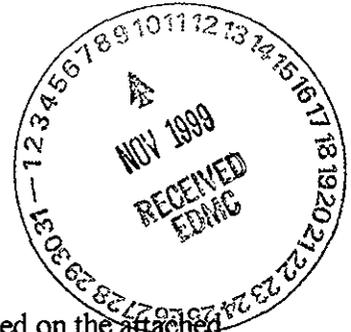


**Recra LabNet Philadelphia
Analytical Report**

Client : TNU-HANFORD B99-082
RFW# : 9907L481
SDG/SAF# : H0472/B99-082

W.O.# : 10985-001-001-9999-00
Date Received: 07-22-99

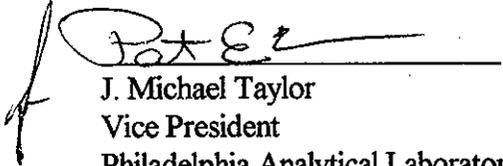
METALS CASE NARRATIVE



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 sample (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.
10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.
11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.

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


J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory
mld/m07-481

8-4-99
Date



METALS METHOD GLOSSARY

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

Recra Lot#: 9907L481

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	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Antimony	<input type="checkbox"/> 6010B <input type="checkbox"/> 7041 ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 204.2			<input type="checkbox"/> 99
Arsenic	<input type="checkbox"/> 6010B <input type="checkbox"/> 7060A ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 206.2	<input type="checkbox"/> 3113B		<input type="checkbox"/> 99
Barium	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Beryllium	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Bismuth	<input type="checkbox"/> 6010B ¹	<input type="checkbox"/> 200.7 ¹		<input type="checkbox"/> 1620	<input type="checkbox"/> 99
Boron	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Cadmium	<input type="checkbox"/> 6010B <input type="checkbox"/> 7131A ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 213.2			<input type="checkbox"/> 99
Calcium	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Chromium	<input type="checkbox"/> 6010B <input type="checkbox"/> 7191 ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 218.2			<input type="checkbox"/> SS17
Cobalt	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Copper	<input type="checkbox"/> 6010B <input type="checkbox"/> 7211 ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 220.2			<input type="checkbox"/> 99
Iron	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Lead	<input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7421 ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 239.2	<input type="checkbox"/> 3113B		<input type="checkbox"/> 99
Lithium	<input type="checkbox"/> 6010B <input type="checkbox"/> 7430 ⁴	<input type="checkbox"/> 200.7		<input type="checkbox"/> 1620	<input type="checkbox"/> 99
Magnesium	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Manganese	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Mercury	<input checked="" type="checkbox"/> 7470A ³ <input type="checkbox"/> 7471A ³	<input type="checkbox"/> 245.1 ² <input type="checkbox"/> 245.5 ²			<input type="checkbox"/> 99
Molybdenum	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Nickel	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Potassium	<input type="checkbox"/> 6010B <input type="checkbox"/> 7610 ⁴	<input type="checkbox"/> 200.7 <input type="checkbox"/> 258.1 ⁴			<input type="checkbox"/> 99
Rare Earths	<input type="checkbox"/> 6010B ¹	<input type="checkbox"/> 200.7 ¹		<input type="checkbox"/> 1620	<input type="checkbox"/> 99
Selenium	<input type="checkbox"/> 6010B <input type="checkbox"/> 7740 ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 270.2	<input type="checkbox"/> 3113B		<input type="checkbox"/> 99
Silicon	<input type="checkbox"/> 6010B ¹	<input type="checkbox"/> 200.7		<input type="checkbox"/> 1620	<input type="checkbox"/> 99
Silica	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7		<input type="checkbox"/> 1620	<input type="checkbox"/> 99
Silver	<input type="checkbox"/> 6010B <input type="checkbox"/> 7761 ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 272.2			<input type="checkbox"/> 99
Sodium	<input type="checkbox"/> 6010B <input type="checkbox"/> 7770 ⁴	<input type="checkbox"/> 200.7 <input type="checkbox"/> 273.1 ⁴			<input type="checkbox"/> 99
Strontium	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Thallium	<input type="checkbox"/> 6010B <input type="checkbox"/> 7841 ⁵	<input type="checkbox"/> 200.7 <input type="checkbox"/> 279.2 <input type="checkbox"/> 200.9			<input type="checkbox"/> 99
Tin	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Titanium	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Uranium	<input type="checkbox"/> 6010B ¹	<input type="checkbox"/> 200.7 ¹		<input type="checkbox"/> 1620	<input type="checkbox"/> 99
Vanadium	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Zinc	<input type="checkbox"/> 6010B	<input type="checkbox"/> 200.7			<input type="checkbox"/> 99
Zirconium	<input type="checkbox"/> 6010B ¹	<input type="checkbox"/> 200.7 ¹		<input type="checkbox"/> 1620	<input type="checkbox"/> 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 08/04/99

CLIENT: TNU-HANFORD B99-082
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9907L481

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
*****	*****	*****	*****	*****	*****	*****
-001	B0W105	Mercury, Total	0.10	u UG/L	0.10	1.0
		Lead, Total	30.9	u UG/L	30.9	1.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 08/04/99

