK 8/24/00	See item (2) in Special Instructions. (2 EACH)						
								Samples originated in non RAD controlled area. <2000 pCi/g. NATA Required.			TIE TO: SL-R	TIE TO: RCF	
B103C7	WATER	8-25-00	0830				X (1)	TASTEKEN			B103C9	B103C5	
B103C8	WATER	8-25-00	0900				X (2)	PROJECT INFO ONLY			B103D0	B103C6	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
RB Kerkow RB KERKOW	8/25/00 1700	STORED at REF. 2C	8/25/00 1700
Removed from Ref. 2C 3728	8.28.00 0715	R Thorson	8.28.00 0715
R Thorson	8.28.00 1430	FEDEX	08/28/00
FED Express	08/29/00 5:PM	E. Segura E. SEGURA	08/30/00 8:30
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Lab COA: R1325N-2F00

~~(1) ICP Metals - 6010A (TAL) (Barium, Cadmium, Chromium, Silver); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium); Mercury - 7470 - (CV)~~ RK 8/24/00

(2) Gross Alpha; Gross Beta; Gamma Spectroscopy(Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Isotopic Plutonium; ~~Americium-241, Strontium-89,90 - Total Sr, Nickel-63~~ RK 8/24/00

Delete: ISOTOPIC Am^{241}; Sr 89-90 TOTAL Sr; Ni^{63}. RK 8/24/00

FAXED 8/30/00

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: BECHTEL HANFORD INC. Date/Time received 08/29/00 5:00 PM

CoC No. B00-056-001

Container I.D. No. ERC99-010 Requested TAT (Days) [illegible] P.O. Received Yes [ ] No [✓]

INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [✓] No [ ] N/A [ ]
4. Custody seals on sample containers dated & signed? Yes [✓] No [ ] N/A [ ]
5. Cooler Temperature: _____ Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: 2
7. Number of containers per sample: 2 (EACH) (Or see CoC _____)
8. Paperwork agrees with samples? Yes [✓] No [ ]
9. Samples have: Tape [✓] Hazard labels [ ] Rad labels [ ] Appropriate sample labels [✓]
10. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
11. Describe any anomalies: _____

13. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date _____
14. Received by E Aguro Date: 08/30/00 Time: 8:30 PM

LOGIN

TNU W.O. No. _____ Group No. _____ Client W.O. No. _____

PROGRAM MANAGER

Sample holding times exceeded? Yes [ ] No [ ]

Client Notified: Name _____ Date/time _____

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B00-056
RFW# : 0008L388
SDG# : H0994
SAF# : B00-056

W.O. # : 10985-001-001-9999-00
Date Received: 08-29-00

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 2 water samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

3. Sample holding times as required by the method and/or contract were met for Sulfate, however pH, Nitrate and Nitrite were received past hold.

4. The cooler temperature was recorded on the chain-of-custody.

4. The cooler temperatures were recorded on the chain-of-custody.

5. The method blanks were within method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits.

7. The matrix spike recoveries were within the 75-125% control limits.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

09-14-00
Date

njp&pef\i08-388

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 10 pages.

