

Thermo Nutech
W.O. No. N9-09-079-7203

Bechtel Hanford Inc.
SDG H0524

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0524 is composed of one solid (soil) sample designated under SAF No. B99-078 with a Project Designation of: 200 Area Source characterization-200-CW-1 OU.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklist. The Gamma Scan results were reported to BHI via fax on October 25, 1999 while Total Strontium data was faxed to BHI on November 9, 1999.

2.0 ANALYSIS NOTES

2.1 Gamma Scan Analyses

No problems were encountered during the course of the analyses.

2.2 Total Strontium Analyses

No problems were encountered during the course of the analyses.

RECEIVED
JAN 18 2000
EDMC

NOV 1999
RECEIVED
Data
Log In

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0524

SDG 7203
 Contact N. Joseph Verville

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0524

SAMPLE SUMMARY

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B0W9M1	GP-1	SOLID		N909079-01	B99-078	B99-078-109	09/07/99 08:52
Method Blank		SOLID		N909038-15	B99-078		
Method Blank		SOLID		N909079-03	B99-078		
Lab Control Sample		SOLID		N909038-14	B99-078		
Lab Control Sample		SOLID		N909079-02	B99-078		
Duplicate (N909079-01)	GP-1	SOLID		N909079-04	B99-078		09/07/99 08:52
Duplicate (N909079-01)	GP-1	SOLID		N909079-05	B99-078		09/07/99 08:52

SAMPLE SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-CS
 Version 3.06
 Report date 11/09/99

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0524

SDG 7203
 Contact N. Joseph Verville

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0524

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
7197		Method Blank	SOLID						N909038-15	7197-015
		Lab Control Sample	SOLID						N909038-14	7197-014
7203	B99-078-109	B0W9M1	SOLID	85.5			09/10/99	3	N909079-01	7203-001
		Method Blank	SOLID						N909079-03	7203-003
		Lab Control Sample	SOLID						N909079-02	7203-002
		Duplicate (N909079-01)	SOLID	85.5			09/10/99	3	N909079-04	7203-004
		Duplicate (N909079-01)	SOLID				09/10/99	3	N909079-05	7203-005

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-QS
 Version 3.06
 Report date 11/09/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0524

PREP BATCH SUMMARY

SDG 7203
 Contact N. Joseph Verville

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0524

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Beta Counting										
SR	SOLID	Total Strontium in Soil	6893-153	10.0	1			1	1	1/1
Gamma Spectroscopy										
GAM	SOLID	Gamma Scan	6893-172	15.0	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
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 Version Ver 1.0
 Form DVD-PBS
 Version 3.06
 Report date 11/09/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0524

SDG 7203
Contact N. Joseph Verville

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0524

WORK SUMMARY

CLIENT SAMPLE ID	LAB SAMPLE ID	LOCATION	MATRIX	COLLECTED	SUP-	ANALYZED	REVIEWED	BY	METHOD
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX				
B0W9M1		N909079-01		7203-001	GAM	10/19/99	10/25/99	NJV	Gamma Scan
GP-1		09/07/99		7203-001	SR	11/06/99	11/09/99	NJV	Total Strontium in Soil
B99-078-109	B99-078	09/10/99							
Method Blank		N909038-15		7197-015	SR	11/01/99	11/08/99	NJV	Total Strontium in Soil
			SOLID						
	B99-078								
Method Blank		N909079-03		7203-003	GAM	10/19/99	10/25/99	NJV	Gamma Scan
			SOLID						
	B99-078								
Lab Control Sample		N909038-14		7197-014	SR	11/01/99	11/08/99	NJV	Total Strontium in Soil
			SOLID						
	B99-078								
Lab Control Sample		N909079-02		7203-002	GAM	10/22/99	10/25/99	NJV	Gamma Scan
			SOLID						
	B99-078								
Duplicate (N909079-01)		N909079-04		7203-004	GAM	10/19/99	10/25/99	NJV	Gamma Scan
GP-1		09/07/99							
	B99-078	09/10/99							
Duplicate (N909079-01)		N909079-05		7203-005	SR	11/09/99	11/09/99	NJV	Total Strontium in Soil
GP-1		09/07/99							
	B99-078	09/10/99							

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
GAM	B99-078	Gamma Scan	GAMMAHI	1			1	1	1		4
SR	B99-078	Total Strontium in Soil	SRTOTAL	1			1	1	1		4
TOTALS				2			2	2	2		8

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 11/09/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0524