CLIENT: TNU-HANFORD B99-082

RECRA LOT #: 9907L481

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99C0218-MB1	Mercury, Total	0.10	u UG/L	0.10	1.0
BLANK2	99C0218-MB2	Mercury, TCLP Leachate	0.10	u UG/L	0.10	1.0
BLANK1	99L0504-MB1	Lead, Total	30.9	u UG/L	30.9	1.0

Recre LabNet - Lionville

INORGANICS ACCURACY REPORT 08/04/99

CLIENT: TNU-HANFORD B99-082

RECRA LOT #: 9907L481

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

SAMPLE	SITE ID	ANALYTE	SPIKED	INITIAL	SPIKED	%RECOV	DILUTION
			SAMPLE	RESULT	AMOUNT		FACTOR (SPK)
-001	B0W105	Mercury, Total	0.98	0.10u	1.0	97.9	1.0
		Lead, Total	501	30.9 u	500	100.3	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 08/04/99

CLIENT: TNU-HANFORD B99-082

RECRA LOT #: 9907L481

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

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE	RPD	
*****	*****	*****	*****	*****	*****	*****
-001REP	BOW105	Mercury, Total	0.10u	0.10u	NC	1.0
		Lead, Total	30.9 u	30.9 u	NC	1.0

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 08/04/99

CLIENT: TNU-HANFORD B99-082

RECRA LOT #: 9907L481

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	99C0218-LC1	Mercury, LCS	5.1	5.0	UG/L	102.6
LCS1	99L0504-LC1	Lead, LCS	2500	2500	UG/L	99.9

Recra LabNet - Lionville Laboratory
 INORGANIC ANALYTICAL DATA PACKAGE FOR
 TNU-HANFORD B99-082

DATE RECEIVED: 07/22/99

RFW LOT # :9907L481

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOW105						
MERCURY, TOTAL	001	W	99C0218	07/19/99	07/27/99	07/28/99
MERCURY, TOTAL	001 REP	W	99C0218	07/19/99	07/27/99	07/28/99
MERCURY, TOTAL	001 MS	W	99C0218	07/19/99	07/27/99	07/28/99
LEAD, TOTAL	001	W	99L0504	07/19/99	07/27/99	07/28/99
LEAD, TOTAL	001 REP	W	99L0504	07/19/99	07/27/99	07/28/99
LEAD, TOTAL	001 MS	W	99L0504	07/19/99	07/27/99	07/28/99

LAB QC:

MERCURY LABORATORY	LC1 BS	W	99C0218	N/A	07/27/99	07/28/99
MERCURY, TOTAL	MB1	W	99C0218	N/A	07/27/99	07/28/99
MERCURY, TCLP LEACHA	MB2	W	99C0218	N/A	07/27/99	07/28/99
LEAD LABORATORY	LC1 BS	W	99L0504	N/A	07/27/99	07/28/99
LEAD, TOTAL	MB1	W	99L0504	N/A	07/27/99	07/28/99

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-082-01	Page 1 of 2	
Collector Fahlber4g/Porter		Company Contact J Adler		Telephone No. 373-4316		Project Coordinator TRENT, SJ	Price Code 7L	Data Turnaround 21 Days
Project Designation 105-DR FSB - QC Sample Analysis		Sampling Location 105 DR		SAF No. B99-082				
Ice Chest No. SML552		Field Logbook No. EL 1281		Method of Shipment Fed. Ex				
Shipped To TMA/RECRA KE 7-19-99		Offsite Property No.		Bill of Lading/Air Bill No. 423579527753				
				COA R105 D42870				

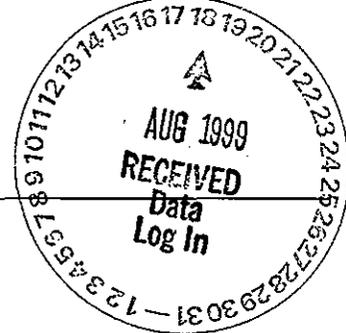
POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	HNO3 to pH <2	HCl to pH <2	HNO3 to pH <2	Cool 4C	HNO3 to pH <2			
	Type of Container	P	P	aG	P	P	aG	P			
	No. of Container(s)	1	1	1	1	1	3	5			
	Special Handling and/or Storage	Volume	120mL	120mL	500mL	500mL	500mL	1000mL	IL		

SAMPLE ANALYSIS				Carbon-14	Tritium - H3	Mercury - 7470 - (CV)	Technetium-99	ICP Metals - 6010A (Add-on) (Lead)	PCBs - 8080	See item (1) in Special Instructions.
-----------------	--	--	--	-----------	--------------	-----------------------	---------------	------------------------------------	-------------	---------------------------------------

Sample No.	Matrix *	Sample Date	Sample Time								
B0W105	Water	7-19-99	1250			X		X	X		

CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By Brent Porter 7/20/99 14:30		Received By Ref # 1A 7/20/99 14:30		(1) Gamma Spectroscopy(Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; Nickel-63				Soil Water Vapor Other Solid Other Liquid		
Relinquished By Brent Porter 7/21/99 09:00		Received By Brent Porter 7/21/99 09:00								
Relinquished By Brent Porter 7/21/99 13:00		Received By Fed Express 7/21/99								
Relinquished By Ted [Signature]		Received By [Signature]								
LABORATORY SECTION		Received By [Signature]		Title [Signature]				Date/Time		
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time		

2 of 1A
3/99 09:00
012



**Recra LabNet Philadelphia
Analytical Report**

Client: TNU-HANFORD B99-082

RFW#: 9907L481

SDG/SAF#: H0472/B99-082

W.O.#: 10985-001-001-9999-00

Date Received: 07-22-99

PCB

One (1) water sample was collected on 07-19-99.

The sample and its associated QC samples were extracted on 07-23-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 08-02,03-99. The extraction procedure was based on method 3520 and the extracts were analyzed based on method 8082 for Aroclors only.

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

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

J. Michael Taylor
J. Michael Taylor

Vice President
Philadelphia Analytical Laboratory

pefr:\group\data\pest\07L-481.pcb

08-11-99
Date

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 7 pages.

GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



GLOSSARY OF PESTICIDE/PCB DATA

- P** = This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.



Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 08/05/99 12:04

RFW Batch Number: 9907L481

Client: TNU-HANFORD B99-082

Work Order: 10985001001 Page: 1

004

Sample Information	Cust ID:	B0W105	B0W105	B0W105	PBLKPK	PBLKPK BS
	RFW#:	001	001 MS	001 MSD	99LE0861-MB1	99LE0861-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	UG/L	UG/L	UG/L	UG/L	UG/L
Surrogate:	Tetrachloro-m-xylene	58 %	62 %	58 %	32 %	45 %
	Decachlorobiphenyl	74 %	90 %	94 %	93 %	81 %
=====fl=====fl=====fl=====fl=====fl=====fl=====fl=====						
Aroclor-1016		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1221		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Aroclor-1232		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1242		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1248		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1254		1.0 U	100 %	101 %	1.0 U	99 %
Aroclor-1260		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Handwritten signature

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Recra LabNet - Lionville Laboratory
PCB ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-082

DATE RECEIVED: 07/22/99

RFW LOT # :9907L481

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOW105	001	W	99LE0861	07/19/99	07/23/99	08/03/99
BOW105	001 MS	W	99LE0861	07/19/99	07/23/99	08/03/99
BOW105	001 MSD	W	99LE0861	07/19/99	07/23/99	08/03/99
LAB QC:						
PBLKPK	MB1	W	99LE0861	N/A	07/23/99	08/02/99
PBLKPK	MB1 BS	W	99LE0861	N/A	07/23/99	08/02/99

Out/SS

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-082-01		Page 1 of 1	
Collector Fahlber4g/Porter		Company Contact J Adler		Telephone No. 373-4316		Project Coordinator TRENT, SJ		Price Code 7L Data Turnaround 21 Days	
Project Designation 105-DR FSB - QC Sample Analysis		Sampling Location 105 DR		SAF No. B99-082					
Ice Chest No. SML552		Field Logbook No. EL 1281		Method of Shipment Fed. Ex					
Shipped To TMA/RECRA EF 7.19.99		Offsite Property No.		Bill of Lading/Air Bill No. 423579527753					
				COA R105 D42870					

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	HNO3 to pH <2	HCl to pH <2	HNO3 to pH <2	Cool 4C	HNO3 to pH <2			
	Type of Container	P	P	aG	P	P	aG	P			
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	3	5			
	Volume	120mL	120mL	500mL	500mL	500mL	1000mL	1L			

SAMPLE ANALYSIS		Carbon-14	Tritium - H3	Mercury - 7470 - (CV)	Technetium-99	ICP Metals - 6010A (Add-on) [Lead]	PCBs - 8080	See item (1) in Special Instructions.			
-----------------	--	-----------	--------------	-----------------------	---------------	------------------------------------	-------------	---------------------------------------	--	--	--

Sample No.	Matrix *	Sample Date	Sample Time								
BOW105	Water	7.19.99	1250		X		X	X			

CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By <i>Brent Porter</i> 7/20/99 14:30		Received By <i>Ref # 1A</i> 7/20/99 14:30		(1) Gamma Spectroscopy(Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; Nickel-63				Soil Water Vapor Other Solid Other Liquid			
Relinquished By <i>Brent Porter</i> 7/21/99 09:00		Received By <i>Brent Porter</i> 7/21/99 09:00									
Relinquished By <i>Brent Porter</i> 7/21/99 13:00		Received By <i>Fed Express</i> 7/21/99									
Relinquished By <i>Fed Ex</i> 7/21/99		Received By <i>[Signature]</i> 7/21/99									
LABORATORY SECTION	Received By	Title				Date/Time					
FINAL SAMPLE DISPOSITION	Disposal Method				Disposed By				Date/Time		

H0472-TMA/RECR

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0472 is composed of one liquid (water) sample designated under SAF No. B99-082 with a Project Designation of : 105-DR FSB-QC Sample Analysis.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklist. The results were transmitted to BHI via facsimile on August 11, 1999 with the exception of the carbon-14 and technetium-99 data, which was faxed to BHI on August 18, 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.

