



**RECRA  
LabNet**

a division of Recra Environmental, Inc.

Virtual Laboratories Everywhere

0048941



**Recra LabNet Philadelphia  
Analytical Report**

**Client : TNU-HANFORD  
RFW# : 9705L721  
SDG# : H0087**

**W.O. #: 10985-001-001-9999-00  
Date Received: 05-24-97**

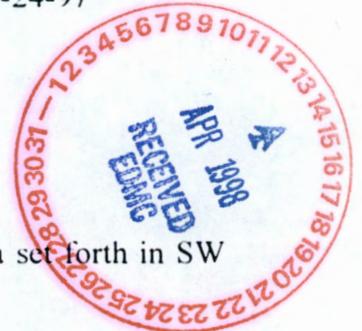
**GC/MS VOLATILE**

One (1) water sample was collected on 05-21-97.

The sample and its associated QC samples were analyzed according to criteria set forth in SW 846 Method 8240 for TCL Volatile target compounds on 06-04-97.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding time for analysis was met.
3. Non-target compounds were not detected in this sample.
4. Sample BOK597 required two-fold dilution because it contained high levels of target compounds.
5. Two (2) of twenty-one (21) surrogate recoveries were outside EPA QC limits. Sample BOK597 was diluted, reanalyzed on 06-04-97, and reported.
6. All matrix spike recoveries were within EPA QC limits.
7. All blank spike recoveries were within EPA QC limits.
8. The method blanks contained the common contaminant Methylene Chloride at levels less than the CRQL.



*Bruce C. Taylor*  
for J. Michael Taylor

Vice President and Laboratory Manager  
Lionville Analytical Laboratory

6-24-97

Date

mmz\oa.05-721v.cn

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.

## GLOSSARY OF VOA DATA

### DATA QUALIFIERS

- U** = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J** = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D** = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I** = Interference.
- NQ** = Result qualitatively confirmed but not able to quantify.
- N** = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X** = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y** = Additional qualifiers used as required are explained in the case narrative.

GLOSSARY OF VOA DATA

ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP, Z** = Indicates Spiked Compound.

Recra LabNet - Lionville Laboratory

Volatiles by GC/MS, HSL List

Report Date: 06/20/97 10:00

RFW Batch Number: 9705L721

Client: TNU-HANFORD

Work Order: 10985001001 Page: 1a

Sample Information	Cust ID:	BOK597	BOK597	BOK597	BOK597	VBLKDK	VBLKDK BS
	RFW#:	001	001 DL	001 REP	001 MS	97LVG110-MB1	97LVG110-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	2.00	1.00	1.00	1.00	1.00
	Units:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Toluene-d8		105 %	106 %	107 %	105 %	100 %	100 %
Surrogate Bromofluorobenzene		72 * %	106 %	105 %	76 * %	98 %	98 %
Recovery 1,2-Dichloroethane-d4		96 %	110 %	102 %	101 %	99 %	96 %
=====fl=====fl=====fl=====fl=====fl=====fl=====fl=====							
Chloromethane		10 U	20 U	10 U	10 U	10 U	10 U
Bromomethane		10 U	20 U	10 U	10 U	10 U	10 U
Vinyl Chloride		10 U	20 U	10 U	10 U	10 U	10 U
Chloroethane		10 U	20 U	10 U	10 U	10 U	10 U
Methylene Chloride		2 JB	4 JBD	6 B	6 B	3 J	9 B
Acetone		10 U	20 U	10 U	10 U	10 U	10 U
Carbon Disulfide		5 U	10 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene		5 U	10 U	5 U	90 %	5 U	98 %
1,1-Dichloroethane		5 U	10 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)		5 U	10 U	5 U	5 U	5 U	5 U
Chloroform		4 J	5 JD	4 J	4 J	5 U	5 U
1,2-Dichloroethane		5 U	10 U	5 U	5 U	5 U	5 U
2-Butanone		10 U	20 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane		5 U	10 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride		210 E	240 D	220 E	220 E	5 U	5 U
Bromodichloromethane		5 U	10 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane		5 U	10 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	10 U	5 U	5 U	5 U	5 U
Trichloroethene		5 J	5 JD	5	85 %	5 U	93 %
Dibromochloromethane		5 U	10 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane		5 U	10 U	5 U	5 U	5 U	5 U
Benzene		5 U	10 U	5 U	85 %	5 U	92 %
Trans-1,3-Dichloropropene		5 U	10 U	5 U	5 U	5 U	5 U
Bromoform		5 U	10 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone		10 U	20 U	10 U	10 U	10 U	10 U
2-Hexanone		10 U	20 U	10 U	10 U	10 U	10 U
Tetrachloroethene		5 U	10 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		5 U	10 U	5 U	5 U	5 U	5 U
Toluene		5 U	10 U	5 U	90 %	5 U	94 %

