

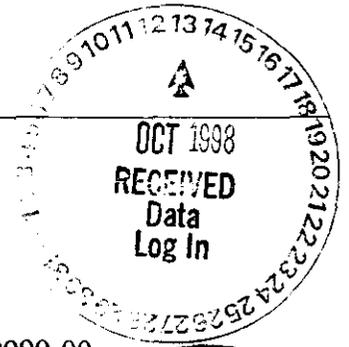
H0169/B98-022

0050109



a division of Recra Environmental, Inc.  
Virtual Laboratories Everywhere

**Recra LabNet Philadelphia  
Analytical Report**



**Client :** TNU-HANFORD B98-022  
**RFW# :** 9808L286  
**SDG/SAF# :** H0169/B98-022

**W.O.# :** 10985-001-001-9999-00  
**Date Received :** 08-11-98



**METALS CASE NARRATIVE**

1. This narrative covers the analyses of 1 soil sample.
2. The sample was prepared and analyzed in accordance with methods checked on the attached glossary.
3. All analyses were performed within the required holding times with the exception of Mercury. The sample was relogged after the holding time for Mercury had been exceeded.
4. The cooler temperature has been recorded on the original Chain of Custody.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits with the exception of the ending CCV for Lead at 117.4%. There is a possible high bias to the sample result. The sample was run in three separate files over a 1 week period. In each case, the CCV trended high. Other files were completed between these runs and the instrument maintained its calibration throughout the file. It appears that the sample matrix caused the high CCV recoveries. A comparison of the sample results between the files gives similar numbers. This matrix effect was noted on previously reported TNU HANFORD batches SDG# H0195 (Recra batch#9808L318 and 9808L335).
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.
7. All preparation/method blanks were within method criteria. 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.

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 **12** pages.

10. The matrix spike (MS) recovery for 1 analyte and matrix spike duplicate (MSD) recoveries for 2 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

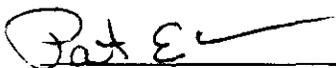
11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution is performed. A PDS was prepared at meaningful concentration levels, due to high concentrations of the following analytes:

<u>Sample ID</u>	<u>Element</u>	<u>PDS</u> <u>Concentration (ppb)</u>	<u>PDS</u> <u>% Recovery</u>
BOP892	Chromium	1200	106.3%

12. The MS and MSD for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganic Matrix Spike Duplicate Report.

13. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

14. 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

  
\_\_\_\_\_  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

10.9.98  
Date

jjw\m08-286



## METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 98096296

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	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Antimony	<u>6010B</u> <u>7041<sup>5</sup></u>	<u>200.7</u> <u>204.2</u>			<u>99</u>
Arsenic	<u>6010B</u> <u>7060A<sup>5</sup></u>	<u>200.7</u> <u>206.2</u>	<u>3113B</u>		<u>99</u>
Barium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Beryllium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Bismuth	<u>6010B<sup>1</sup></u>	<u>200.7<sup>1</sup></u>		<u>1620</u>	<u>99</u>
Boron	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Cadmium	<u>6010B</u> <u>7131A<sup>5</sup></u>	<u>200.7</u> <u>213.2</u>			<u>99</u>
Calcium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Chromium	<u>✓6010B</u> <u>7191<sup>5</sup></u>	<u>200.7</u> <u>218.2</u>			<u>SS17</u>
Cobalt	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Copper	<u>6010B</u> <u>7211<sup>5</sup></u>	<u>200.7</u> <u>220.2</u>			<u>99</u>
Iron	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Lead	<u>✓6010B</u> <u>7421<sup>5</sup></u>	<u>200.7</u> <u>239.2</u>	<u>3113B</u>		<u>99</u>
Lithium	<u>6010B</u> <u>7430<sup>4</sup></u>	<u>200.7</u>		<u>1620</u>	<u>99</u>
Magnesium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Manganese	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Mercury	<u>7470A<sup>3</sup></u> <u>✓7471A<sup>3</sup></u>	<u>245.1<sup>2</sup></u> <u>245.5<sup>2</sup></u>			<u>99</u>
Molybdenum	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Nickel	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Potassium	<u>6010B</u> <u>7610<sup>4</sup></u>	<u>200.7</u> <u>258.1<sup>4</sup></u>			<u>99</u>
Rare Earths	<u>6010B<sup>1</sup></u>	<u>200.7<sup>1</sup></u>		<u>1620</u>	<u>99</u>
Selenium	<u>6010B</u> <u>7740<sup>5</sup></u>	<u>200.7</u> <u>270.2</u>	<u>3113B</u>		<u>99</u>
Silicon	<u>6010B<sup>1</sup></u>	<u>200.7</u>		<u>1620</u>	<u>99</u>
Silica	<u>6010B</u>	<u>200.7</u>		<u>1620</u>	<u>99</u>
Silver	<u>6010B</u> <u>7761<sup>5</sup></u>	<u>200.7</u> <u>272.2</u>			<u>99</u>
Sodium	<u>6010B</u> <u>7770<sup>4</sup></u>	<u>200.7</u> <u>273.1<sup>4</sup></u>			<u>99</u>
Strontium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Thallium	<u>6010B</u> <u>7841<sup>5</sup></u>	<u>200.7</u> <u>279.2</u> <u>200.9</u>			<u>99</u>
Tin	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Titanium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Uranium	<u>6010B<sup>1</sup></u>	<u>200.7<sup>1</sup></u>		<u>1620</u>	<u>99</u>
Vanadium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Zinc	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Zirconium	<u>6010B<sup>1</sup></u>	<u>200.7<sup>1</sup></u>		<u>1620</u>	<u>99</u>

Other: \_\_\_\_\_

Method: \_\_\_\_\_

# 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 09/11/98

CLIENT: TNU-HANFORD B98-022  
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9808L286