N909038-15

Method Blank

METHOD BLANK

SDG <u>7203</u>	Client/Case no <u>Hanford</u>	<u>SDG H0524</u>
Contact <u>N. Joseph Verville</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N909038-15</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7197-015</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-078</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Total Strontium	SR-RAD	0.102	0.39	0.40	1.0	U	SR

200 Area Source chrtzn-200-CW-1 OU

QC-BLANK 32151

METHOD BLANKS

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SUMMARY DATA SECTION

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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>11/09/99</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0524

N909079-03

Method Blank

METHOD BLANK

SDG <u>7203</u>	Client/Case no <u>Hanford</u>	SDG <u>H0524</u>
Contact <u>N. Joseph Verville</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N909079-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7203-003</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B99-078</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	U		0.16		U	GAM
Cobalt 60	10198-40-0	U		0.019	0.050	U	GAM
Cesium 137	10045-97-3	U		0.015	0.10	U	GAM
Europium 152	14683-23-9	U		0.035	0.10	U	GAM
Europium 154	15585-10-1	U		0.057	0.10	U	GAM
Europium 155	14391-16-3	U		0.021	0.10	U	GAM
Radium 226	13982-63-3	U		0.028	0.10	U	GAM
Radium 228	15262-20-1	U		0.063	0.20	U	GAM
Thorium 228	14274-82-9	U		0.017		U	GAM
Thorium 232	TH-232	U		0.063		U	GAM
Americium 241	14596-10-2	U		0.014		U	GAM
Uranium 238	U-238	U		2.2		U	GAM
Uranium 235	15117-96-1	U		0.040		U	GAM

200 Area Source chrtzn-200-CW-1 OU

QC-BLANK 31879

METHOD BLANKS

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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>11/09/99</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0524

N909038-14

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7203</u>	Client/Case no <u>Hanford</u>	<u>SDG H0524</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N909038-14</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7197-014</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B99-078</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 LMFS (TOTAL)	PROTOCOL LIMITS
Total Strontium	13.8	1.0	0.78	1.0	SR	12.2	0.49	113	78-122	

200 Area Source chrtzn-200-CW-1 OU

QC-LCS 32150

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>11/09/99</u>

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0524

N909079-02

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7203</u>	Client/Case no <u>Hanford</u> <u>SDG H0524</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>
Lab sample id <u>N909079-02</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id <u>7203-002</u>	Material/Matrix _____ <u>SOLID</u>
	SAF No <u>B99-078</u>

ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ LMES	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FIBERS	pCi/g	pCi/g	%	(TOTAL)	LIMITS
Cobalt 60	0.439	0.032	0.015	0.050	GAM	0.415	0.017	106	73-127	80-120
Cesium 137	0.431	0.027	0.019	0.10	GAM	0.411	0.016	105	74-126	80-120

200 Area Source chrtzn-200-CW-1. OU

QC-LCS 31878

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 11/09/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0524

N909079-04

B0W9M1

DUPLICATE

SDG <u>7203</u>	Client/Case no <u>Hanford</u>	SDG <u>H0524</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>N909079-04</u>	Lab sample id <u>N909079-01</u>	Client sample id <u>B0W9M1</u>
Dept sample id <u>7203-004</u>	Dept sample id <u>7203-001</u>	Location/Matrix <u>GP-1</u> <u>SOLID</u>
	Received <u>09/10/99</u>	Collected <u>09/07/99 08:52</u>
% solids <u>85.5</u>	% solids <u>85.5</u>	Custody/SAF No <u>B99-078-109</u> <u>B99-078</u>

ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI-	ORIGINAL	2σ ERR	MDA	QUALI-	RPD	3σ	PROT
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS		TEST	pCi/g	(COUNT)			
Potassium 40	12.2	0.65	0.30			GAM	11.4	1.0	0.50		7	35
Cobalt 60	U		0.040	0.050	U	GAM	U		<u>0.065</u>	U	-	
Cesium 137	836	1.2	<u>0.37</u>	0.10		GAM	795	1.9	<u>0.65</u>		5	32
Europium 152	U		<u>1.1</u>	0.10	U	GAM	U		<u>1.8</u>	U	-	
Europium 154	0.713	0.15	<u>0.16</u>	0.10		GAM	0.494	0.30	<u>0.30</u>		36	89
Europium 155	U		<u>1.0</u>	0.10	U	GAM	U		<u>1.2</u>	U	-	
Radium 226	0.658	0.31	<u>0.45</u>	0.10		GAM	0.647	0.62	<u>0.90</u>	U	2	162
Radium 228	0.711	0.19	<u>0.25</u>	0.20		GAM	0.941	0.32	<u>0.38</u>		28	75
Thorium 228	1.00	0.41	0.57			GAM	0.652	0.56	0.82	U	42	130
Thorium 232	0.711	0.19	0.25			GAM	0.941	0.32	0.38		28	75
Americium 241	U		2.7		U	GAM	U		1.6	U	-	
Uranium 238	U		8.3		U	GAM	U		9.7	U	-	
Uranium 235	U		1.3		U	GAM	U		1.8	U	-	