Recra LabNet Philadelphia

WET CHEMISTRY

METHODS GLOSSARY FOR WATER SAMPLE ANALYSIS

	EPA /600	SW846	OTHER
Acidity	___ 305.1		
___Alkalinity ___Bicarbonate ___Carbonate	___ 310.1		
BOD	___ 405.1		___ 5210B (b)
Ion Chormatography:			
___Bromide ___Chloride ___Fluoride	___ 300.0	___ 9056	
✓Nitrate ✓Nitrite ___Phosphate	✓ 300.0	___ 9056	
✓Sulfate ___Formate ___Acetate ___Oxalate	✓ 300.0	___ 9056	
Chloride	___ 325.2	___ 9251	
Chorine, Residual	___ 330.5 (mod)		
Cyanide, Amenable to Chorination	___ 335.2	___ 9010B	
Cyanide, Total	___ 335.2	___ 9010B ___ 9014	___ ILMO4.0 (e)
Cyanide, Weak Acid Dissociable		___	___ 412 (a) ___ 4500CN-I (b
COD	___ 410.4(mod)		___ 5220C (b)
Color	___ 110.2		
Corrosivity by Coupon		___ 1110(mod)	
Chromium VI		___ 7196A	___ 3500Cr-D (b)
Fluoride	___ 340.2		___ 4500-FC
Hardness, Calcium	___ 215.2		
Hardness, Total	___ 130.2		
Iodide			___ ASTM D19P202 (1)
Surfactant	___ 425.1		
___Nitrate-Nitrite ___Nitrate ___Nitrite	___ 353.2		
Ammonia	___ 350.3		
Total___ Kjeldahl ___ Organic Nitrogen	___ 351.4		
Total___ Organic ___ Inorganic Carbon	___ 415.1	___ 9060	
Oil & Grease	___ 413.1	___ 9070	
✓pH ____ pH; paper	___ 150.1	✓ 9040B ___ 9041A	
Petroleum Hydrocarbons, Total Recoverable	___ 418.1		
Phenol	___ 420.1 ___ 420.2	___ 9065 ___ 9066	
___Ortho ___Total Phosphate	___ 365.2		___ 4500-P B ___ C
Salinity			___ 210A (a) ___ 2520 (b)
Settleable Solids	___ 160.5		
Sulfide	___ 376.1 ___ 376.2	___ 9030B/9034 (acid soluble)	
Reactive ___Cyanide ___Sulfide		___ Section 7.3 (__9014__9030B)	
Silica	___ 370.1		
Sulfite	___ 377.1		
Sulfate	___ 375.4	___ 9038	
Specific Conductance	___ 120.1	___ 9050A	
Specific Gravity			___ D5057-90 ___ 213E (a)
Synthetic Precipitation Leach	___ 1312		
Total ___Dissolved __Suspended ___Solids	160 ___.1 ___.2 ___.3		
Total Organic Halides	___ 450.1	___ 9020B	
Turbidity	___ 180.1		
Volatile Solids:			
__Total __Dissolved __Suspended	___ 160.4		
Other:		**Method:**	

Recra LabNet Philadelphia
METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LC = Laboratory Control Sample.
NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.

2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).

3. Test Methods for Evaluating Solid Waste (USEPA SW-846).

a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).

b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).

c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).

d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).

e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.

f. Code of Federal Regulations.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/13/00

CLIENT: TNU-HANFORD B00-056 RECRA LOT #: 0006L388

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B103C7	Nitrite by IC	0.50 u	MG/L	0.50	2.0
		Nitrate by IC	0.51	MG/L	0.50	2.0
		Sulfate by IC	0.66	MG/L	0.50	2.0
		pH	7.8	PH UNIT	0.01	1.0
-002	B103C8	Nitrite by IC	0.50 u	MG/L	0.50	2.0
		Nitrate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	0.66	MG/L	0.25	1.0
		pH	7.9	PH UNIT	0.01	1.0

RECRA LabNet Use Only

00082388

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

60

Client TNU - HANFORD SAF# B00-056

Est. Final Proj. Sampling Date

Project # 10985-001-001-9999-00

Project Contact/Phone #

RECRA Project Manager OS

QC Spec Del Std TAT 7 day

Date Rec'd 8-29-00 Date Due 9-5-00

Account #

Refrigerator #																		
#/Type Container	Liquid									3			3		3			
	Solid									1AG			1PL		1PL			
Volume	Liquid									500			125		125			
	Solid																	
Preservatives										HNO3			—		—			
ANALYSES REQUESTED →		ORGANIC								INORG								
		VOA	BNA	Pest/PCB	Herb					Metal	CN							
RECRA LabNet Use Only										MACRATC			HPI		HCO3, CO3, HCO3, CO3			

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected													
S - Soil	001	B103C7			W	8/25/00	0830								1			1		1
SE - Sediment	002	1 8			1	1	1090								1			1		1
SO - Solid																				
SL - Sludge																				
W - Water																				
O - Oil																				
A - Air																				
DS - Drum Solids																				
DL - Drum Liquids																				
L - EP/TCLP Leachate																				
WI - Wipe																				
X - Other																				
F - Fish																				