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BOP892	Chromium, Total	230	MG/KG	0.08	1.0
		Mercury, Total	0.28	MG/KG	0.02	1.0
		Lead, Total	4.9	MG/KG	0.19	1.0

Recre LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/11/98

CLIENT: TWU-HANFORD B98-022  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9808L286

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	98L1115-MB1	Chromium, Total	0.12	MG/KG	0.08	1.0
		Lead, Total	0.19 u	MG/KG	0.19	1.0
BLANK1	98C0405-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

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INORGANICS ACCURACY REPORT 09/11/98

CLIENT: TRU-HAMFORD B98-022

RECRA LOT #: 9808L286

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	BOP892	Chromium, Total	207	230	21.0	-110. *	1.0
		Chromium, Total MSD	210	230	20.6	-98. *	1.0
		Mercury, Total	0.43	0.28	0.16	93.9	1.0
		Mercury, Total MSD	0.56	0.28	0.17	165.7	1.0
		Lead, Total	55.0	4.9	52.5	95.4	1.0
		Lead, Total MSD	56.1	4.9	51.5	99.4	1.0

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INORGANICS DUPLICATE SPIKE REPORT 09/11/98

CLIENT: TWU-HANFORD B98-022

RECRA LOT #: 9808L286

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

SAMPLE	SITE ID	ANALYTE	SPIKE#1 SPIKE#2	
-----	-----	-----	%RECOV	%RECOV %DIFF
-001	BOP892	Chromium, Total	-110.	-98. *
		Mercury, Total	93.9	165.7
		Lead, Total	95.4	99.4
				4.1

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*10/15/98*

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INORGANICS PRECISION REPORT 09/11/98

CLIENT: THU-HANFORD B98-022

RECRA LOT #: 9808L286

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

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE	RPD	
-001REP	BOP892	Chromium, Total	230	223	2.8	1.0
		Mercury, Total	0.28	0.23	19.4	1.0
		Lead, Total	4.9	4.7	4.2	1.0

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INORGANICS LABORATORY CONTROL STANDARDS REPORT 09/11/98

CLIENT: TNU-HANFORD B98-022

RECRE LOT #: 9808L286

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

SAMPLE	SITE ID	ANALYTE	SPIKED	SPIKED	UNITS	%RECOV
			SAMPLE	AMOUNT		
-----	-----	-----	-----	-----	-----	-----
LCS1	98L1115-LC1	Chromium, LCS	49.7	50.0	MG/KG	99.4
		Lead, LCS	246	250	MG/KG	98.6
LCS1	98C0405-LC1	Mercury, LCS	1.1	1.2	MG/KG	95.2

Recra LabNet - Lionville Laboratory  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNU-HANFORD B98-022

DATE RECEIVED: 08/11/98

RFW LOT # :9808L286

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOP892						
CHROMIUM, TOTAL	001	S	98L1115	07/09/98	08/14/98	08/20/98
CHROMIUM, TOTAL	001 REP	S	98L1115	07/09/98	08/14/98	08/20/98
CHROMIUM, TOTAL	001 MS	S	98L1115	07/09/98	08/14/98	08/20/98
CHROMIUM, TOTAL	001 MSD	S	98L1115	07/09/98	08/14/98	08/20/98
MERCURY, TOTAL	001	S	98C0405	07/09/98	08/20/98	08/20/98
MERCURY, TOTAL	001 REP	S	98C0405	07/09/98	08/20/98	08/20/98
MERCURY, TOTAL	001 MS	S	98C0405	07/09/98	08/20/98	08/20/98
MERCURY, TOTAL	001 MSD	S	98C0405	07/09/98	08/20/98	08/20/98
LEAD, TOTAL	001	S	98L1115	07/09/98	08/14/98	08/20/98
LEAD, TOTAL	001 REP	S	98L1115	07/09/98	08/14/98	08/20/98
LEAD, TOTAL	001 MS	S	98L1115	07/09/98	08/14/98	08/20/98
LEAD, TOTAL	001 MSD	S	98L1115	07/09/98	08/14/98	08/20/98

LAB QC:

CHROMIUM LABORATORY	LC1 BS	S	98L1115	N/A	08/14/98	08/19/98
CHROMIUM, TOTAL	MB1	S	98L1115	N/A	08/14/98	08/19/98
MERCURY LABORATORY	LC1 BS	S	98C0405	N/A	08/20/98	08/20/98
MERCURY, TOTAL	MB1	S	98C0405	N/A	08/20/98	08/20/98
LEAD LABORATORY	LC1 BS	S	98L1115	N/A	08/14/98	08/19/98
LEAD, TOTAL	MB1	S	98L1115	N/A	08/14/98	08/19/98





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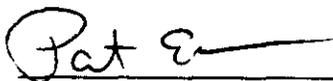
**Recra LabNet Philadelphia  
Analytical Report**

**Client :** TNU-HANFORD B98-022  
**RFW# :** 9808L286  
**SDG/SAF# :** H0169/B98-022

**W.O. # :** 10985-001-001-9999-00  
**Date Received:** 07-14-98

**INORGANIC CASE NARRATIVE**

1. This narrative covers the analyses of 1 soil sample.
2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.
3. Sample holding time as required by the method and/or contract was met for initial Chromium VI analysis for sample BOP892, however the matrix quality control samples were analyzed past hold.
4. The method blanks for Chromium VI were within the method criteria.
5. The Laboratory Control Sample (LCS) for Chromium VI were within the laboratory control limits with the exception of LCS 98LVI064-MB1 for Insoluble Chromium VI which was above the 80-120% acceptance limits.
6. The matrix spike (MS) recovery for Soluble Chromium VI was within the 75-125% control limit, however the Insoluble Chromium VI MS spike recovery was above the control limits.
7. The replicate analysis for Chromium VI was outside the 20% Relative Percent Difference (RFD) control limit, however the replicate results were less than 10 times the reporting limit.
8. Results for solid samples are reported on a dry weight basis.