200 Area Source chrtzn-200-CW-1 OU

QC-DUP#1 31880

DUPLICATES

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SUMMARY DATA SECTION

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 11/09/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0524

N909079-05

B0W9M1

DUPLICATE

SDG <u>7203</u>	Client/Case no <u>Hanford</u>	SDG <u>H0524</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>N909079-05</u>	Lab sample id <u>N909079-01</u>	Client sample id <u>B0W9M1</u>
Dept sample id <u>7203-005</u>	Dept sample id <u>7203-001</u>	Location/Matrix <u>GP-1</u> <u>SOLID</u>
	Received <u>09/10/99</u>	Collected <u>09/07/99 08:52</u>
	% solids <u>85.5</u>	Custody/SAF No <u>B99-078-109</u> <u>B99-078</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 PROT TOT LIMIT
Total Strontium	7.33	0.40	0.21	1.0		SR	7.16	0.30	0.16		2	24

200 Area Source chrtzn-200-CW-1 OU

QC-DUP#1 32157

DUPLICATES

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SUMMARY DATA SECTION

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>11/09/99</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0524

N909079-01

B0W9M1

DATA SHEET

SDG <u>7203</u>	Client/Case no <u>Hanford</u>	SDG <u>H0524</u>
Contact <u>N. Joseph Verville</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N909079-01</u>	Client sample id <u>B0W9M1</u>	
Dept sample id <u>7203-001</u>	Location/Matrix <u>GP-1</u>	<u>SOLID</u>
Received <u>09/10/99</u>	Collected <u>09/07/99 08:52</u>	
% solids <u>85.5</u>	Custody/SAF No <u>B99-078-109</u>	<u>B99-078</u>

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Total Strontium	SR-RAD	7.16	0.30	0.16	1.0		SR
Potassium 40	13966-00-2	11.4	1.0	0.50			GAM
Cobalt 60	10198-40-0	U		<u>0.065</u>	0.050	U	GAM
Cesium 137	10045-97-3	795	1.9	<u>0.65</u>	0.10		GAM
Europium 152	14683-23-9	U		<u>1.8</u>	0.10	U	GAM
Europium 154	15585-10-1	0.494	0.30	<u>0.30</u>	0.10		GAM
Europium 155	14391-16-3	U		<u>1.2</u>	0.10	U	GAM
Radium 226	13982-63-3	0.647	0.62	<u>0.90</u>	0.10	U	GAM
Radium 228	15262-20-1	0.941	0.32	<u>0.38</u>	0.20		GAM
Thorium 228	14274-82-9	0.652	0.56	0.82		U	GAM
Thorium 232	TH-232	0.941	0.32	0.38			GAM
Americium 241	14596-10-2	U		1.6		U	GAM
Uranium 238	U-238	U		9.7		U	GAM
Uranium 235	15117-96-1	U		1.8		U	GAM

200 Area Source chrtzn-200-CW-1 OU

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>11/09/99</u>

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0524

Test SR Matrix SOLID
SDG 7203
Contact N. Joseph Verville

METHOD SUMMARY
TOTAL STRONTIUM IN SOIL
BETA COUNTING

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0524

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Total Strontium
Preparation batch 6893-153				
B0W9M1	N909079-01		7203-001	7.16
BLK (QC ID=32151)	N909038-15		7197-015	U
LCS (QC ID=32150)	N909038-14		7197-014	ok
Duplicate (N909079-01)	N909079-05		7203-005	ok
Nominal values and limits from method				
200 Area Source chrtzn-200-CW-1 OU			RDLs (pCi/g)	1.0

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- 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 6893-153 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.153																
B0W9M1	N909079-01			0.16	1.04			95		400			60	11/03/99	11/06	GRB-219
BLK (QC ID=32151)	N909038-15			0.40	<u>1.02</u>			78		200				11/01/99	11/01	GRB-214
LCS (QC ID=32150)	N909038-14			0.78	<u>1.02</u>			76		129				11/01/99	11/01	GRB-229
Duplicate (N909079-01)	N909079-05			0.21	1.04			91		400			63	11/03/99	11/09	GRB-220
(QC ID=32157)																
Nominal values and limits from method				1.0	1.04					100			180			