Special Instructions: Saf B00-056

DATE/REVISIONS:

1. Run Matrix QC
2.
3.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ✓ or
Hand Delivered
Airbill # Del Belt
2) Ambient or Chilled
3) Received In Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times Y or (N)

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 4.5 °C

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	8/29/00	0930

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL REWRITTEN		

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES: 4235 7953 8544

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-056-001	Page 1 of 1

Collector: R.B. Kerkow	Company Contact: J. Fancher — Telephone No.: 373-9123	Project Coordinator: TRENT, SJ	Price Code: 7J — Data Turnaround: 7 day
Project Designation: 100-NR-1 TSD Sites R. A. Sampling - Water	Sampling Location: 120-N-2 pond WATER	SAF No.: B00-056	Air Quality ☐
Ice Chest No.: SM1-127 (1of1)	Field Logbook No.: EL-1524 — COA: R1325N2600	Method of Shipment: FEDEX	
Shipped To: ~~TMA~~/RECRA	Offsite Property No.	Bill of Lading/Air Bill No.: 4235 7953 8544	

RK 8/24/00

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples stored in Ref.# 2C at the 3728 Shipping Facility on 8/25/00. Collector not available to relinquish samples on 8/28/00 for shipment. TCT 8-28-00

Preservation	None	Cool 4C	HNO3 to pH <2	HNO3 to pH <2						
Type of Container	P	P	G	C/P						
No. of Container(s)	1 RK 8/24/00	1	1 RK 8/24/00	2						
Volume	~~60mL~~ 125mL	125mL	~~250mL~~ 500mL	2L						
SAMPLE ANALYSIS	pH (Water) - 9040	IC Anions - 300.0 (Nitrate, Nitrite, Sulfate)	See item (1) in Special Instructions.	See item (2) in Special Instructions. RK 8/24/00						

Samples originated in non Rad Controlled area. <2000 dpm/g. TAS Taken for project info only

Sample No.	Matrix *	Sample Date	Sample Time										
B103C7	WATER	8-25-00	0830	X	X	X	X	RK 8/25/00				B103C9 (TIETO: STL-RL)	B103C5 (TIETO: RCF) 1
B103C8	WATER	8-25-00	0900	X	X	X	X	RK 8/25/00				B103D0	B103C6 2

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
RB Kerkow	8/25/00 1700	REF 2C	8/25/00 1700
Removed Ref 2C 8.28.00	0730	R. Thorson 8.28.00	0730
R. Thorson 8.28.00	1430	FEDEX	
FedEx	8/29/00 0930	Kurt Hemmingsen	8/29/00 0930

SPECIAL INSTRUCTIONS

Lab COA: R1325N-2F00

(1) ICP Metals - 6010A (TAL) {Barium, Cadmium, Chromium, Silver}; ICP Metals - 6010A (Add-on) {Arsenic, Lead, Selenium}; Mercury - 7470 - (CV)

~~(2) Gross Alpha; Gross Beta; Gamma Spectroscopy(Water) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}, Gamma Spec - Add-on {Americium-241}, Isotopic Plutonium, Americium-241, Strontium-89,90 - Total Sr, Nickel-63~~ RK 8/24/00

DELETE: ISOTOPIC Am^{241}, $Sr^{89,90}$ - TOTAL Sr, Ni^{63}. RK 8/24/00

Matrix *

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Temp 4-5

10

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B00-056
RFW#: 0008L388
SDG/SAF#: H0994/B00-056

W.O.#: 10985-001-001-9999-00
Date Received: 08-29-00

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 water samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. The duplicate analyses for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

13. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

09-14-00
Date

jjw/m08-388

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 00082388

Leaching Procedure: __1310 __1311 __1312 __Other:_____

CLP Metals __ Digestion and __ Analysis Methods: __ILM03.0 __ILM04.0

Metals Digestion Methods: X 3005A __3010A __3015 __3020A __3050B __3051 __200.7 __SS17
__Other: _____