\*= Outside of EPA CLP QC limits.

004

Cust ID: BOK597 BOK597 BOK597 BOK597 VBLKDK VBLKDK BS

RFW#: 001 001 DL 001 REP 001 MS 97LVG110-MB1 97LVG110-MB1

Chlorobenzene	5 U	10 U	5 U	87 %	5 U	94 %
Ethylbenzene	5 U	10 U	5 U	5 U	5 U	5 U
Styrene	5 U	10 U	5 U	5 U	5 U	5 U
Xylene (total)	5 U	10 U	5 U	5 U	5 U	5 U

\*= Outside of EPA CLP QC limits.

005

Recra LabNet - Lionville Laboratory  
 VOA ANALYTICAL DATA PACKAGE FOR  
 TNU-HANFORD

DATE RECEIVED: 05/24/97

RFW LOT # :9705L721

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOK597	001	W	97LVG110	05/21/97	N/A	06/04/97
BOK597	001	Di	W 97LVG111	05/21/97	N/A	06/04/97
BOK597	001	REP	W 97LVG110	05/21/97	N/A	06/04/97
BOK597	001	MS	W 97LVG110	05/21/97	N/A	06/04/97

LAB QC:

VBLKDK	MB1	W	97LVG110	N/A	N/A	06/04/97
VBLKDK	MB1	BS	W 97LVG110	N/A	N/A	06/04/97
VBLKDM	MB1	W	97LVG111	N/A	N/A	06/04/97

WESTON Analytics Use Only  
**9705L721**

# Custody Transfer Record/Lab Work Request

Client <b>TNU-HANFORD</b>	Refrigerator #	1
Est. Final Proj. Sampling Date	#/Type Container	Liquid <b>36L</b>
Work Order # <b>10985-001-001-9999-00</b>	Volume	Liquid <b>40</b>
Project Contact/Phone #	Preservatives	<b>42L</b>
AD Project Manager <b>K.B.</b>	ANALYSES REQUESTED →	
QC <b>STD</b> Del <b>STD</b> TAT <b>30 DAY</b>	ORGANIC	INORG
Date Rec'd <b>5-24-97</b> Date Due <b>6-23-97</b>	VOA	Metal
Account # <b>TNU HANFORD</b>	BNA	CN
	Pest/PCB	
	Herb	

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 (✓)		Matrix	Date Collected	Time Collected	WESTON Analytics Use Only														
			MS	MSD																		
	<b>001</b>	<b>BOK597</b>			<b>W</b>	<b>5/21/97</b>	<b>1107</b>	<b>0624H</b>														

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Special Instructions:  
**ASD - CLIENT INFO**  
**AMSC - COMP**

**DATE/REVISIONS:**  
 → 1. **NO HEADSPACE**  
 → 2. **0624H = 8240(TCL)**

**WESTON Analytics Use Only**

Samples were:  1) Shipped or Hand Delivered  2) Ambient or Chilled  3) Received in Good Condition  4) Labels Indicate Property Preserved  5) Received Within Holding Time