PROCEDURES	REFERENCE	SRTOTAL
	RP-500	Strontium - Initial Separation, rev 0
	RP-519	Strontium-89,90 Demounting and Yttrium Purification, rev 0

AVERAGES ± 2 SD	MDA	<u>0.39</u> ± <u>0.56</u>
FOR 4 SAMPLES	YIELD	<u>85</u> ± <u>19</u>

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/09/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0524

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID

SDG 7203

Contact N. Joseph Verville

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0524

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6893-172					
BOW9M1	N909079-01		7203-001	U	795
BLK (QC ID=31879)	N909079-03		7203-003	U	U
LCS (QC ID=31878)	N909079-02		7203-002	ok	ok
Duplicate (N909079-01)	N909079-04		7203-004	- U	ok
Nominal values and limits from method		RDLs (pCi/g)		0.050	0.10
200 Area Source chrtzn-200-CW-1 OU					

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- PREPARED	YZED	DETECTOR
Preparation batch 6893-172 2σ prep error 15.0 % Reference Lab Notebook 6893 pg.172																
BOW9M1	N909079-01		<u>0.18</u>	626						113		42	09/24/99	10/19		02,03,00
BLK (QC ID=31879)	N909079-03		0.034	626						287			09/24/99	10/19		01,01,00
LCS (QC ID=31878)	N909079-02		0.015	626						291			09/24/99	10/22		MB,05,00
Duplicate (N909079-01)	N909079-04		<u>0.14</u>	626						200		42	09/24/99	10/19		MB,05,00
(QC ID=31880)																
Nominal values and limits from method			0.050	626						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 0.092 ± 0.16
 FOR 4 SAMPLES YIELD _____ ± _____

METHOD SUMMARIES

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Lab id TMANC
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SDG 7203
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0524

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.

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Form DVD-RG
Version 3.06
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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0524

SDG 7203
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
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Case no SDG H0524

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.

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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.

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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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Client Hanford
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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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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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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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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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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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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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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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REPORT GUIDE

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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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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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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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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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-1	SAF No. B99-078			
Ice Chest No. SM 250 ERC 96-087	Field Logbook No. EL-1511	Method of Shipment -gov. vehicle - FEDEX			
Shipped To TMA/REORA 9-7-99	Offsite Property No. A 990248 N/A 9999 N/A	Bill of Lading/Air Bill No. N/A			
COA B20CWI 671C					

POSSIBLE SAMPLE HAZARDS/REMARKS

Preservation	Cool 4C	None																	
	Type of Container	aG	aG																
Special Handling and/or Storage	No. of Container(s)	1	1																
	Volume	500mL	1000mL																

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	See item (2) in Special Instructions.														
BOW9M0	Soil	9-7-99	0850		X														
BOW9M1	Soil	9-7-99	0852		X														
BOW9M2	Soil	9-7-99	0900		X														
BOW9M3	Soil	9-7-99	0924		X														
BOW9M4	Soil	9-7-99	0936		X														

CHAIN OF POSSESSION

Sign/Print Names

Relinquished By Daisy Bowers	Date/Time 9-7-99/1600	Received By Ref 1 B	Date/Time 9-7-99/1600
Relinquished By Ref BI	Date/Time 9-9-99 0600	Received By Chris	Date/Time 9/9/99 0600
Relinquished By Chris	Date/Time 9/9/99 1400	Received By FEDEX	Date/Time 9/9/99 1400
Relinquished By Fed Ex	Date/Time 9-10-99 10:00	Received By JR Corso	Date/Time 9-10-99 10:00

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7421 - (CV); Chromium Hex - 7196
(2) Gamma Spec - Complete (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

COLLECTOR UNAVAILABLE TO SIGN COL

Matrix *

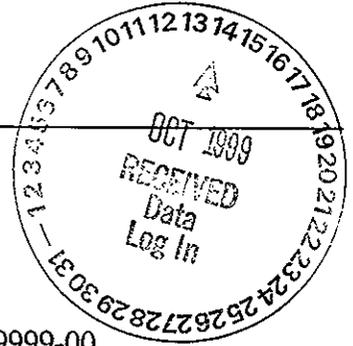
- Soil
- Water
- Vapor
- Other Solid
- Other Liquid