  
 \_\_\_\_\_  
 J. Michael Taylor  
 Vice President  
 Philadelphia Analytical Laboratory

9-15-98  
 Date

njp&pe/i08-286

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 9 pages.

# WET CHEMISTRY METHODS GLOSSARY FOR ANALYSIS OF SOIL/SOLID SAMPLES

	<u>ASTM</u>	<u>SW846</u>	<u>OTHER</u>
%Ash	_ D2216-80		
%Moisture	_ D2216-80		_ <del>ILMO4.0 (e)</del>
%Solids			_ <del>ILMO4.0 (e)</del>
%Volatile Solids	_ D2216-80		
ASTM Extraction in Water	_ D3987-81/85		
BTU	_ D240-87		
CEC		_ 9081	_ c
Corrosivity __ by coupon __ by pH		_ 1110 (mod) _ 9045	
Cyanide, Total		_ 9010	_ ILMO4.0 (e)
Cyanide, Reactive		_ Sec 7.3	
Density			_ b
Halides, Extractable Organic			_ EPA 600/4/84-008 (mod)
Halides, Total			_ EPA 600/4/84-008 (mod)
EP-Toxicity		_ 1310A	
Flash Point		_ 1010	
Ignitability		_ 1010	
Carbon, Total Organic (by LOI)			_ c
Oil and Grease		_ 9071A	
Carbon, Total Organic		_ 9060	_ Lloyd Kahn (mod)
Oxygen Bomb Prep for Anions	_ D240-87 (mod)	_ 5050	
Petroleum Hydrocarbons, Total Recoverable		_ 9071	_ EPA 418.1 (mod)
pH, Soil		_ 9045B	
Sulfide, Reactive		_ Sec 7.3	
Specific Gravity	_ D1429-76C		
Sulfur, Total		_ 9056	
TCLP		_ 1311	
TCLV		_ 1311	
Synthetic Precipitation Leach		_ 1312	
Chlorine, Total		_ 9056	
Paint Filter		_ 9095	

Other: Chromium VI

Method: SW-306A/7196A

# 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., (1989).
  - b. Standard Methods for the Examination of Water and Waste, 17 ed., (1983)
  - 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.

RFW 21-21L-034/D-06/96

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/14/98

CLIENT: TNU-HANFORD B98-022  
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9808L286

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BOP892	‡ Solids	95.2	‡	0.01	1.0
		Chromium VI	1.7	MG/KG	0.84	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/14/98

CLIENT: TNU-HANFORD B98-022

RECRA LOT #: 9808L286

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
*****	*****	*****	*****	*****	*****	*****
BLANK10	98LVI051-MB1	Chromium VI	0.80 u	MG/KG	0.80	1.0
BLANK10	98LVI061-MB1	Chromium VI	0.80 u	MG/KG	0.80	1.0

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9/15/98

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 09/14/98

CLIENT: TNU-HANFORD B98-022  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9808L286

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	BOP892	<i>Soluble</i> Chromium VI	42.7	1.5	42.0	98.1	1.0
		<i>Insoluble</i> Chromium VI MSD	1770	1.5	1200	147.8	20.0
BLANK10	98LVI051-MB1	<i>Soluble</i> Chromium VI	40.1	0.80u	40.0	100.2	1.0
		<i>Insoluble</i> Chromium VI MSD	1160	0.80u	1090	106.3	20.0
BLANK10	98LVI061-MB1	<i>Soluble</i> Chromium VI	38.5	0.80u	40.0	96.3	1.0
		<i>Insoluble</i> Chromium VI MSD	1570	0.80u	1050	150.1	20.0

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INORGANICS PRECISION REPORT 09/14/98

CLIENT: TNU-HANFORD B98-022  
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9808L286

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-001REP	BOP892	Chromium VI	<del>1.5</del> 1.7 9.14.98	1.2	<del>34.5</del> 34.5 9.14.98	1.0

07  
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9/15/98

Recra LabNet - Lionville Laboratory  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNU-HANFORD B98-022

DATE RECEIVED: ~~08/11/98~~ <sup>07/14/98</sup> <sub>10/14-98</sub>

RFW LOT # : 9808L286

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOP892						
% SOLIDS	001	S	98L&S168	07/09/98	08/14/98	08/17/98
CHROMIUM VI	001	S	98LVI051	07/09/98	07/19/98	07/19/98
CHROMIUM VI	001 REP	S	98LVI061	07/09/98	09/12/98	09/12/98
CHROMIUM VI	001 MS	S	98LVI061	07/09/98	09/12/98	09/12/98
CHROMIUM VI	001 MSD	S	98LVI061	07/09/98	09/12/98	09/12/98

LAB QC:

CHROMIUM VI	MB1	S	98LVI051	N/A	07/19/98	07/19/98
CHROMIUM VI	MB1 BS	S	98LVI051	N/A	07/19/98	07/19/98
CHROMIUM VI	MB1 BSD	S	98LVI051	N/A	07/19/98	07/19/98
CHROMIUM VI	MB1	S	98LVI061	N/A	09/12/98	09/12/98
CHROMIUM VI	MB1 BS	S	98LVI061	N/A	09/12/98	09/12/98
CHROMIUM VI	MB1 BSD	S	98LVI061	N/A	09/12/98	09/12/98

08  
 09/14/98



## Case Narrative

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### 1.0 GENERAL

Thermo Nutech Sample Delivery Group H0169 is comprised of a single solid sample designated under SAF No. B98-022 with a Project Designation of : 100 D Areas - Full Protocol.

The samples were received as stated on the Chain-of-Custody documents.

### 2.0 ANALYSIS NOTES

#### 2.1 Nickel-63 Analyses

No problems were encountered with the analyses

#### 2.2 Isotopic Uranium Analyses

The relative percent difference in the U-233/234 and U-238 results between the duplicate and the original analysis were 67 and 81% respectively, greater than the  $3\sigma$  limits limits of 31 and 31% respectively. The difference in the results is most probably due to inhomogeneity of the activity in the sample matrix.

