H0512-TMA/RCA

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

0052430

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9909L968
SDG/SAF# : B99-078/H0512

W.O.# : 10985-001-001-9999-00
Date Received: 09-02-99

RECEIVED
JAN 18 2000
EDMC

REVISION

METALS CASE NARRATIVE

This package has been revised to include the addition of Antimony and Thallium.

1. This narrative covers the analyses of 7 soil 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) 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. The matrix spike (MS) recovery for Antimony was outside the 75-125% control limits. Refer to the Inorganics Accuracy 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 20 pages.

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11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at the following level:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
B0W9J0	Antimony	500	103.8

12. The duplicate analyses for 4 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. 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.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

11-9-99
Date

mld/m09-968r

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 9909L968

Leaching Procedure: __1310 __1311 __1312 __Other:_____

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

Metals Digestion Methods: __3005A __3010A __3015 __3020A ✓3050A __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	✓6010B	__7060A [5]	__200.7	__206.2	__3113B		__99
Barium	✓6010B		__200.7				__99
Beryllium	✓6010B		__200.7				__99
Bismuth	__6010B [1]		__200.7 [1]			__1620	__99
Boron	__6010B		__200.7				__99
Cadmium	✓6010B	__7131A [5]	__200.7	__213.2			__99
Calcium	__6010B		__200.7				__99
Chromium	✓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	✓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	__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	✓6010B	__7740 [5]	__200.7	__270.2	__3113B		__99
Silicon	__6010B [1]		__200.7			__1620	__99
Silica	__6010B		__200.7			__1620	__99
Silver	✓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-03/98

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.

RFW 21-21L-033/N-10/96

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INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L968

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0W9J0	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	2.5	MG/KG	0.25	1.0
		Barium, Total	95.8	MG/KG	0.02	1.0
		Beryllium, Total	0.34	MG/KG	0.008	1.0
		Cadmium, Total	0.42	MG/KG	0.02	1.0
		Chromium, Total	11.0	MG/KG	0.06	1.0
		Copper, Total	21.3	MG/KG	0.09	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	10.2	MG/KG	0.09	1.0
		Lead, Total	6.0	MG/KG	0.16	1.0
		Antimony, Total	0.19 u	MG/KG	0.19	1.0
		Selenium, Total	0.81	MG/KG	0.28	1.0
		Thallium, Total	1.4	MG/KG	0.40	1.0
		Vanadium, Total	78.2	MG/KG	0.05	1.0
		Zinc, Total	84.7	MG/KG	0.06	1.0
-002	B0W9J1	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	2.4	MG/KG	0.28	1.0
		Barium, Total	59.0	MG/KG	0.03	1.0
		Beryllium, Total	0.24	MG/KG	0.009	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	6.3	MG/KG	0.07	1.0
		Copper, Total	17.3	MG/KG	0.10	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	9.9	MG/KG	0.10	1.0
		Lead, Total	3.5	MG/KG	0.18	1.0
		Antimony, Total	0.21 u	MG/KG	0.21	1.0
		Selenium, Total	0.81	MG/KG	0.32	1.0
		Thallium, Total	1.4	MG/KG	0.45	1.0
		Vanadium, Total	74.5	MG/KG	0.05	1.0
		Zinc, Total	54.7	MG/KG	0.07	1.0

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INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L968