Metals Analysis Methods

	SW846		EPA		STD MTD	EPA OSWR	USATHAMA
Aluminum	__6010B		__200.7				__99
Antimony	__6010B	__7041 [5]	__200.7	__204.2			__99
Arsenic	X 6010B	__7060A [5]	__200.7	__206.2	__3113B		__99
Barium	X 6010B		__200.7				__99
Beryllium	__6010B		__200.7				__99
Bismuth	__6010B [1]		__200.7 [1]			__1620	__99
Boron	__6010B		__200.7				__99
Cadmium	X 6010B	__7131A [5]	__200.7	__213.2			__99
Calcium	__6010B		__200.7				__99
Chromium	X 6010B	__7191 [5]	__200.7	__218.2			__SS17
Cobalt	__6010B		__200.7				__99
Copper	__6010B	__7211 [5]	__200.7	__220.2			__99
Iron	__6010B		__200.7				__99
Lead	X 6010B	__7421 [5]	__200.7	__239.2	__3113B		__99
Lithium	__6010B	__7430 [4]	__200.7			__1620	__99
Magnesium	__6010B		__200.7				__99
Manganese	__6010B		__200.7				__99
Mercury	X 7470A [3]	__7471A [3]	__245.1 [2]	__245.5 [2]			__99
Molybdenum	__6010B		__200.7				__99
Nickel	__6010B		__200.7				__99
Potassium	__6010B	__7610 [4]	__200.7	__258.1 [4]			__99
Rare Earths	__6010B [1]		__200.7 [1]			__1620	__99
Selenium	X 6010B	__7740 [5]	__200.7	__270.2	__3113B		__99
Silicon	__6010B [1]		__200.7			__1620	__99
Silica	__6010B		__200.7			__1620	__99
Silver	X 6010B	__7761 [5]	__200.7	__272.2			__99
Sodium	__6010B	__7770 [4]	__200.7	__273.1 [4]			__99
Strontium	__6010B		__200.7				__99
Thallium	__6010B	__7841 [5]	__200.7	__279.2	__200.9		__99
Tin	__6010B		__200.7				__99
Titanium	__6010B		__200.7				__99
Uranium	__6010B [1]		__200.7 [1]			__1620	__99
Vanadium	__6010B		__200.7				__99
Zinc	__6010B		__200.7				__99
Zirconium	__6010B [1]		__200.7 [1]			__1620	__99

Other:_____ Method:_____

L-WI-033/M-11/99

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LCS = Laboratory Control Sample.
NC = Not calculated.

ANALYTICAL METAL METHODS

1. Not included in the method element list.

2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).

3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).

4. Flame AA.

5. Graphite Furnace AA.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/14/00

CLIENT: TWU-HANFORD B00-056 RECRA LOT #: 0008L388

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B103C7	Silver, Total	2.6	u	UG/L	2.6	1.0
		Arsenic, Total	29.2	u	UG/L	29.2	1.0
		Barium, Total	16200		UG/L	2.5	1.0
		Cadmium, Total	4.8	u	UG/L	4.8	1.0
		Chromium, Total	4.4		UG/L	3.5	1.0
		Mercury, Total	0.10	u	UG/L	0.10	1.0
		Lead, Total	22.1	u	UG/L	22.1	1.0
		Selenium, Total	51.8	u	UG/L	51.8	1.0

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/14/00

CLIENT: TNU-HANFORD B00-056

RECRA LOT #: 0008L388

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	B103C8	Silver, Total	2.6	u	UG/L	2.6	1.0
		Arsenic, Total	29.2	u	UG/L	29.2	1.0
		Barium, Total	15800		UG/L	2.5	1.0
		Cadmium, Total	4.8	u	UG/L	4.8	1.0
		Chromium, Total	3.5	u	UG/L	3.5	1.0
		Mercury, Total	0.10	u	UG/L	0.10	1.0
		Lead, Total	22.1	u	UG/L	22.1	1.0
		Selenium, Total	51.8	u	UG/L	51.8	1.0

RECRA LabNet Use Only
00081388

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

Client TNU - HANFORD SAF# B00-056
Est. Final Proj. Sampling Date
Project # 10985-001-001-9999-00
Project Contact/Phone #
RECRA Project Manager OS
QC Spec Del Std TAT 7 day
Date Rec'd 8-29-00 Date Due 9-5-00
Account #