#### 2.3 Isotopic Plutonium Analyses

No problems were encountered with the analyses. Some MDA's were slightly greater than the RDL.

#### 2.4 Gamma Scan Analyses

No problems were encountered with the analyses



**TMA/RICHMOND**  
 SAMPLE DELIVERY GROUP H0169

SDG 7484  
 Contact N. Joseph Verville

**SAMPLE SUMMARY**

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0169

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB		CHAIN OF CUSTODY	COLLECTED
				SAMPLE ID	SAF NO		
B0P892		SOLID		N807054-01	B98-022	B98-022-15	07/09/98 08:15
Method Blank		SOLID		N807054-03	B98-022		
Lab Control Sample		SOLID		N807054-02	B98-022		
Duplicate (N807054-01)		SOLID		N807054-04	B98-022		07/09/98 08:15

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CS  
 Version 3.06  
 Report date 08/03/98

**TMA/RICHMOND**  
 SAMPLE DELIVERY GROUP H0169

SDG 7484  
 Contact N. Joseph Verville

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0169

**QC SUMMARY**

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7484	B98-022-15	B0P892	SOLID				07/14/98	5	N807054-01	7484-001
		Method Blank	SOLID						N807054-03	7484-003
		Lab Control Sample	SOLID						N807054-02	7484-002
		Duplicate (N807054-01)	SOLID				07/14/98	5	N807054-04	7484-004

QC SUMMARY

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Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-QS  
 Version 3.06  
 Report date 08/03/98

# TMA/RICHMOND

SAMPLE DELIVERY GROUP H0169

SDG 7484  
 Contact N. Joseph Verville

## PREP BATCH SUMMARY

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0169

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI- FIERS
			BATCH	2σ %	CLIENT	MORE	RE BLANK	LCS	
<b>Alpha Spectroscopy</b>									
PU	SOLID	Plutonium, Isotopic in Soil	2785-100	5.0	1		1	1	1/1
U	SOLID	Uranium, Isotopic in Soil	2785-100	5.0	1		1	1	1/1
<b>Gamma Spectroscopy</b>									
GAM	SOLID	Gamma Scan	2785-100	15.0	1		1	1	1/1
<b>Liquid Scintillation Counting</b>									
NI_L	SOLID	Nickel 63 in Soil	2785-100	10.0	1		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 08/03/98

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0169

**WORK SUMMARY**

SDG 7484  
Contact N. Joseph Verville

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0169

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD	
CUSTODY	SAF No	RECEIVED			FIX					
B0P892		N807054-01	7484-001	GAM		07/27/98	08/03/98	NJV	Gamma Scan	
	SOLID	07/09/98	7484-001	NI_L		07/29/98	08/03/98	NJV	Nickel 63 in Soil	
B98-022-15	B98-022	07/14/98	7484-001	PU		07/28/98	08/03/98	NJV	Plutonium, Isotopic in Soil	
			7484-001	U		07/28/98	08/03/98	NJV	Uranium, Isotopic in Soil	
Method Blank		N807054-03	7484-003	GAM		07/28/98	08/03/98	NJV	Gamma Scan	
	SOLID		7484-003	NI_L		07/29/98	08/03/98	NJV	Nickel 63 in Soil	
	B98-022		7484-003	PU		07/28/98	08/03/98	NJV	Plutonium, Isotopic in Soil	
			7484-003	U		07/28/98	08/03/98	NJV	Uranium, Isotopic in Soil	
Lab Control Sample		N807054-02	7484-002	GAM		07/28/98	08/03/98	NJV	Gamma Scan	
	SOLID		7484-002	NI_L		07/29/98	08/03/98	NJV	Nickel 63 in Soil	
	B98-022		7484-002	PU		07/28/98	08/03/98	NJV	Plutonium, Isotopic in Soil	
			7484-002	U		07/28/98	08/03/98	NJV	Uranium, Isotopic in Soil	
Duplicate (N807054-01)		N807054-04	7484-004	GAM		07/28/98	08/03/98	NJV	Gamma Scan	
	SOLID	07/09/98	7484-004	NI_L		07/29/98	08/03/98	NJV	Nickel 63 in Soil	
	B98-022	07/14/98	7484-004	PU		07/28/98	08/03/98	NJV	Plutonium, Isotopic in Soil	
			7484-004	U		07/28/98	08/03/98	NJV	Uranium, Isotopic in Soil	

**COUNTS OF TESTS BY SAMPLE TYPE**

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
GAM	B98-022	Gamma Scan	GAMMAHI	1			1	1	1	4
NI_L	B98-022	Nickel 63 in Soil	NI63LSC	1			1	1	1	4
PU	B98-022	Plutonium, Isotopic in Soil	PUPLATE	1			1	1	1	4
U	B98-022	Uranium, Isotopic in Soil	UPLATE	1			1	1	1	4
<b>TOTALS</b>				<b>4</b>			<b>4</b>	<b>4</b>	<b>4</b>	<b>16</b>

WORK SUMMARY

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CNS  
Version 3.06  
Report date 08/03/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0169**

**N807054-03**

**Method Blank**

**METHOD BLANK**

SDG <u>7484</u>	Client/Case no <u>Hanford</u>	SDG <u>H0169</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N807054-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7484-003</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B98-022</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	0.005	0.010	0.016	0.30	U	U
Uranium 235	15117-96-1	0.002	0.008	0.016	0.30	U	U
Uranium 238	U-238	0.003	0.003	0.013	0.30	U	U
Plutonium 238	13981-16-3	0	0.015	<u>0.058</u>	0.050	U	PU
Plutonium 239/240	15117-48-3	<u>0.068</u>	0.046	<u>0.058</u>	0.050		PU
Nickel 63	13981-37-8	0.83	2.6	4.4	20	U	NI_L
GAMMA SCAN ANALYTES		U					
Potassium 40	13966-00-2	U		0.057		U	GAM
Cobalt 60	10198-40-0	U		0.004	0.050	U	GAM
Cesium 137	10045-97-3	U		0.004	0.050	U	GAM
Europium 152	14683-23-9	U		0.011	0.10	U	GAM
Europium 154	15585-10-1	U		0.014	0.10	U	GAM
Europium 155	14391-16-3	U		0.011	0.10	U	GAM
Americium 241	14596-10-2	U		0.012		U	GAM
Uranium 238	U-238	U		0.51		U	GAM