COC Tape was:  1) Present on Outer Package  2) Unbroken on Outer Package  3) Present on Sample  4) Unbroken on Sample  5) Received Within Holding Time

COC Record Present Upon Sample Rec'd

Relinquished by	Received by	Date	Time
<b>Fed X</b>	<b>M. Scott</b>	<b>5/24/97</b>	<b>9:30</b>

**ORIGINAL REWRITTEN**

Discrepancies Between Samples Labels and COC Record?  Y or  N

NOTES:

Collector <b>RZ STEFFLER (RFS)</b>	Company Contact <b>J.H. KESSNER</b>	Telephone No. <b>(509)372-9538</b>	Project Coordinator <b>Stewart, DL</b>	Data Turnaround <b>45 Days</b>
Project Designation <b>200-UP-1 IRRM Groundwater Sampling FY1997</b>	Sampling Location <b>200-W</b>	Field Logbook No. <b>WHC-N-205 # 64</b>	SAF No. <b>C97-013</b>	Method of Shipment <b>Air Express</b>
Ice Chest No. <b>SML-263</b>	Offsite Property No. <b>NA</b>	BIW of Lading/Air BIW No. <b>NA</b>		
Shipped To <b>TMA NORCAL</b>				

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	HNO3 to pH < 2	HCl to pH < 2	HCl or H2SO4 to pH < 2 Coe
	Type of Container	GI*	GI*	GI*	Gs*
No. of Container(s)	1	1	1	3	
Special Handling and/or Storage	Volume	20ml	125ml	1000ml	40ml

SAMPLE ANALYSIS	Activity Scan	Total Uranium	Technetium-99	YDA - E248A (TCL)
	<b>SDC# H0087</b>			

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	Total Uranium	Technetium-99	YDA - E248A (TCL)
BOK597	Water	MAY 21 1997	1107	X	X	X	X

CHAIN OF POSSESSION	Sign/Print Names		SPECIAL INSTRUCTIONS TOTAL ACTIVITY EXEMPT  FAX copies of log-in to DL Stewart (372-1704) and JM Duncan (372-9052)	Matrix * S - Sed SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum Solids DL - Drum Liquids T - Tissue WI - Waste L - Liquid V - Vegetation X - Other		
	Relinquished By <b>RZ STEFFLER (RFS)</b>	Date/Time <b>5-22-97 12:35</b>			Received By <b>J.H. KESSNER</b>	Date/Time <b>5-22-97 11:20 AM</b>
	Relinquished By <b>Red X</b>	Date/Time <b>5-24-97 9:22</b>			Received By <b>J.L. SCOTT</b>	Date/Time <b>5-24-97 9:50</b>
	Relinquished By	Date/Time			Received By	Date/Time

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

# Thermo NUtech

3711 Wright Avenue

P.O. Box 4416

Richland, WA 99352

Phone: (509) 922-4416 Fax: (509) 922-4417

July 7, 1997

Ms. Doris Ayres  
Bechtel Hanford Inc.  
1022 Lee Boulevard  
Richland, WA 99352

Reference: P.O. #TSH-SBV-207925  
Thermo NUtech N7-05-067-7441, SDG H0087



Dear Ms. Ayres:

Enclosed is the data report for the single water sample designated as SAF No. C97-013/SDG H0087 received at Thermo NUtech on May 23, 1997. Results are given for total uranium, and technetium-99 analyses.

This data package is paginated from 1 through .

Please call if you have any questions concerning this data.

Sincerely,

A handwritten signature in cursive script that reads "N. Joseph Verville".

N. Joseph Verville  
Program Manager

/jv

Enclosure: Data Package

## Case Narrative

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### 1.0 GENERAL

Thermo NUtech Sample Delivery Group H0087 is comprised of the single water sample designated as SAF C97-013 delivered under Project Designation 200-UP-1 IRM Groundwater Sampling FY-1997.