2.3 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.4 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.5 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.6 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.7 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.8 Tritium Analyses

No problems were encountered during the course of the analyses.

2.9 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0472

SAMPLE SUMMARY

SDG 7164
 Contact L.A. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0472

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
BOW105	105DR	WATER		N907128-01	B99-082	B99-082-01	07/19/99 12:50
Method Blank		WATER		N907128-03	B99-082		
Lab Control Sample		WATER		N907128-02	B99-082		
Duplicate (N907128-01)	105DR	WATER		N907128-04	B99-082		07/19/99 12:50

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-CS
 Version 3.06
 Report date 08/18/99

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0472

SDG 7164
 Contact L.A. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0472

QC SUMMARY

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	SAMPLE SOLIDS	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	DEPARTMENT SAMPLE ID
7164	B99-082-01	B0W105	WATER			07/22/99	3	N907128-01 7164-001
		Method Blank	WATER					N907128-03 7164-003
		Lab Control Sample	WATER					N907128-02 7164-002
		Duplicate (N907128-01)	WATER			07/22/99	3	N907128-04 7164-004

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-QS
 Version 3.06
 Report date 08/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0472

SDG 7164
 Contact L.A. Johnson

PREP BATCH SUMMARY

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0472

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Alpha Spectroscopy										
AM	WATER	Americium 241 in Water	6893-031	5.0	1			1	1	1/1
PU	WATER	Plutonium, Isotopic in Water	6893-031	5.0	1			1	1	1/1
U	WATER	Uranium, Isotopic in Water	6893-031	5.0	1			1	1	1/1
Beta Counting										
SR	WATER	Total Strontium in Water	6893-031	10.0	1			1	1	1/1
TC	WATER	Technetium 99 in Water	6893-031	10.0	1			1	1	1/1
Gamma Scan										
GAM	WATER	Gamma Emitters	6893-031	15.0	1			1	1	1/1
Liquid Scintillation Counting										
C	WATER	Carbon 14 in Water	6893-031	10.0	1			1	1	1/1
H	WATER	Tritium in Water	6893-031	10.0	1			1	1	1/1
NI_L	WATER	Nickel-63 in Liquid	6893-031	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 08/18/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0472

SDG 7164
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0472

WORK SUMMARY

CLIENT SAMPLE ID		LAB SAMPLE ID								
LOCATION	MATRIX	COLLECTED		SUP-						
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
B0W105		N907128-01	7164-001	AM		08/07/99	08/11/99	NJV	Americium 241 in Water	
105DR		07/19/99	7164-001	C		08/10/99	08/18/99	NJV	Carbon 14 in Water	
B99-082-01	B99-082	07/22/99	7164-001	GAM		08/04/99	08/11/99	NJV	Gamma Emitters	
			7164-001	H		08/04/99	08/11/99	NJV	Tritium in Water	
			7164-001	NI_L		08/04/99	08/11/99	NJV	Nickel-63 in Liquid	
			7164-001	PU		08/05/99	08/11/99	NJV	Plutonium, Isotopic in Water	
			7164-001	SR		07/30/99	08/11/99	NJV	Total Strontium in Water	
			7164-001	TC		08/16/99	08/18/99	NJV	Technetium 99 in Water	
			7164-001	U		08/04/99	08/11/99	NJV	Uranium, Isotopic in Water	
Method Blank		N907128-03	7164-003	AM		08/09/99	08/11/99	NJV	Americium 241 in Water	
			7164-003	C		08/10/99	08/18/99	NJV	Carbon 14 in Water	
	B99-082		7164-003	GAM		08/07/99	08/11/99	NJV	Gamma Emitters	
			7164-003	H		08/04/99	08/11/99	NJV	Tritium in Water	
			7164-003	NI_L		08/05/99	08/11/99	NJV	Nickel-63 in Liquid	
			7164-003	PU		08/05/99	08/11/99	NJV	Plutonium, Isotopic in Water	
			7164-003	SR		07/30/99	08/11/99	NJV	Total Strontium in Water	
			7164-003	TC		08/16/99	08/18/99	NJV	Technetium 99 in Water	
			7164-003	U		08/04/99	08/11/99	NJV	Uranium, Isotopic in Water	
Lab Control Sample		N907128-02	7164-002	AM		08/07/99	08/11/99	NJV	Americium 241 in Water	
			7164-002	C		08/10/99	08/18/99	NJV	Carbon 14 in Water	
	B99-082		7164-002	GAM		08/06/99	08/11/99	NJV	Gamma Emitters	
			7164-002	H		08/04/99	08/11/99	NJV	Tritium in Water	
			7164-002	NI_L		08/04/99	08/11/99	NJV	Nickel-63 in Liquid	
			7164-002	PU		08/05/99	08/11/99	NJV	Plutonium, Isotopic in Water	
			7164-002	SR		07/30/99	08/11/99	NJV	Total Strontium in Water	
			7164-002	TC		08/13/99	08/18/99	NJV	Technetium 99 in Water	
			7164-002	U		08/04/99	08/11/99	NJV	Uranium, Isotopic in Water	
Duplicate (N907128-01)		N907128-04	7164-004	AM		08/07/99	08/11/99	NJV	Americium 241 in Water	
105DR		07/19/99	7164-004	C		08/10/99	08/18/99	NJV	Carbon 14 in Water	
	B99-082	07/22/99	7164-004	GAM		08/07/99	08/11/99	NJV	Gamma Emitters	
			7164-004	H		08/04/99	08/11/99	NJV	Tritium in Water	
			7164-004	NI_L		08/05/99	08/11/99	NJV	Nickel-63 in Liquid	
			7164-004	PU		08/09/99	08/11/99	NJV	Plutonium, Isotopic in Water	
			7164-004	SR		07/30/99	08/11/99	NJV	Total Strontium in Water	
			7164-004	TC		08/13/99	08/18/99	NJV	Technetium 99 in Water	
			7164-004	U		08/04/99	08/11/99	NJV	Uranium, Isotopic in Water	