QC-BLANK 28685

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>08/03/98</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0169

N807054-02

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7484</u>	Client/Case no <u>Hanford</u>	<u>SDG H0169</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N807054-02</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7484-002</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B98-022</u>	

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Uranium 233/234	4.9	0.27	0.12	0.30		U	4.95	0.20	99	87-113	80-120
Uranium 235	4.1	0.24	0.016	0.30		U	4.04	0.16	102	87-113	80-120
Uranium 238	5.2	0.28	0.12	0.30		U	5.10	0.20	102	87-113	80-120
Plutonium 238	5.5	0.60	0.031	0.050		PU	5.70	0.23	96	82-118	80-120
Plutonium 239/240	4.6	0.51	0.031	0.050	B	PU	4.63	0.19	99	81-119	80-120
Nickel 63	140	7.7	4.9	20		NI_L	135	5.4	104	81-119	
GAMMA SCAN ANALYTES											
Potassium 40	U		0.15		U	GAM					
Cobalt 60	0.28	0.024	0.012	0.050		GAM	0.280	0.011	100	73-127	80-120
Cesium 137	0.25	0.021	0.017	0.050		GAM	0.247	0.010	101	73-127	80-120
Europium 152	U		0.032	0.10	U	GAM					
Europium 154	U		0.034	0.10	U	GAM					
Europium 155	U		0.027	0.10	U	GAM					
Americium 241	U		0.033		U	GAM					
Uranium 238	U		1.8		U	GAM					

QC-LCS 28684

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0169

N807054-04

BQP892

**DUPLICATE**

SDG <u>7484</u>	Client/Case no <u>Hanford</u>	SDG <u>H0169</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
<b>DUPLICATE</b>	<b>ORIGINAL</b>	
Lab sample id <u>N807054-04</u>	Lab sample id <u>N807054-01</u>	Client sample id <u>BQP892</u>
Dept sample id <u>7484-004</u>	Dept sample id <u>7484-001</u>	Location/Matrix <u>SOLID</u>
	Received <u>07/14/98</u>	Collected <u>07/09/98 08:15</u>
		Custody/SAF No <u>B98-022-15</u> <u>B98-022</u>

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Uranium 233/234	0.29	0.052	0.026	0.30	J	U	0.58	0.066	0.019	J	67	31	
Uranium 235	0.005	0.014	0.023	0.30	U	U	0.032	0.015	0.014	J	146	167	
Uranium 238	0.24	0.044	0.015	0.30	J	U	0.57	0.063	0.015	J	81	31	
Plutonium 238	0	0.009	0.033	0.050	U	PU	0	0.010	0.039	U	-		
Plutonium 239/240	0.078	0.035	0.033	0.050	B	PU	0.15	0.054	0.039	B	63	86	
Nickel 63	0.93	9.5	16	20	U	NI_L	17	5.1	7.2	J	179	183	
<b>GAMMA SCAN ANALYTES</b>	U						U						
Potassium 40	6.6	0.36	0.21			GAM	5.8	0.20	0.10		13	33	
Cobalt 60	0.15	0.029	0.029	0.050		GAM	0.10	0.014	0.012		40	51	
Cesium 137	13	0.11	0.057	0.050		GAM	11	0.060	0.023		17	33	
Europium 152	4.6	0.11	0.12	0.10		GAM	3.0	0.057	0.060		42	33	
Europium 154	0.54	0.10	0.11	0.10		GAM	0.30	0.041	0.043		57	51	
Europium 155	U		0.11	0.10	U	GAM	U		0.064	U	-		
Radium 226	0.58	0.072	0.086	0.10		GAM	0.45	0.034	0.039		25	40	
Radium 228	0.42	0.15	0.18	0.20		GAM	0.47	0.049	0.055		11	62	
Thorium 228	0.47	0.040	0.057			GAM	0.41	0.020	0.029		14	35	
Thorium 232	0.42	0.15	0.18			GAM	0.47	0.049	0.055		11	62	
Americium 241	U		0.14		U	GAM	U		0.068	U	-		
Uranium 238	U		4.4		U	GAM	U		1.9	U	-		

QC-DUP#1 28686

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0169**

**N807054-01**

**B0P892**

**DATA SHEET**

SDG <u>7484</u>	Client/Case no <u>Hanford</u>	SDG <u>H0169</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N807054-01</u>	Client sample id <u>B0P892</u>	
Dept sample id <u>7484-001</u>	Location/Matrix _____	<u>SOLID</u>
Received <u>07/14/98</u>	Collected <u>07/09/98 08:15</u>	
	Custody/SAF No <u>B98-022-15</u>	<u>B98-022</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	0.58	0.066	0.019	0.30		U
Uranium 235	15117-96-1	0.032	0.015	0.014	0.30	J	U
Uranium 238	U-238	0.57	0.063	0.015	0.30		U
Plutonium 238	13981-16-3	0	0.010	0.039	0.050	U	PU
Plutonium 239/240	15117-48-3	0.15	0.054	0.039	0.050	B	PU
Nickel 63	13981-37-8	17	5.1	7.2	20	J	NI_L
<b>GAMMA SCAN ANALYTES</b>		U					
Potassium 40	13966-00-2	5.8	0.20	0.10			GAM
Cobalt 60	10198-40-0	0.10	0.014	0.012	0.050		GAM
Cesium 137	10045-97-3	11	0.060	0.023	0.050		GAM
Europium 152	14683-23-9	3.0	0.057	0.060	0.10		GAM
Europium 154	15585-10-1	0.30	0.041	0.043	0.10		GAM
Europium 155	14391-16-3	U		0.064	0.10	U	GAM
Radium 226	13982-63-3	0.45	0.034	0.039	0.10		GAM
Radium 228	15262-20-1	0.47	0.049	0.055	0.20		GAM
Thorium 228	14274-82-9	0.41	0.020	0.029			GAM
Thorium 232	7440-29-1	0.47	0.049	0.055			GAM
Americium 241	14596-10-2	U		0.068		U	GAM
Uranium 238	U-238	U		1.9		U	GAM