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	B0W9J2	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	1.7	MG/KG	0.28	1.0
		Barium, Total	34.3	MG/KG	0.03	1.0
		Beryllium, Total	0.15	MG/KG	0.008	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	4.6	MG/KG	0.07	1.0
		Copper, Total	14.8	MG/KG	0.10	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	7.2	MG/KG	0.10	1.0
		Lead, Total	2.2	MG/KG	0.18	1.0
		Antimony, Total	0.21 u	MG/KG	0.21	1.0
		Selenium, Total	0.81	MG/KG	0.31	1.0
		Thallium, Total	1.3	MG/KG	0.45	1.0
		Vanadium, Total	71.4	MG/KG	0.05	1.0
		Zinc, Total	49.7	MG/KG	0.07	1.0
-004	B0W9J3	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	2.3	MG/KG	0.26	1.0
		Barium, Total	42.8	MG/KG	0.02	1.0
		Beryllium, Total	0.35	MG/KG	0.008	1.0
		Cadmium, Total	0.02 u	MG/KG	0.02	1.0
		Chromium, Total	4.6	MG/KG	0.06	1.0
		Copper, Total	14.6	MG/KG	0.1	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	7.3	MG/KG	0.1	1.0
		Lead, Total	3.1	MG/KG	0.17	1.0
		Antimony, Total	0.20 u	MG/KG	0.20	1.0
		Selenium, Total	0.73	MG/KG	0.29	1.0
		Thallium, Total	1.3	MG/KG	0.42	1.0
		Vanadium, Total	67.8	MG/KG	0.05	1.0
		Zinc, Total	49.2	MG/KG	0.06	1.0

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INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L968

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	B0W9J4	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	1.4	MG/KG	0.25	1.0
		Barium, Total	51.2	MG/KG	0.02	1.0
		Beryllium, Total	0.23	MG/KG	0.008	1.0
		Cadmium, Total	0.02 u	MG/KG	0.02	1.0
		Chromium, Total	4.6	MG/KG	0.06	1.0
		Copper, Total	14.9	MG/KG	0.09	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	7.3	MG/KG	0.09	1.0
		Lead, Total	2.9	MG/KG	0.16	1.0
		Antimony, Total	0.19 u	MG/KG	0.19	1.0
		Selenium, Total	0.61	MG/KG	0.28	1.0
		Thallium, Total	1.0	MG/KG	0.40	1.0
		Vanadium, Total	61.5	MG/KG	0.05	1.0
		Zinc, Total	44.9	MG/KG	0.06	1.0
-006	B0W9J5	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Arsenic, Total	2.2	MG/KG	0.24	1.0
		Barium, Total	64.2	MG/KG	0.02	1.0
		Beryllium, Total	0.31	MG/KG	0.007	1.0
		Cadmium, Total	0.02 u	MG/KG	0.02	1.0
		Chromium, Total	5.6	MG/KG	0.06	1.0
		Copper, Total	15.8	MG/KG	0.09	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Nickel, Total	8.3	MG/KG	0.09	1.0
		Lead, Total	3.4	MG/KG	0.15	1.0
		Antimony, Total	0.18 u	MG/KG	0.18	1.0
		Selenium, Total	0.59	MG/KG	0.27	1.0
		Thallium, Total	1.4	MG/KG	0.39	1.0
		Vanadium, Total	74.6	MG/KG	0.04	1.0
		Zinc, Total	52.7	MG/KG	0.06	1.0

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INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L968

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-007	B0W9J6	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	1.8	MG/KG	0.30	1.0
		Barium, Total	41.0	MG/KG	0.03	1.0
		Beryllium, Total	0.31	MG/KG	0.009	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	4.8	MG/KG	0.07	1.0
		Copper, Total	14.1	MG/KG	0.11	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	6.2	MG/KG	0.11	1.0
		Lead, Total	3.0	MG/KG	0.19	1.0
		Antimony, Total	0.23 u	MG/KG	0.23	1.0
		Selenium, Total	0.66	MG/KG	0.33	1.0
		Thallium, Total	0.73	MG/KG	0.48	1.0
		Vanadium, Total	63.0	MG/KG	0.05	1.0
		Zinc, Total	44.9	MG/KG	0.07	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L968

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L0649-MB1	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	0.33 u	MG/KG	0.33	1.0
		Barium, Total	0.04	MG/KG	0.03	1.0
		Beryllium, Total	0.01 u	MG/KG	0.01	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	0.13	MG/KG	0.08	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		Nickel, Total	0.13	MG/KG	0.12	1.0
		Lead, Total	0.37	MG/KG	0.21	1.0
		Antimony, Total	0.25 u	MG/KG	0.25	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
		Thallium, Total	0.53 u	MG/KG	0.53	1.0
		Vanadium, Total	0.06 u	MG/KG	0.06	1.0
		Zinc, Total	0.09	MG/KG	0.08	1.0
BLANK1	99C0269-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