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

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT			
Client: <u>Bechtel Hanford</u>	Date/Time received <u>9-10-99 10:00</u>		
CoC No. <u>B99-078-109</u>			
Container I.D. No. <u>ERC96087</u>	Requested TAT (Days) <u>45</u>	P.O. Received Yes [] No []	
INSPECTION			
1. Custody seals on shipping container intact?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	N/A [<input checked="" type="checkbox"/>]
2. Custody seals on shipping container dated & signed?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	N/A [<input type="checkbox"/>]
3. Custody seals on sample containers intact?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	N/A [<input type="checkbox"/>]
4. Custody seals on sample containers dated & signed?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	N/A [<input type="checkbox"/>]
5. Cooler Temperature: _____	Packing material is:	Wet [<input type="checkbox"/>]	Dry [<input checked="" type="checkbox"/>]
6. Number of samples in shipping container: <u>1</u>			
7. Number of containers per sample: <u>1</u>	(Or see CoC _____)		
8. Paperwork agrees with samples?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	
9. Samples have: Tape [<input checked="" type="checkbox"/>]	Hazard labels [<input type="checkbox"/>]	Rad labels [<input type="checkbox"/>]	Appropriate sample labels [<input checked="" type="checkbox"/>]
10. Samples are: In good condition [<input checked="" type="checkbox"/>]	Leaking [<input type="checkbox"/>]	Broken Container [<input type="checkbox"/>]	Missing [<input type="checkbox"/>]
11. Describe any anomalies:	_____		
	<u>The collection time on the sample is 8:40</u>		
	<u>The collection time on the CoC is 8:57</u>		

13. Was P.M. notified of any anomalies?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	Date <u>9-10-99</u>
14. Received by <u>AL Corwin</u>	Date: <u>9-10-99</u>	Time: <u>10:00</u>	
LOGIN			
TNU W.O. No. _____	Group No. _____	Client W.O. No. _____	
PROGRAM MANAGER			
Sample holding times exceeded?	Yes [<input type="checkbox"/>]	No [<input type="checkbox"/>]	
Client Notified: Name _____	Date/time _____		



**Recra LabNet Philadelphia
Analytical Report**

Client : TNU-HANFORD B99-078
RFW# : 9909L049
SDG/SAF# : H0524/B99-078

W.O.# : 10985-001-001-9999-00
Date Received: 09-10-99

soil 058 10/11/99

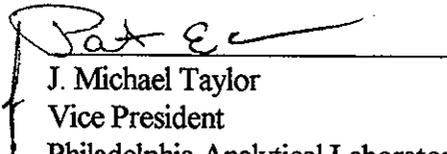
METALS CASE NARRATIVE

1. This narrative covers the analyses of 1 water 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.
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 1 analyte was 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 are performed. A PDS was prepared at the following levels:

<u>Sample ID</u>	<u>Element</u>	<u>PDS Concentration (ppb)</u>	<u>PDS % Recovery</u>
B0W9M1	Zinc	500	110.0

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 13 pages.

12. The duplicate analyses for 3 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.


J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory
mld/m09-049

10-9-99
Date



METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this

Recra Lot#: 9909L049

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

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

Recre LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 10/08/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L049

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0W9M1	Silver, Total	0.1	u MG/KG	0.1	1.0
		Arsenic, Total	2.7	MG/KG	0.32	1.0
		Barium, Total	71.7	MG/KG	0.03	1.0
		Beryllium, Total	0.18	MG/KG	0.01	1.0
		Cadmium, Total	0.94	MG/KG	0.03	1.0
		Chromium, Total	8.7	MG/KG	0.08	1.0
		Copper, Total	16.7	MG/KG	0.12	1.0
		Mercury, Total	0.02	u MG/KG	0.02	1.0
		Nickel, Total	8.7	MG/KG	0.12	1.0
		Lead, Total	11.7	MG/KG	0.20	1.0
		Selenium, Total	0.53	MG/KG	0.36	1.0
		Vanadium, Total	63.2	MG/KG	0.06	1.0
		Zinc, Total	93.3	MG/KG	0.08	1.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 10/08/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L049

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING	DILUTION
					LIMIT	FACTOR
BLANK1	99L0657-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	0.11	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	0.11	MG/KG	0.08	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		Nickel, Total	0.12 u	MG/KG	0.12	1.0
		Lead, Total	0.21 u	MG/KG	0.21	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
		Vanadium, Total	0.06 u	MG/KG	0.06	1.0
		Zinc, Total	0.15	MG/KG	0.08	1.0
BLANK1	99C0282-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 10/08/99

CLIENT: TNU-HANFORD B99-078
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9909L049