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVP-DS</u>
Version <u>3.06</u>
Report date <u>08/03/98</u>

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0169

**METHOD SUMMARY**

PLUTONIUM, ISOTOPIC IN SOIL  
ALPHA SPECTROSCOPY

Test PU Matrix SOLID  
SDG 7484  
Contact N. Joseph Verville

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0169

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 2785-100					
BOP892	N807054-01		7484-001	U	0.15
BLK (QC ID=28685)	N807054-03		7484-003	U	<u>0.068</u>
LCS (QC ID=28684)	N807054-02		7484-002	ok	ok
Duplicate (N807054-01)	N807054-04		7484-004	- U	ok
Nominal values and limits from method		RDLs (pCi/g)		0.050	0.050

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 2785-100 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 100														
BOP892	N807054-01		0.039	1.00			56		<u>405</u>			19	07/28/98	SS-055
BLK (QC ID=28685)	N807054-03		<u>0.058</u>	1.00			38		<u>405</u>				07/28/98	SS-058
LCS (QC ID=28684)	N807054-02		0.031	1.00			69		<u>405</u>				07/28/98	SS-056
Duplicate (N807054-01) (QC ID=28686)	N807054-04		0.033	1.00			65		<u>404</u>			19	07/28/98	SS-065
Nominal values and limits from method			0.050	1.00			20-105		700	100		180		

PROCEDURES	REFERENCE	PUPLATE
EP-060		Soil Preparation, rev 0
EP-070		Soil Dissolution, rev 0
EP-940		Plutonium Purification, rev 0
EP-008		Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	<u>0.040</u> ± <u>0.025</u>
FOR 4 SAMPLES	YIELD	<u>57</u> ± <u>28</u>

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 08/03/98

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0169

**METHOD SUMMARY**

URANIUM, ISOTOPIC IN SOIL  
ALPHA SPECTROSCOPY

Test U Matrix SOLID  
SDG 7484  
Contact N. Joseph Verville

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0169

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	SUF- PLANCHET	1: Uranium			2: Uranium			3: Uranium			RESULT RATIOS (%)				
				233/234	235	238	1+3	2σ	2+3	2σ							
Preparation batch 2785-100																	
BOP892	N807054-01	7484-001		0.58	0.032 J	0.57	102	16	6	3							
BLK (QC ID=28685)	N807054-03	7484-003		U	U	U											
LCS (QC ID=28684)	N807054-02	7484-002		ok	ok	ok											
Duplicate (N807054-01)	N807054-04	7484-004		<u>OUT</u> J	ok U	<u>OUT</u> J	121	31	2	6							
Nominal values and limits from method				RDls (pCi/g)	0.30	0.30	0.30	100			4						
								Averages	111		4						

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL-					
													PREPARED	YZED	DETECTOR			
Preparation batch 2785-100														2σ prep error	5.0 %	Reference Lab	Notebook #2785	pg. 100
BOP892	N807054-01		0.019	1.00			91	807				19	07/28/98	07/28	SS-045			
BLK (QC ID=28685)	N807054-03		0.016	1.00			84	807					07/28/98	07/28	SS-049			
LCS (QC ID=28684)	N807054-02		0.12	1.00			83	807					07/28/98	07/28	SS-048			
Duplicate (N807054-01)	N807054-04		0.026	1.00			74	807				19	07/28/98	07/28	SS-050			
(QC ID=28686)																		
Nominal values and limits from method			0.30	1.00			30-105	150	100		180							

PROCEDURES	REFERENCE	UPLATE
EP-060		Soil Preparation, rev 0
EP-070		Soil Dissolution, rev 0
EP-910		Uranium Purification, rev 0
EP-008		Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	<u>0.045</u> ± <u>0.10</u>
FOR 4 SAMPLES	YIELD	<u>83</u> ± <u>14</u>

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 08/03/98

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0169

**METHOD SUMMARY**

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID

SDG 7484

Contact N. Joseph Verville

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0169

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cobalt 60	Cesium 137
------------------	------------------	-----------------	------------------	-----------	------------

Preparation batch 2785-100

BOP892	N807054-01		7484-001	0.10	11
BLK (QC ID=28685)	N807054-03		7484-003	U	U
LCS (QC ID=28684)	N807054-02		7484-002	ok	ok
Duplicate (N807054-01)	N807054-04		7484-004	ok	ok

Nominal values and limits from method RDLs (pCi/g) 0.050 0.050

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MAX MDA g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	---------------	----------

Preparation batch 2785-100 2σ prep error 15.0 % Reference Lab Notebook #2785 pg. 100

BOP892	N807054-01		<u>0.057</u>	870						470			18	07/27/98	07/27	02,04,00
BLK (QC ID=28685)	N807054-03		0.008	750						437				07/27/98	07/28	01,04,00
LCS (QC ID=28684)	N807054-02		0.031	750						436				07/27/98	07/28	01,03,00
Duplicate (N807054-01)	N807054-04		<u>0.096</u>	868						409			19	07/27/98	07/28	02,03,00
	(QC ID=28686)															