Refrigerator #											3			3		3		13
#/Type Container	Liquid										1AG			1PL		1PL		
	Solid																	
Volume	Liquid										500			125		125		
	Solid																	
Preservatives											HNO3			—		—		
ANALYSES REQUESTED →		ORGANIC									INORG			PA		NO2, NO3 SULFATE	Fe Alk	
		VOA	BNA	Pest/PCB	Herb						Metal	CN						
		RECRA LabNet Use Only																
											MRCRATC			HPI		ICP CONSTITUENTS		

MATRIX CODES:
S - Soil
SE - Sediment
SG - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected																
001	B103C7			W	8/25/00	0830									1			1		1		
002	1 8			1	1	090									1			1		1		

Special Instructions: Saf B00-056

DATE/REVISIONS:
1. Run Matrix QC
2.
3.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ✓ or Hand Delivered
Airbill # [illegible]
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec't Y or N
Cooler Temp. 4.5 °C

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	8/29/00	0930

Relinquished by	Received by	Date	Time
COMPOSITE WASTE		ORIGINAL REWRITTEN	

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:
4235 7953 8544

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-056-001	Page 1 of 1

Collector: R.B. Kerkow	Company Contact: J. Fancher — Telephone No.: 373-9123	Project Coordinator: TRENT, SJ	Price Code: 7J — Data Turnaround: 7 day
Project Designation: 100-NR-1 TSD Sites R. A. Sampling - Water	Sampling Location: 120-N-2 pond WATER	SAF No.: B00-056	Air Quality ☐
Ice Chest No.: SM1-127 (1of1)	Field Logbook No.: EL-1524 — COA: R1325N2600	Method of Shipment: FEDEX	
Shipped To: ~~TMR~~/RECRA RK 8/24/00	Offsite Property No.	Bill of Lading/Air Bill No.: 4235 7953 8544	

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples stored in Ref.# 2C at the 3728 Shipping Facility on 8/25/00. Collector not available to relinquish samples on 8/28/00 for shipment. RT 8-28-00

Samples originated in non Rad Controlled area < 2000 mR/h. TAS Taken for project info only

Preservation	None	Cool 4C	HNO3 to pH <2	HNO3 to pH <2						
Type of Container	P	P	G	G/P						
No. of Container(s)	1 RK 8/24/00	1	1 RK 8/24/00	2						
Volume	~~60mL~~ 125mL	125mL	~~250mL~~ 500mL	1L						
SAMPLE ANALYSIS	pH (Water) - 9040	IC Anions - 300.0 (Nitrate, Nitrite, Sulfate)	See item (1) in Special Instructions.	See item (2) in Special Instructions. RK 8/24/00					TIE TO: STL-RL	TIE TO: RCF

Sample No.	Matrix *	Sample Date	Sample Time										
B103C7	WATER	8-25-00	0830	X	X	X	~~X~~ RK 8/25/00				B103C9	B103C5	1
B103C8	WATER	8-25-00	0900	X	X	X	~~X~~ RK 8/25/00				B103D0	B103C6	2

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
RB Kerkow	8/25/00 1700	REF 2C	8/25/00 1700
Removed Ref 2C 8-28-00	0730	R. Thorson 8-28-00	0730
R. Thorson 8-28-00	1430	FEDEX	
FedEx	8/29/00 0930	[illegible]	8/29/00 0930

SPECIAL INSTRUCTIONS

Lab COA: R1325N-2F00

(1) ICP Metals - 6010A (TAL) (Barium, Cadmium, Chromium, Silver); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium); Mercury - 7470 - (CV)

~~(2) Gross Alpha; Gross Beta; Gamma Spectroscopy(Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Isotopic Plutonium, Americium-241; Strontium-89,90 - Total Sr; Nickel-63~~ RK 8/24/00

DELETE: ISOTOPIC Am^{241}, Sr 89, 90 - TOTAL Sr, Ni^{63}. RK 8/24/00

Matrix *: S=Soil, SE=Sediment, SO=Solid, S=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Temp 4-5