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INORGANICS ACCURACY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L968

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B0W9J0	Silver, Total	3.3	0.08u	3.8	86.8	1.0
		Arsenic, Total	140	2.5	151	90.5	1.0
		Barium, Total	234	95.8	151	91.5	1.0
		Beryllium, Total	3.9	0.34	3.8	93.7	1.0
		Cadmium, Total	3.7	0.42	3.8	86.3	1.0
		Chromium, Total	26.5	11.0	15.1	102.6	1.0
		Copper, Total	39.3	21.3	18.9	95.2	1.0
		Mercury, Total	0.17	0.02u	0.16	107.5	1.0
		Nickel, Total	44.2	10.2	37.8	89.9	1.0
		Lead, Total	40.0	6.0	37.8	89.9	1.0
		Antimony, Total	15.8	0.19u	37.8	41.8	1.0
		Selenium, Total	134	0.81	151	87.8	1.0
		Thallium, Total	133	1.4	151	86.9	1.0
		Vanadium, Total	118	78.2	37.8	106.3	1.0
		Zinc, Total	121	84.7	37.8	96.8	1.0

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INORGANICS PRECISION REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L968

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0W9J0	Silver, Total	0.08u	0.09u	NC	1.0
		Arsenic, Total	2.5	2.6	3.9	1.0
		Barium, Total	95.8	96.5	0.73	1.0
		Beryllium, Total	0.34	0.46	31.3	1.0
		Cadmium, Total	0.42	0.30	33.2	1.0
		Chromium, Total	11.0	12.1	9.5	1.0
		Copper, Total	21.3	21.1	0.94	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Nickel, Total	10.2	10.7	4.8	1.0
		Lead, Total	6.0	6.4	6.5	1.0
		Antimony, Total	0.19u	0.25	~~NC~~ 200	1.0
		Selenium, Total	0.81	0.66	20.8	1.0
		Thallium, Total	1.4	1.3	7.4	1.0
		Vanadium, Total	78.2	81.7	4.4	1.0
		Zinc, Total	84.7	87.5	3.3	1.0

Correction AD 11/9/99

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L968

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	99L0649-LC1	Silver, LCS	48.8	50.0	MG/KG	97.6
		Arsenic, LCS	954	1000	MG/KG	95.4
		Barium, LCS	489	500	MG/KG	97.7
		Beryllium, LCS	24.1	25.0	MG/KG	96.4
		Cadmium, LCS	23.9	25.0	MG/KG	95.6
		Chromium, LCS	49.0	50.0	MG/KG	98.0
		Copper, LCS	122	125	MG/KG	97.8
		Nickel, LCS	191	200	MG/KG	95.7
		Lead, LCS	238	250	MG/KG	95.1
		Antimony, LCS	286	300	MG/KG	95.3
		Selenium, LCS	926	1000	MG/KG	92.6
		Thallium, LCS	970	1000	MG/KG	97.0
		Vanadium, LCS	251	250	MG/KG	100.5
		Zinc, LCS	94.1	100	MG/KG	94.1
LCS1	99C0269-LC1	Mercury, LCS	0.98	1.0	MG/KG	98.3

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 09/02/99 RFW LOT # :9909L968

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0W9J0						
SILVER, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
SILVER, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
SILVER, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
MERCURY, TOTAL	001	S	99C0269	08/31/99	09/12/99	09/12/99
MERCURY, TOTAL	001 REP	S	99C0269	08/31/99	09/12/99	09/12/99
MERCURY, TOTAL	001 MS	S	99C0269	08/31/99	09/12/99	09/12/99
NICKEL, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
NICKEL, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
NICKEL, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
LEAD, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
LEAD, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
LEAD, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
SELENIUM, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
SELENIUM, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 09/02/99 RFW LOT # :9909L968