Nominal values and limits from method 0.050 750 100 180

PROCEDURES	REFERENCE	GAMMAHI
EP-060		Soil Preparation, rev 0
EP-100		Ge(Li) Preparation for Environmental Samples, rev 0

AVERAGES ± 2 SD	MDA <u>0.048</u> ± <u>0.075</u>
FOR 4 SAMPLES	YIELD _____ ± _____

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id TMAC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 08/03/98

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0169

**METHOD SUMMARY**

NICKEL 63 IN SOIL  
LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID  
SDG 7484  
Contact N. Joseph Verville

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0169

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Nickel 63
Preparation batch 2785-100				
B0P892	N807054-01	7484-001	17	J
BLK (QC ID=28685)	N807054-03	7484-003	U	
LCS (QC ID=28684)	N807054-02	7484-002	ok	
Duplicate (N807054-01)	N807054-04	7484-004	ok	U
Nominal values and limits from method		RDLs (pCi/g)	20	

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 2785-100		2σ prep error 10.0 %		Reference Lab		Notebook #2785		pg. 100							
B0P892	N807054-01		7.2	0.500						25		20	07/28/98	07/29	LSC-005
BLK (QC ID=28685)	N807054-03		4.4	0.500						25			07/28/98	07/29	LSC-005
LCS (QC ID=28684)	N807054-02		4.9	0.500						25			07/28/98	07/29	LSC-005
Duplicate (N807054-01)	N807054-04		16	0.500						25		20	07/28/98	07/29	LSC-005
(QC ID=28686)															
Nominal values and limits from method			20	0.500						25		180			

PROCEDURES REFERENCE NI63LSC  
EP-060 Soil Preparation, rev 0  
EP-431 Nickel-63 Purification, rev 0

AVERAGES ± 2 SD MDA 8.1 ± 11  
FOR 4 SAMPLES YIELD \_\_\_\_\_ ± \_\_\_\_\_

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 08/03/98

**TMA / RICHMOND**  
SAMPLE DELIVERY GROUP H0169

SDG 7484  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0169

**SAMPLE SUMMARY**

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
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**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0169

SDG 7484  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0169

**PREPARATION BATCH SUMMARY**

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0169

SDG 7484  
Contact N. Joseph Verville

**REPORT GUIDE**

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Contract TRB-SBB-207925  
Case no SDG H0169

**WORK SUMMARY**

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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SAMPLE DELIVERY GROUP H0169

SDG 7484  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
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**DATA SHEET**

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

- U The RESULT is less than the MDA (Minimum Detectable Activity).

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Protocol Hanford  
Version Ver 1.0  
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SDG 7484  
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0169

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.
- Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.
- For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.
- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- \* An MDA is underlined if it is bigger than its RDL.

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GUIDE, cont.

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DATA SHEET

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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Form DVD-RG  
Version 3.06  
Report date 08/03/98

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Contact N. Joseph Verville

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LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of RESULT, including that introduced by rounding the result prior to printing.  
  
If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of ADDED.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

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Contact N. Joseph Verville

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**DUPLICATE**

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:

1. A fixed percentage specified in the protocol.

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Case no SDG H0169

**DUPLICATE**

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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**REPORT GUIDE**

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**MATRIX SPIKE**

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- \* The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.
3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- \* The second limits are protocol defined upper and lower QC limits

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**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0169

SDG 7484  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
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**MATRIX SPIKE**

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- \* The recovery is underlined (out of spec) if it is outside either of these ranges.

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SAMPLE DELIVERY GROUP H0169

SDG 7484  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
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Case no SDG H0169

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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SUMMARY DATA SECTION

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SDG 7484  
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GUIDE, cont.

Client Hanford  
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METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- \* Aliquots are underlined if less than the nominal value specified for the method.
- \* Preparation factors are underlined if greater than the nominal value specified for the method.
- \* Dilution factors are underlined if greater than the nominal value specified for the method.
- \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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SUMMARY DATA SECTION

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Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
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METHOD SUMMARY

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1-3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H0169

SDG 7484  
Contact N. Joseph Verville

**GUIDE, cont.**

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**METHOD SUMMARY**

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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**SUMMARY DATA SECTION**

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Lab id TMANC  
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Collector: ID Jacques/Rick Kerkow  
 Company Contact: Mike Stankovich  
 Telephone No.: 521-7620  
 Project Coordinator: KOERNER, CC  
 Data Turnaround: 15 <sup>no 7-28</sup> 15 Days <sub>no 7-9-98</sub>  
 Project Designation: 100 D Areas - Full Protocol  
 Sampling Location: 116-DR-9  
 SAF No.: B98-022  
 Ice Chest No.:  
 Field Logbook No.: EL-1339-2  
 Method of Shipment: Hand Delivered - Gov. Vehicle  
 Shipped To: ~~Quanterra Incorporated~~ TMA only  
 Offsite Property No.: A980024  
 Bill of Lading/Air Bill No.: 423579513882

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool/C	None	None	None	None	None	None
	Radioactive	P	aG	aG	aG	aG	aG	P	
		1	1	1	1	1	1		
Special Handling and/or Storage	Volume	20mL	60mL	60mL	60mL	60mL	1000mL		

SAMPLE ANALYSIS	Activity Scan	Cesium Hex - 7196	Americium-241; Isotopic Plutonium; Isotopic Uranium	Mercury - 7471 (CV) ②	Nickel-63	See item (1) in Special Instructions.
	SP6A H0169'					

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	Cesium Hex - 7196	Americium-241; Isotopic Plutonium; Isotopic Uranium	Mercury - 7471 (CV)	Nickel-63	See item (1) in Special Instructions.
BOP892	Soil	7-9-95	0915	X	X	X	X	X	X