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B0W9M1	Silver, Total	5.0	0.1 u	5.4	92.6	1.0
		Arsenic, Total	204	2.7	215	93.7	1.0
		Barium, Total	289	71.7	215	101.0	1.0
		Beryllium, Total	5.2	0.18	5.4	93.0	1.0
		Cadmium, Total	5.8	0.94	5.4	90.1	1.0
		Chromium, Total	31.4	8.7	21.5	105.6	1.0
		Copper, Total	45.2	16.7	26.9	105.9	1.0
		Mercury, Total	0.22	0.02u	0.18	125.0	1.0
		Nickel, Total	59.7	8.7	53.8	94.8	1.0
		Lead, Total	59.0	11.7	53.8	87.9	1.0
		Selenium, Total	198	0.53	215	91.8	1.0
		Vanadium, Total	117	63.2	53.8	99.3	1.0
		Zinc, Total	172	93.3	53.8	145.5	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 10/08/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L049

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

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE	RPD	
-001REP	B0W9M1	Silver, Total	0.1 u	0.11u	NC	1.0
		Arsenic, Total	2.7	2.8	3.6	1.0
		Barium, Total	71.7	68.5	4.6	1.0
		Beryllium, Total	0.18	0.15	19.3	1.0
		Cadmium, Total	0.94	0.58	47.5	1.0
		Chromium, Total	8.7	8.4	3.5	1.0
		Copper, Total	16.7	20.5	20.4	1.0
		Mercury, Total	0.02u	0.03	NC	1.0
		Nickel, Total	8.7	7.6	13.5	1.0
		Lead, Total	11.7	8.3	34.0	1.0
		Selenium, Total	0.53	0.55	2.6	1.0
		Vanadium, Total	63.2	55.9	12.3	1.0
		Zinc, Total	93.3	92.1	1.3	1.0

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 10/08/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L049

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

SAMPLE	SITE ID	ANALYTE	SPIKED	SPIKED	UNITS	%RECOV
			SAMPLE	AMOUNT		
LCS1	99L0657-LC1	Silver, LCS	49.5	50.0	MG/KG	99.0
		Arsenic, LCS	972	1000	MG/KG	97.2
		Barium, LCS	494	500	MG/KG	98.8
		Beryllium, LCS	24.2	25.0	MG/KG	96.8
		Cadmium, LCS	24.5	25.0	MG/KG	98.0
		Chromium, LCS	50.0	50.0	MG/KG	100
		Copper, LCS	124	125	MG/KG	98.9
		Nickel, LCS	196	200	MG/KG	98.0
		Lead, LCS	244	250	MG/KG	97.5
		Selenium, LCS	948	1000	MG/KG	94.8
		Vanadium, LCS	254	250	MG/KG	101.8
		Zinc, LCS	96.1	100	MG/KG	96.1
LCS1	99C0282-LC1	Mercury, LCS	1.0	1.0	MG/KG	105.0

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

DATE RECEIVED: 09/10/99

RFW LOT # :9909L049

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0W9M1						
SILVER, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
SILVER, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
SILVER, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
ARSENIC, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
ARSENIC, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
ARSENIC, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
BARIUM, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
BARIUM, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
BARIUM, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
BERYLLIUM, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
BERYLLIUM, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
BERYLLIUM, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
CADMIUM, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
CADMIUM, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
CADMIUM, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
CHROMIUM, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
CHROMIUM, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
CHROMIUM, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
COPPER, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
COPPER, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
COPPER, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
MERCURY, TOTAL	001	S	99C0282	09/07/99	09/30/99	10/01/99
MERCURY, TOTAL	001 REP	S	99C0282	09/07/99	09/30/99	10/01/99
MERCURY, TOTAL	001 MS	S	99C0282	09/07/99	09/30/99	10/01/99
NICKEL, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
NICKEL, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
NICKEL, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
LEAD, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
LEAD, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
LEAD, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
SELENIUM, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
SELENIUM, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
SELENIUM, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
VANADIUM, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
VANADIUM, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99

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

DATE RECEIVED: 09/10/99

RFW LOT # :9909L049

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
VANADIUM, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99
ZINC, TOTAL	001	S	99L0657	09/07/99	09/28/99	10/05/99
ZINC, TOTAL	001 REP	S	99L0657	09/07/99	09/28/99	10/05/99
ZINC, TOTAL	001 MS	S	99L0657	09/07/99	09/28/99	10/05/99

LAB QC:

SILVER LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
SILVER, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
ARSENIC LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
ARSENIC, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
BARIUM LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
BARIUM, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
BERYLLIUM LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
BERYLLIUM, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
CADMIUM LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
CADMIUM, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
CHROMIUM LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
CHROMIUM, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
COPPER LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
COPPER, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
MERCURY LABORATORY	LC1 BS	S	99C0282	N/A	09/30/99	10/01/99
MERCURY, TOTAL	MB1	S	99C0282	N/A	09/30/99	10/01/99
NICKEL LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
NICKEL, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
LEAD LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
LEAD, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
SELENIUM LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
SELENIUM, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
VANADIUM LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
VANADIUM, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99
ZINC LABORATORY	LC1 BS	S	99L0657	N/A	09/28/99	10/05/99
ZINC, TOTAL	MB1	S	99L0657	N/A	09/28/99	10/05/99

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-109

Page 1 of 2
820 9-7-99

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-1	SAF No. B99-078			
Ice Chest No. ERC 99-009	Field Logbook No. EL-1511	Method of Shipment gov vehicle FED EX			
Shipped To TM/RECRA 9-30-99	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A COA B20CW1671C			

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

SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.								

Sample No.	Matrix *	Sample Date	Sample Time							
B0W9M0	Soil	9-7-99	0840	X						B0W808
B0W9M1	Soil	9-7-99	0852	X						B0W809
B0W9M2 9-7-99	Soil	9-7-99	0900	X						B0W5M1
B0W9M3 9-7-99	Soil	9-7-99	0924	X						
B0W9M4 9-7-99	Soil	9-7-99	0936	X						

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS See chain of custody comments on SAF B99-078.	Matrix *
Relinquished By <i>Doug Bowers</i> Date/Time <i>9-7-99/1600</i>	Received By <i>R. P. B</i> Date/Time <i>9-7-99/1600</i>	(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} COLLECTOR UNAVAILABLE TO SIGN COC	Soil Water Vapor Other Solid Other Liquid
Relinquished By <i>REF ID</i> Date/Time <i>9999 1000</i>	Received By <i>S. G. M. D. P. S. L. F. P. M.</i> Date/Time <i>1000</i>		
Relinquished By <i>SIGAL</i> Date/Time <i>9999 1000</i>	Received By <i>FED EX</i> Date/Time		
Relinquished By <i>FED EX</i> Date/Time <i>9-10-99 0945</i>	Received By <i>T. Murray</i> Date/Time <i>9-10-99 0945</i>		

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

013

SDR # B00-010
Revision #: 0
Date Initiated: 10/11/99

SAMPLE DISPOSITION RECORD

SAF: B99-078
OU: 200-CW-1
Project ID: 200-CW-1
Task ID: 1
Sampling Event: 200 Area Source Characterization 200-CW-1 OU

Laboratory: TMA/RECRA

Task Manager: M.E. Todd

Sampling Information:
Number of Samples: 33
ID Numbers: See Attachment
Matrix: Soil
Collection Date: 08/31/99 - 09/07/99

Issue Background:

Class: Project Data Use General Laboratory Direction Validation Direction Sample Management Direction

Type: Addition of Analyses

Description: Perform Total Radioactive Strontium Analysis

Disposition:

Description: The 200-CW-1 Characterization project requested that the laboratory perform a total radioactive strontium analysis on the listed samples.

Justification: Total radioactive strontium data was determined to be needed subsequent to collection of the listed samples.

Approval Signatures:

S. J. Trent



10/11/99

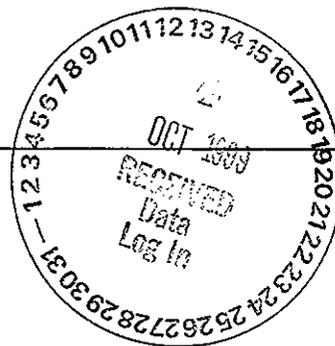
Project Coordinator (Print/Sign Name)

Date

M. E. Todd

Task Manager (Print/Sign Name)

Date



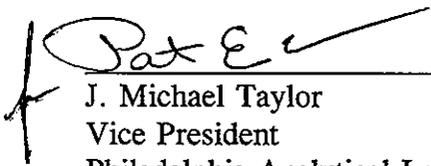
**Recra LabNet Philadelphia
Analytical Report**

Client : TNU-HANFORD B99-078
RFW# : 9909L049
SDG# : H0524
SAF# : B99-078

W.O. # : 10985-001-001-9999-00
Date Received: 09-10-99

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 checked on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The cooler temperature was recorded on the chain-of-custody.
5. The method blank for Chromium VI was within method criteria.
6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.
7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.
9. Results for solid samples are reported on a dry weight basis.