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SELENIUM, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	001	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	001 REP	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	001 MS	S	99L0649	08/31/99	09/23/99	09/28/99
B0W9J1						
SILVER, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
MERCURY, TOTAL	002	S	99C0269	08/31/99	09/12/99	09/12/99
NICKEL, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
LEAD, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
SELENIUM, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	002	S	99L0649	08/31/99	09/23/99	09/28/99
B0W9J2						
SILVER, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 09/02/99 RFW LOT # :9909L968

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY, TOTAL	003	S	99C0269	08/31/99	09/12/99	09/12/99
NICKEL, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
LEAD, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
SELENIUM, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	003	S	99L0649	08/31/99	09/23/99	09/28/99
B0W9J3						
SILVER, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
MERCURY, TOTAL	004	S	99C0269	08/31/99	09/12/99	09/12/99
NICKEL, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
LEAD, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
SELENIUM, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	004	S	99L0649	08/31/99	09/23/99	09/28/99
B0W9J4						
SILVER, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
MERCURY, TOTAL	005	S	99C0269	08/31/99	09/12/99	09/12/99
NICKEL, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 09/02/99 RFW LOT # :9909L968

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
LEAD, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
SELENIUM, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	005	S	99L0649	08/31/99	09/23/99	09/28/99
B0W9J5						
SILVER, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
MERCURY, TOTAL	006	S	99C0269	08/31/99	09/12/99	09/12/99
NICKEL, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
LEAD, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
SELENIUM, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	006	S	99L0649	08/31/99	09/23/99	09/28/99
B0W9J6						
SILVER, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
ARSENIC, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
BARIUM, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
BERYLLIUM, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
CADMIUM, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
CHROMIUM, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
COPPER, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
MERCURY, TOTAL	007	S	99C0269	08/31/99	09/12/99	09/12/99
NICKEL, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
LEAD, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
ANTIMONY, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 09/02/99 RFW LOT # :9909L968

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SELENIUM, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
THALLIUM, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
VANADIUM, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99
ZINC, TOTAL	007	S	99L0649	08/31/99	09/23/99	09/28/99

LAB QC:

SILVER LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
SILVER, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
ARSENIC LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
ARSENIC, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
BARIUM LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
BARIUM, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
BERYLLIUM LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
BERYLLIUM, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
CADMIUM LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
CADMIUM, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
CHROMIUM LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
CHROMIUM, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
COPPER LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
COPPER, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
MERCURY LABORATORY	LC1 BS	S	99C0269	N/A	09/12/99	09/12/99
MERCURY, TOTAL	MB1	S	99C0269	N/A	09/12/99	09/12/99
NICKEL LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
NICKEL, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
LEAD LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
LEAD, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
ANTIMONY LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
ANTIMONY, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
SELENIUM LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
SELENIUM, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
THALLIUM LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
THALLIUM, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
VANADIUM LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
VANADIUM, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99
ZINC LABORATORY	LC1 BS	S	99L0649	N/A	09/23/99	09/28/99
ZINC, TOTAL	MB1	S	99L0649	N/A	09/23/99	09/28/99

RECRA LabNet Use Only
9909L968

Custody Transfer Record/Lab Work Request

Page 1 of 1

All

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

Client: TNU-Hanford B99-078
Est. Final Proj. Sampling Date:
Project #: 10986-001-001-9999-00
Project Contact/Phone #:
RECRA Project Manager: OJ
QC: Spec Del: Std TAT: 30 day
Date Rec'd: 9/2/99 Date Due: 10/2/99
Account #:

Refrigerator #			6
#/Type Container	Liquid		
	Solid		1g
Volume	Liquid		
	Solid		500
Preservatives			

ANALYSES REQUESTED → ORGANIC: VOA, BNA, Pest/PCB, Herb; INORG: Metal, CN

RECRA LabNet Use Only

MATRIX CODES: S - Soil, SE - Sediment, 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

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	1PH	1CR6	Met①
001	BØW9JØ			S	8/31/99	0724	✓	✓	✓
2	1					0732			
3	2					0742			
4	3					0750			
5	4					0800			
6	5					0812			
7	6					0835			

Special Instructions:
Saf # B99-078
11/3/99 Sb + Tl added per client

COMPOSITE WASTE

DATE/REVISIONS:
1. Run matrix QC
2. Met① = As, Ba, Cd, Cr, Pb, Se, Ag, Be, Cu,
3. Ni, V, Zn, Hg
4.
5.
6.