The sample was received as stated on the Chain-of-Custody document.

### 2.0 ANALYSIS NOTES

#### 2.1 Total Uranium Analysis

No problems were encountered with the analyses.

#### 2.2 Technetium-99 Analyses

No problems were encountered with the analyses.

**THERMO NUTECH**  
**SAMPLE DELIVERY GROUP H0087**

**N705067-01**

**B0K597**

**DATA SHEET**

SDG <u>7441</u>	Client/Case no <u>Westinghouse Hanford</u> SDG <u>H0087</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TSH-SBV-207925</u>
Lab sample id <u>N705067-01</u>	Client sample id <u>B0K597</u>
Dept sample id <u>7441-001</u>	Location/Matrix <u>200-W</u> <u>LIQUID</u>
Received <u>05/23/97</u>	Collected <u>05/21/97 11:07</u>
	Custody/SAF No <u>C97-013,WHCN205 C97-013</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Technetium 99	14133-76-7	7700	66	4.8	15		TC
Total Uranium (ug/L)	7440-61-1	1800	220	<u>26</u>	0.10		U_T

Lab id <u>TMANC</u>
Protocol <u>WHC-HASM-1</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>07/07/97</u>

THERMO NUTECH  
SAMPLE DELIVERY GROUP H0087

Test TC Matrix LIQUID  
SDG 7441  
Contact N. Joseph Verville

METHOD SUMMARY  
TECHNETIUM 99 IN WATER  
BETA COUNTING

Client Westinghouse Hanford  
Contract TSH-SBV-207925  
Case no SDG H0087

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Planchet	Technetium 99
Preparation batch 2785-039					
BOK597	N705067-01	A1		7441-001	7700
BLK (QC ID=26942)	N705067-03			7441-003	U
LCS (QC ID=26941)	N705067-02			7441-002	ok
Duplicate (N705067-01)	N705067-04	A1		7441-004	ok
Nominal values and limits from method		RDLs (pCi/L)		15	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2785-039 2σ prep error 10.0 % Reference Lab Notebook #2785 pgs. 39																
BOK597	N705067-01	A1		4.8	<u>0.100</u>			68	110				37	06/24/97	06/27	GRB-219
BLK (QC ID=26942)	N705067-03			3.3	0.200			44	135					06/24/97	07/01	GRB-218
LCS (QC ID=26941)	N705067-02			3.3	0.200			58	101					06/24/97	06/27	GRB-209
Duplicate (N705067-01) (QC ID=26959)	N705067-04	A1		7.0	<u>0.100</u>			46	110				37	06/24/97	06/27	GRB-220
Nominal values and limits from method				15	0.200			20-105	50				180			

PROCEDURES REFERENCE TC99TRLSC  
EP-020 Sample Leach For Technetium-99, rev 0  
EP-540 Technetium-99 Purification, rev 0

AVERAGES ± 2 SD MDA 4.6 : 1.5  
FOR 4 SAMPLES YIELD 54 : 22

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 11

Lab id TMARC  
Protocol WHC-HASM-1  
Version Ver 1.0  
Form DVD-CMS  
Version 1.06  
Report date 07/07/97

**THERMO NUTECH**

SAMPLE DELIVERY GROUP H0087

**METHOD SUMMARY**

URANIUM, TOTAL IN WATER  
KINETIC PHOSPHORIMETRY

Test U T Matrix LIQUID  
SDG 7441  
Contact N. Joseph Verville

Client Westinghouse Hanford  
Contract TSH-SBV-207925  
Case no SDG H0087

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Total Uranium
Preparation batch 2785-039				
BOK597	N705067-01		7441-001	1800
BLK (QC ID=26942)	N705067-03		7441-003	U
LCS (QC ID=26941)	N705067-02		7441-002	ok X
Duplicate (N705067-01)	N705067-04		7441-004	ok
Nominal values and limits from method		RDLs (ug/L)		0.10