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix *	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98	COA - R116D7 2F00		S - Soil	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)		SE - Sediment	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98	(2) ICPC (Supertrace) Chromium, Lead mercury (CV)		SO - Solid	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98	Note: above indicated sample containers shipped directly to Theemo. Richmond, CA. other analytes shipped to RECRA Libville, PA.		SL - Sludge	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			W - Water	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			O - Oil	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			A - Air	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			DS - Drum Solids	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			DL - Drum Liquids	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			T - Tissue	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			WI - Wipe	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			L - Liquid	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			V - Vegetation	
Relinquished By: <i>[Signature]</i>	Date/Time: 7/14/98	Received By: <i>[Signature]</i>	Date/Time: 7/14/98			X - Other	
LABORATORY SECTION	Received By: <i>[Signature]</i>	Title: <i>[Signature]</i>	Date/Time: 7/14/98				
FINAL SAMPLE DISPOSITION	Disposal Method: <i>[Signature]</i>	Disposed By: <i>[Signature]</i>	Date/Time: 7/14/98				

US DOE %  
FLUOR DANIEL HANFORD CO. INC.  
2355 STEVENS DRIVE/1163 BLDG.  
RICHLAND WA 99352  
(509)376-5898

SHIP DATE: 13JUL98  
ACC# 188288189

ACTUAL WGT: 31 LBS MAN-WT

TO: THERMO NUTECH/ LARRY JOHNSON (510)235-2633  
THERMO NUTECH RICHMOND LABORATORIES  
2838 WRIGHT AVE

RICHMOND

CA 94804-0040

4235 7951 3882

**FedEx** BILL THIRD PARTY

4235 7951 3882

REF: R116072600 A980024

**PRIORITY OVERNIGHT TUE**

CAD# 0053292 13JUL98

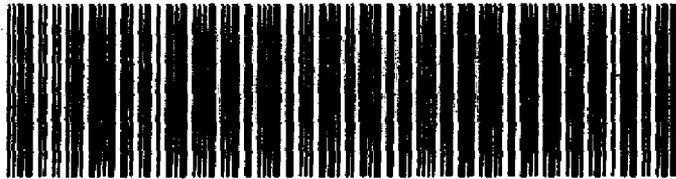
TRK# 4235 7951 3882 Form 8201

Deliver by:  
14JUL98

**OAK** AA

94804 -CA-US

**WA JEMA**



PART # 147923 FORMAT # 077 RIT 09/87

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 7/14/98 / 1000 S.G.#: H0169  
Work Order Number: N8-07-52,53(54) SAF #: B98-022  
Shipping Container ID: 617A Chain of Custody #: B98-022-15

- 1. Custody Seals on shipping container intact? Yes [] No []
- 2. Custody Seals dated and signed? Yes [] No []
- 3. Chain-of-Custody record present? Yes [] No []
- 4. Cooler temperature \_\_\_\_\_
- 5. Vermiculite/packing materials is Wet [] Dry []
- 6. Number of samples in shipping container: ~~5~~<sup>m</sup>6 (25 bottles)
- 7. Sample holding times exceeded? Yes [] No []

8. Samples have:

<input checked="" type="checkbox"/> tape	<input checked="" type="checkbox"/> hazard labels
<input checked="" type="checkbox"/> custody seals	<input checked="" type="checkbox"/> appropriate sample labels

9. Samples are:

<input checked="" type="checkbox"/> in good condition	<input type="checkbox"/> leaking
<input type="checkbox"/> broken	<input type="checkbox"/> have air bubbles

- 10. Where any anomalies identified in sample receipt? Yes [] No []
- 11. Description of anomalies (include sample numbers): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Sample Custodian/Laboratory: [Signature] / INU Date: 7/14/98  
Telephoned To: \_\_\_\_\_ On \_\_\_\_\_ By \_\_\_\_\_

Contractor <b>BHI</b>	<b>OFF-SITE PROPERTY CONTROL</b>	CONTROL NO. <i>(To be obtained from PROPERTY MANAGEMENT)</i> <b>477</b>
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**PART I - TO BE COMPLETED BY ORIGINATOR**

Department <b>ER Engineering</b>	Section <b>Sampling and Analytical</b>	Unit <b>Field Services</b>
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The following items are to be shipped from  Contractor  Vendor

Routing **Federal Express**  Prepaid  Collect

Shipped to Company Address City Country	<b>Thermo Hitech Richmond Laboratory 2030 Wright Ave Richmond, CA 94804-0040 Attn: Larry Johnson (510) 235-2633</b>	Off-site Custodian	Payroll No.
	Zip Code	On-site Custodian	

Qty.	Property No.	Description (include Manufacture Name, Model, Serial No.)	Acquisition Cost
1	31 lbs	Sample #: <b>ED-100</b> (2) <b>ED-100</b> (2) <b>ED-100</b> (2) <b>ED-100</b> (2) Cooler ID: <b>617A</b> Polycooler with environmental samples packed in wet-ice and vermiculite <i>padding for</i>	N/A

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

Necessity for the off-site use of this property

Required for Project Work. List Project No. **116-D-7**

Business Trip

Off-site Assignment

Shipment to Subcontractor. List Subcontract No. \_\_\_\_\_

Other (Please specify) \_\_\_\_\_

Bill of Lading #: **4352 151 282**

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

RM Clearance for Public Release	RM Survey No.	Date
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Location of and Contact for Property (Name/Phone No./Bldg./Area)  
**Mike Stankovich/(509)531-7626/MO-561/1000**

Date Ready for Shipment <b>7/13/98</b>	Cost Code to be Charged <b>R116073600</b>	Approximate Date This Property will be Returned
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Originated By <b>Renee Nielson</b>	Date <b>7/13/98</b>	Authorized By <b>Renee Nielson</b>	Date <b>7/13/98</b>
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Property Representative Signature	Date	Property Management Approval	Date
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**PART II - TO BE COMPLETED BY SHIPPING**

Authorized Shipping Signature	Date
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**DISTRIBUTION (AFTER FINAL SIGNATURES)**

White - Property Management    Yellow - Shipping    Green - Accounts Payable    Pink - Originator    Goldenrod - Property Management