RECRA LabNet Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___
Airbill # *
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. 5.2 C

Relinquished by	Received by	Date	Time
FedEx	Janson	9/2/99	0930

Relinquished by	Received by	Date	Time
	ORIGINAL REWRITTEN		

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES: *423579528922

018

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-106	Page 1 of ~~3~~ 2 BXB 8-31-99

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-6		SAF No.: B99-078	Data Turnaround: 45 Days
Ice Chest No.: 96-006	Field Logbook No.: EL-1511		Method of Shipment: ~~gov vehicle~~ FEDEX	
Shipped To: ~~TMA~~/RECRA BZB 8-31-99	Offsite Property No.: A99 0239		Bill of Lading/Air Bill No.: 4235 7952 8922 - S.2	
			COA: B20CW1 67/C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	None	cool 4C									
Type of Container	aG	aG	aG									
No. of Container(s)	1	1	0									
Volume	500mL	1000mL	500ml									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) below									

Sample No.	Matrix *	Sample Date	Sample Time										
B0W9J0	Soil	8-31-99	0724	X		X		6'-7'				BOW5	4-31
B0W9J1	Soil	8-31-99	0732	X				8.5'-9.5'				BOW5	28
B0W9J2	Soil	8-31-99	0742	X				11'-12'					
B0W9J3	Soil	8-31-99	0750	X				14'-15'					
B0W9J4	Soil	8-31-99	0800	X				16'-17'					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers / Doug Bowers	Date/Time: 8-31-99/1230	Received By: Ref 1B	Date/Time: 8-31-99/1230
Relinquished By: Ref 1B	Date/Time: 9.1.99 11:00	Received By: C Price	Date/Time: 9.1.99 11:00
Relinquished By: C Price	Date/Time: 9.1.99 1400	Received By: FEDEX	Date/Time: 9.1.99 1400
Relinquished By:	Date/Time: FedEx	Received By: Jenson	Date/Time: 9/2/99 0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Beryllium, Copper, Nickel, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) Gamma Spec - Complete {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

(3) Preform ph from 500ml ICP jar

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

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

019

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-106	Page 2 of 2 DJB 8-31-99

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-6		SAF No.: B99-078
Ice Chest No.: 96-006	Field Logbook No.: EL-1511		Method of Shipment: ~~gov vehicle~~ / ~~CT~~ FEDEX
Shipped To: TMA/RECRA DJB 8-31-99	Offsite Property No.: A99 0239		Bill of Lading/Air Bill No.: 4235 7952 8922
			COA: B20CW1 671C

POSSIBLE SAMPLE HAZARDS/REMARKS												
	Preservation	Cool 4C	None									
	Type of Container	aG	aG									
	No. of Container(s)	1	1									
Special Handling and/or Storage	Volume	500mL	1000mL									
SAMPLE ANALYSIS		See item (1) in Special Instructions.	See item (2) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
B0W9J5	Soil	8-31-99	0812	X			21'-22'			B0W5L8			
B0W9J6	Soil	8-31-99	0835	X			24'-25'			↓			
B0W9J7	Soil												
B0W9J8	Soil												
B0W9J9	Soil												

DJB 8-31-99

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 8-31-99/1230	Received By: R.P. IB	Date/Time: 8-31-99/1230
Relinquished By: RP IB	Date/Time: 9-1-99 11:00	Received By: Chris	Date/Time: 9-1-99 11:00
Relinquished By: Chris	Date/Time: 9-1-99 1400	Received By: FEDEX	Date/Time: 9/1/99 14:00
Relinquished By:	Date/Time: FedEx	Received By: Jenson	Date/Time: 9/2/99 0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR U/A TO SIGN COCS.

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Beryllium, Copper, Nickel, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) Gamma Spec - Complete {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Matrix *
- Soil
- Water
- Vapor
- Other Solid
- Other Liquid

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

020