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 08/18/99

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0472

WORK SUMMARY, cont.

SDG 7164
 Contact L.A. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0472

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
AM	B99-082	Americium 241 in Water	AM/CMPLATE	1			1	1	1		4
C	B99-082	Carbon 14 in Water	C14CHEMLSC	1			1	1	1		4
GAM	B99-082	Gamma Emitters	GAMMAHI	1			1	1	1		4
H	B99-082	Tritium in Water	EPA906.0	1			1	1	1		4
NI_L	B99-082	Nickel-63 in Liquid	NI63LSC	1			1	1	1		4
PU	B99-082	Plutonium, Isotopic in Water	PUPLATE	1			1	1	1		4
SR	B99-082	Total Strontium in Water	SR8990	1			1	1	1		4
TC	B99-082	Technetium 99 in Water	TC99TRLSC	1			1	1	1		4
U	B99-082	Uranium, Isotopic in Water	UPLATE	1			1	1	1		4
TOTALS				9			9	9	9		36

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0472

N907128-02

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7164</u>	Client/Case no <u>Hanford</u> <u>SDG-H0472</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>
Lab sample id <u>N907128-02</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id <u>7164-002</u>	Material/Matrix <u>WATER</u>
	SAF No <u>B99-082</u>

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	1950	180	190	400	H	2190	88	89	81-119	80-120
Carbon 14	4470	82	36		C	4800	190	93	85-115	
Technetium 99	1450	41	12	15	TC	1480	59	98	84-116	80-120
Uranium 233/234	8.73	0.86	0.41	1.0	U	9.66	0.39	90	84-116	80-120
Uranium 235	6.93	0.74	0.097	1.0	U	7.84	0.31	88	83-117	80-120
Uranium 238	9.74	0.92	0.39	1.0	U	10.5	0.42	93	84-116	80-120
Plutonium 238	11.0	0.94	0.056	1.0	PU	11.3	0.45	97	84-116	80-120
Plutonium 239/240	11.2	0.96	0.048	1.0	PU	11.9	0.48	94	85-115	80-120
Nickel 63	161	3.9	1.9		NI_L	168	6.7	96	84-116	
Americium 241	18.7	1.4	0.053		AM	21.0	0.84	89	87-113	
Total Strontium	24.9	0.85	0.38	2.0	SR	25.0	1.0	100	83-117	
Cobalt 60	446	16	6.8	25	GAM	470	19	95	77-123	80-120
Cesium 137	393	14	10	15	GAM	414	17	95	77-123	80-120

105-DR FSB-QC Sample Analysis

QC-LCS 31426

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>08/18/99</u>

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0472

N907128-04

BOW105

DUPLICATE

SDG <u>7164</u> Contact <u>L.A. Johnson</u> DUPLICATE Lab sample id <u>N907128-04</u> Dept sample id <u>7164-004</u>	Client/Case no <u>Hanford</u> <u>SDG-H0472</u> Case no <u>TRB-SBB-207925</u> ORIGINAL Lab sample id <u>N907128-01</u> Dept sample id <u>7164-001</u> Received <u>07/22/99</u>
Client sample id <u>BOW105</u> Location/Matrix <u>105DR</u> <u>WATER</u> Collected <u>07/19/99 12:50</u> Custody/SAF No <u>B99-082-01</u> <u>B99-082</u>	