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MDA ug/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	PWM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2785-039 2σ prep error 9.0 % Reference Lab Notebook #2785 pgs. 39															
BOK597	N705067-01		<u>26</u>	0.0200								35	06/25/97	06/25	KPA-001
BLK (QC ID=26942)	N705067-03		0.026	0.0200									06/25/97	06/25	KPA-001
LCS (QC ID=26941)	N705067-02		<u>0.26</u>	0.0200									06/25/97	06/25	KPA-001
Duplicate (N705067-01) (QC ID=26943)	N705067-04		<u>26</u>	0.0200								35	06/25/97	06/25	KPA-001
Nominal values and limits from method			0.10	0.0200											180

PROCEDURES	REFERENCE	ASTM D5174-91
EP-040	Environmental Water Dissolution, rev 1	
EP-044	Preparation of Total Uranium by Kinetic Phosphorimetry, rev 1	
EP-928	Total Uranium by Kinetic Phosphorimetry, rev 0	

AVERAGES ± 2 SD	MDA <u>13</u>	: <u>10</u>
FOR 4 SAMPLES	YIELD _____	: _____



# Total Uranium by KPA - Calculation Sheet

Thermo NUTECH

v. 2.0 3/25/97

Dilution err: 1.8 % per dilution  
 Prep error: 5 % Min 1sig error from MDA = 0.0056 ug/L

Entered: *CSU* Date: *6/25/97*  
 Reviewed: *MT* Date: *6/26/97*

MDA from log (ug/L): 0.0259 (A)  
 Prep vol. (liters): 0.02 (B) Liquids: orig vol of aliquot Solids: vol of orig soln after dissolution  
 Aliquot: 0.02 (C) Liquids: final volume of aliquot Solids: mass originally dissolved  
 Units of aliquot: L <-- Results will be calculated to these units

Sample I.D.	ug/L from KPA Output (D)	1sig Act Err from KPA output	Dil. Fctr (E)	Results in ug					Spike Verification		
				Results = (D x B)/C (F)	%Total 1sig err	Actual Total 1 sig err	Actual Total 2 sig err	MDA (AxExB)/C	ug/L after spiking (G)	Net Spike ug/L (G-D)/E (= H)	Spike Rcvry (H/J)
7441-1	1850	0.01300	1000	1.85E+03 ug/ L	✓ 5.9 %	1.09E+02	2.18E+02	2.59E+01	3800	1.95	0.988
7441-4	1770	0.01250	1000	1.77E+03 ug/ L	✓ 5.9 %	1.04E+02	2.09E+02	2.59E+01	3803.04	2.03304	1.030
QC Blanks	aliquot =	1.0 amp									
7441-3	0	0.00000	1	0.00E+00 ug/ amp	✓ 0.0 %	1.11E-04	2.22E-04	5.18E-04	1.961	1.961	0.993
QC Spikes	aliquot =	1.0 amp									
7441-2	49.306	3.454	10	9.86E-01 ug/ amp	✓ 8.8 %	8.67E-02	1.73E-01	5.18E-03	69.996	2.069	1.048

Results in pCi (ug x 0.6872)								(%2 Sig)			
7441-1				1.27E+03 pCi/L	5.9 %	7.50E+01	1.50E+02	1.78E+01	11.8 %		
7441-4				1.22E+03 pCi/L	5.9 %	7.18E+01	1.44E+02	1.78E+01	11.8 %		

(KFA) STANDARD LIST

STANDARD I. D.	STANDARD (UG/L)
G1-A-A-(2)	16.45
G1-A-B-(3)	4.935
G1-A-C-(3)	2.632
G1-C-A-(4)	0.9870
G1-C-B-(3)	0.5264
G1-B-A-(3)	0.1579
G1-C-C-(4)	0.05264

MT  
Initial

6/26/97  
Date