J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-7-99
Date

njpl09-049

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 SOIL/SOLIDS SAMPLE ANALYSIS

	<u>ASTM</u>	<u>SW846</u>	<u>OTHER</u>
% Ash	___ D2216-80		
% Moisture	___ D2216-80		___ ✓ ILMO4.0 (e)
% Solids	___		___ ✓ ILMO4.0 (e)
% Volatile Solids	___ D2216-80		
ASTM Extraction in Water	___ D3987-81/85		
BTU	___ D240-87		
CEC		___ 9081	___ c
Chromium VI		___ ✓ 3060A/7196A	
Corrosivity ___ by coupon ___ by pH		___ 1110(mod) ___ 9045C	
Cyanide, Total		___ 9010B	___ ILMO4.0 (e)
Cyanide, Reactive		___ Section 7.3	
Halides, Extractable Organic		___ 9020B	___ EPA 600/4/84-008
Halides, Total		___ 9020B	___ EPA 600/4/84-008
EP Toxicity		___ 1310A	
Flash Point		___ 1010	
Ignitability		___ 1010	
Oil & Grease		___ 9071A	
Carbon, Total Organic		___ 9060	___ Lloyd Kahn (mod)
Oxygne Bomb Prep for Anions	___ D240-87(mod)	___ 5050	
Petroleum Hydrocarbons, Total Recoverable		___ 9071	___ EPA 418.1
pH, Soil		___ 9045C	
Sulfide, Reactive		___ Section 7.3	
Sulfide		___ 9030B(mod)	
Specific Gravity	___ D1429-76C/	___ D5057-90	
Sulfur, Total		___ 9056	
Synthetic Prpearation Leach		___ 1312	
Paint Filter		___ 9095A	
Other:	Method:		
Other:	Method		

Recra LabNet Philadelphia
METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

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

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

ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.
2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).
3. Test Methods for Evaluating Solid Waste (USEPA SW-846).
 - a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).
 - b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).
 - c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).
 - d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).
 - e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.
 - f. Code of Federal Regulations.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 10/07/99

CLIENT: TNU-HANFORD B99-078
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9909L049

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0W9M1	% Solids	86.1	%	0.01	1.0
		Chromium VI	0.46 u	MG/KG	0.46	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 10/07/99

CLIENT: TNU-HANFORD B99-078
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9909L049

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
*****	*****	*****	*****	*****	*****	*****
BLANK10	99LVI064-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

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INORGANICS ACCURACY REPORT 10/07/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L049

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	BOW9M1	Soluble Chromium VI	4.7	0.46u	4.6	103.1	1.0
		Insoluble Chromium VI	1250	0.46u	1180	106.2	100
BLANK10	99LVI064-ME1	Soluble Chromium VI	4.1	0.40u	4.0	101.8	1.0
		Insoluble Chromium VI	1070	0.40u	1160	91.5	100

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INORGANICS PRECISION REPORT 10/07/99

CLIENT: TNU-HANFORD B99-078
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9909L049

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE	RPD	
*****	*****	*****	*****	*****	*****	*****
-001REP	B0W9M1	% Solids	86.1	83.1	3.6	1.0
		Chromium VI	0.46u	0.46u	NC	1.0

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			B99-078-109	Page 1 of 1 8-20-99
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-1	SAF No. B99-078				
Ice Chest No. ERC 99-009	Field Logbook No. EL-1511	Method of Shipment gov vehicle SAF FED EX				
Shipped To TMA/RECRA 8-30-99	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A				
			COA B20C w1 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.								
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Sample No.	Matrix *	Sample Date	Sample Time										
BOW9M0	Soil	9-7-99	0840	X									
BOW9M1	Soil	9-7-99	0852	X									
BOW9M2 9999	Soil	9-7-99	0900	X									
BOW9M3 9999	Soil	9-7-99	0924	X									
BOW9M4 9999	Soil	9-7-99	0936	X									

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *
Relinquished By <i>Doug Bowers</i> Date/Time <i>9-7-99/1600</i>		Received By <i>R.P.B</i> Date/Time <i>9-7-99/1600</i>		See chain of custody comments on SAF B99-078. (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) COLLECTOR UNAVAILABLE TO SIGN COC				Soil Water Vapor Other Solid Other Liquid
Relinquished By <i>R.F.B</i> Date/Time <i>9999 1000</i>		Received By <i>SJONE/DPAL</i> Date/Time <i>9999 1000</i>						
Relinquished By <i>SJONE/DPAL</i> Date/Time <i>9999 1000</i>		Received By <i>FED EX</i> Date/Time						
Relinquished By <i>FED EX</i> Date/Time <i>9-10-99 0945</i>		Received By <i>JMurray</i> Date/Time <i>9-10-99 0945</i>						

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