ANALYTE	DUPLICATE		2σ ERR		MDA	RDL	QUALI-	TEST	ORIGINAL		2σ ERR		MDA	QUALI-	RPD	3σ	PROT
	pCi/L	(COUNT)	pCi/L	(COUNT)	pCi/L	pCi/L	FIERS		pCi/L	(COUNT)	pCi/L	(COUNT)	pCi/L	FIERS	%	TOT	LIMIT
Tritium	-31.0	110	190	400	U	H		-25.7	110	190	U	-					
Carbon 14	-19.1	20	36		U	C		-17.4	21	36	U	-					
Techmetium 99	2.98	7.7	12	15	U	TC		1.12	4.0	11	U	-					
Uranium 233/234	0.041	0.055	0.10	1.0	U	U		0.036	0.048	0.092	U	-					
Uranium 235	0.017	0.033	0.13	1.0	U	U		0.015	0.029	0.11	U	-					
Uranium 238	0.027	0.027	0.10	1.0	U	U		0	0.024	0.092	U	-					
Plutonium 238	0.014	0.022	0.044	1.0	U	PU		0.029	0.044	0.090	U	-					
Plutonium 239/240	-0.007	0.014	0.044	1.0	U	PU		0.007	0.044	0.098	U	-					
Nickel 63	0.022	1.1	1.9		U	NI_L		0.089	1.1	1.9	U	-					
Americium 241	0.017	0.020	0.026		U	AM		0.015	0.023	0.042	U	-					
Total Strontium	0.188	0.30	0.41	2.0	U	SR		0.011	0.33	0.45	U	-					
Potassium 40	U		84		U	GAM		U		250	U	-					
Cobalt 60	U		7.8	25	U	GAM		U		14	U	-					
Cesium 137	U		6.6	15	U	GAM		U		13	U	-					
Europium 152	U		17	50	U	GAM		U		35	U	-					
Europium 154	U		19	50	U	GAM		U		38	U	-					
Europium 155	U		15	50	U	GAM		U		38	U	-					
Radium 226	U		13		U	GAM		U		28	U	-					
Radium 228	U		29		U	GAM		U		64	U	-					
Thorium 228	U		10		U	GAM		U		21	U	-					
Thorium 232	U		29		U	GAM		U		64	U	-					
Americium 241	U		15		U	GAM		U		44	U	-					
Uranium 238	U		900		U	GAM		U		1800	U	-					
Uranium 235	U		25		U	GAM		U		55	U	-					

105-DR FSB-QC Sample Analysis

QC-DUP#1 31428

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>08/18/99</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0472

N907128-01

BOW105

DATA SHEET

SDG <u>7164</u>	Client/Case no <u>Hanford</u>	SDG-H0472
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N907128-01</u>	Client sample id <u>BOW105</u>	
Dept sample id <u>7164-001</u>	Location/Matrix <u>105DR</u>	<u>WATER</u>
Received <u>07/22/99</u>	Collected <u>07/19/99 12:50</u>	
	Custody/SAF No <u>B99-082-01</u>	<u>B99-082</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium	10028-17-8	-25.7	110	190	400	U	H
Carbon 14	14762-75-5	-17.4	21	36		U	C
Technetium 99	14133-76-7	1.12	4.0	11	15	U	TC
Uranium 233/234	U-233/234	0.036	0.048	0.092	1.0	U	U
Uranium 235	15117-96-1	0.015	0.029	0.11	1.0	U	U
Uranium 238	U-238	0	0.024	0.092	1.0	U	U
Plutonium 238	13981-16-3	0.029	0.044	0.090	1.0	U	PU
Plutonium 239/240	PU-239/240	0.007	0.044	0.098	1.0	U	PU
Nickel 63	13981-37-8	0.089	1.1	1.9		U	NI_L
Americium 241	14596-10-2	0.015	0.023	0.042		U	AM
Total Strontium	SR-RAD	0.011	0.33	0.45	2.0	U	SR
Potassium 40	13966-00-2	U		250		U	GAM
Cobalt 60	10198-40-0	U		14	25	U	GAM
Cesium 137	10045-97-3	U		13	15	U	GAM
Europium 152	14683-23-9	U		35	50	U	GAM
Europium 154	15585-10-1	U		38	50	U	GAM
Europium 155	14391-16-3	U		38	50	U	GAM
Radium 226	13982-63-3	U		28		U	GAM
Radium 228	15262-20-1	U		64		U	GAM
Thorium 228	14274-82-9	U		21		U	GAM
Thorium 232	TH-232	U		64		U	GAM
Americium 241	14596-10-2	U		44		U	GAM
Uranium 238	U-238	U		1800		U	GAM
Uranium 235	15117-96-1	U		55		U	GAM

105-DR FSB-QC Sample Analysis

DATA SHEETS

Page 1

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>08/18/99</u>

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0472

Test AM Matrix WATER
 SDG 7164
 Contact L.A. Johnson

METHOD SUMMARY
 AMERICIUM 241 IN WATER
 ALPHA SPECTROSCOPY

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0472

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST TEST FIX	SUF- PLANCHET	Americium 241
Preparation batch 6893-031				
BOW105	N907128-01		7164-001	U
BLK (QC ID=31427)	N907128-03		7164-003	U
LCS (QC ID=31426)	N907128-02		7164-002	ok
Duplicate (N907128-01)	N907128-04		7164-004	- U

Nominal values and limits from method RDLs (pCi/L)
 105-DR FSB-QC Sample Analysis

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	BFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 6893-031 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.031																
BOW105	N907128-01		0.042	0.500				84		766			19	08/06/99	08/07	SS-002
BLK (QC ID=31427)	N907128-03		0.023	0.500				81		1258				08/06/99	08/09	SS-002
LCS (QC ID=31426)	N907128-02		0.053	0.500				64		760				08/06/99	08/07	SS-056
Duplicate (N907128-01)	N907128-04		0.026	0.500				85		766			19	08/06/99	08/07	SS-003
	(QC ID=31428)															

Nominal values and limits from method 0.500 20-105 700 100 180

PROCEDURES	REFERENCE	AM/CMPLATE
EP-040	Environmental Water Dissolution, rev 1	
EP-940	Plutonium Purification, rev 0	
EP-960	Americium-Curium Purification, rev 0	
EP-008	Heavy Elements Electroplating, rev 0	

AVERAGES ± 2 SD	MDA	0.036 ± 0.028
FOR 4 SAMPLES	YIELD	78 ± 20

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0472

Test PU Matrix WATER
SDG 7164
Contact L.A. Johnson

METHOD SUMMARY
PLUTONIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0472

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	SUF- PLANCHET	Plutonium 238	Plutonium 239/240
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Preparation batch 6893-031

B0W105	N907128-01		7164-001	U	U
BLK (QC ID=31427)	N907128-03		7164-003	U	U
LCS (QC ID=31426)	N907128-02		7164-002	ok	ok
Duplicate (N907128-01)	N907128-04		7164-004	- U	- U

Nominal values and limits from method RDLs (pCi/L) 1.0 1.0
105-DR PSB-QC Sample Analysis

METHOD PERFORMANCE

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

Preparation batch 6893-031 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.031

B0W105	N907128-01		0.098	0.500			44	725			17	08/05/99	08/05	SS-010
BLK (QC ID=31427)	N907128-03		0.055	0.500			68	725				08/05/99	08/05	SS-011
LCS (QC ID=31426)	N907128-02		0.056	0.500			73	<u>607</u>				08/05/99	08/05	SS-055
Duplicate (N907128-01) (QC ID=31428)	N907128-04		0.044	0.500			55	1258			21	08/05/99	08/09	SS-00i

Nominal values and limits from method 1.0 0.500 20-105 700 100 180

PROCEDURES	REFERENCE	PUPLATE
EP-040	Environmental Water Dissolution, rev 1	
EP-940	Plutonium Purification, rev 0	
EP-008	Heavy Elements Electroplating, rev 0	

AVERAGES ± 2 SD	MDA <u>0.063 ± 0.048</u>
FOR 4 SAMPLES	YIELD <u>60 ± 26</u>

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 08/18/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0472

Test U Matrix WATER
SDG 7164
Contact L.A. Johnson

METHOD SUMMARY
URANIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0472

RESULTS

CLIENT SAMPLE ID	LAB	RAW	SUF-	1: Uranium		2: Uranium		3: Uranium		RESULT RATIOS (%)			
	SAMPLE ID	TEST	FIX	PLANCHET	233/234	235	238	1+3	2σ	2+3	2σ		
Preparation batch 6893-031													
BOW105	N907128-01			7164-001	U	U	U						
BLK (QC ID=31427)	N907128-03			7164-003	U	U	U						
LCS (QC ID=31426)	N907128-02			7164-002	ok	ok	ok						
Duplicate (N907128-01)	N907128-04			7164-004	- U	- U	- U						
Nominal values and limits from method				RDLs (pCi/L)	1.0	1.0	1.0	100			4		
105-DR FSB-QC Sample Analysis										Averages			

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB	RAW	SUF-	MAX MDA	ALIQ	PREP	DILU-	YIELD	BFF	COUNT	FWHM	DRIFT	DAYS	ANAL-			
	SAMPLE ID	TEST	FIX	pCi/L	L	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR	
Preparation batch 6893-031														2σ prep error 5.0 %		Reference Lab Notebook 6893 pg.031	
BOW105	N907128-01			0.11	0.500			88		217			16	08/04/99	08/04	SS-032	
BLK (QC ID=31427)	N907128-03			0.12	0.500			82		217				08/04/99	08/04	SS-034	
LCS (QC ID=31426)	N907128-02			0.41	0.500			102		217				08/04/99	08/04	SS-033	
Duplicate (N907128-01)	N907128-04			0.13	0.500			81		217			16	08/04/99	08/04	SS-035	
(QC ID=31428)																	
Nominal values and limits from method				1.0	0.500			30-105		150	100		180				

PROCEDURES	REFERENCE	UPLATE
EP-040		Environmental Water Dissolution, rev 1
EP-910		Uranium Purification, rev 0
EP-008		Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	<u>0.19</u>	±	<u>0.29</u>
FOR 4 SAMPLES	YIELD	<u>88</u>	±	<u>19</u>

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0472

Test SR Matrix WATER
 SDG 7164
 Contact L.A. Johnson

METHOD SUMMARY
 TOTAL STRONTIUM IN WATER
 BETA COUNTING

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0472

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Total Strontium
Preparation batch 6893-031					
BOW105	N907128-01			7164-001	U
BLK (QC ID=31427)	N907128-03			7164-003	U
LCS (QC ID=31426)	N907128-02			7164-002	ok
Duplicate (N907128-01)	N907128-04			7164-004	- U

Nominal values and limits from method RDLs (pCi/L) 2.0
 105-DR FSB-QC Sample Analysis

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6893-031 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.031															
BOW105	N907128-01			0.45	0.500			71		400			11	07/30/99	GRB-217
BLK (QC ID=31427)	N907128-03			0.37	0.500			74		200				07/30/99	GRB-227
LCS (QC ID=31426)	N907128-02			0.38	0.500			86		400				07/30/99	GRB-218
Duplicate (N907128-01) (QC ID=31428)	N907128-04			0.41	0.500			78		400			11	07/30/99	GRB-220

Nominal values and limits from method 2.0 0.500 100 180

PROCEDURES	REFERENCE	SR8990
EP-040	Environmental Water Dissolution, rev 1	
EP-500	Strontium-89,90 - Purification, rev 0	
EP-519	Strontium-89,90 Planchet Demounting and Yttrium Purification, rev 0	

AVERAGES ± 2 SD	MDA	<u>0.40</u>	±	<u>0.072</u>
FOR 4 SAMPLES	YIELD	<u>77</u>	±	<u>13</u>

METHOD SUMMARIES

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 Protocol Hanford
 Version Ver 1.0
 Form DVD-CMS
 Version 3.06
 Report date 08/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0472

METHOD SUMMARY

TECHNETIUM 99 IN WATER

BETA COUNTING

Test TC Matrix WATER

SDG 7164

Contact L.A. Johnson

Client Hanford

Contract TRB-SBB-207925

Case no SDG-H0472

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Technetium 99 PLANCHET
Preparation batch 6893-031				
BOW105	N907128-01			7164-001 U
BLK (QC ID=31427)	N907128-03			7164-003 U
LCS (QC ID=31426)	N907128-02			7164-002 ok
Duplicate (N907128-01)	N907128-04			7164-004 - U

Nominal values and limits from method RDLs (pCi/L) 15
105-DR FSB-QC Sample Analysis

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6893-031 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.031															
BOW105	N907128-01			11	0.0500			63	101				28	08/10/99	GRB-220
BLK (QC ID=31427)	N907128-03			13	0.0500			54	101					08/10/99	GRB-207
LCS (QC ID=31426)	N907128-02			12	0.0500			59	101					08/10/99	GRB-228
Duplicate (N907128-01)	N907128-04			12	0.0500			60	101				25	08/10/99	GRB-230
	(QC ID=31428)														

Nominal values and limits from method 15 0.0500 20-105 50 180

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

AVERAGES ± 2 SD MDA 12 ± 1.6
FOR 4 SAMPLES YIELD 59 ± 7

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Form DVD-CMS
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TMA/RICHMOND
SAMPLE DELIVERY GROUP H0472

Test GAM Matrix WATER
SDG 7164
Contact L.A. Johnson

METHOD SUMMARY
GAMMA EMITTERS
GAMMA SCAN

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0472

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6893-031					
BOW105	N907128-01		7164-001	U	U
BLK (QC ID=31427)	N907128-03		7164-003	U	U
LCS (QC ID=31426)	N907128-02		7164-002	ok	ok
Duplicate (N907128-01)	N907128-04		7164-004	- U	- U

Nominal values and limits from method RDLs (pCi/L) 25 15
105-DR FSB-QC Sample Analysis

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 6893-031 2σ prep error 15.0 % Reference Lab Notebook 6893 pg.031																
BOW105	N907128-01		13	0.500						437		16	07/27/99	08/04		01,03,00
BLK (QC ID=31427)	N907128-03		15	0.500						401			07/27/99	08/07		01,03,00
LCS (QC ID=31426)	N907128-02		10	0.500						777			07/27/99	08/06		01,04,00
Duplicate (N907128-01)	N907128-04		6.6	0.500						400		19	07/27/99	08/07		01,04,00
	(QC ID=31428)															

Nominal values and limits from method 15 0.500 400 180

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

AVERAGES ± 2 SD MDA 11 ± 7.3
FOR 4 SAMPLES YIELD _____ ± _____

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Form DVD-CMS
Version 3.06
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TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0472

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0472

Test C Matrix WATER
 SDG 7164
 Contact L.A. Johnson

METHOD SUMMARY
 CARBON 14 IN WATER
 LIQUID SCINTILLATION COUNTING

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Carbon 14
Preparation batch 6893-031				
B0W105	N907128-01	7164-001		U
BLK (QC ID=31427)	N907128-03	7164-003		U
LCS (QC ID=31426)	N907128-02	7164-002		ok
Duplicate (N907128-01)	N907128-04	7164-004		- U

Nominal values and limits from method RDLs (pCi/L)
 105-DR FSB-QC Sample Analysis

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6893-031 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.031															
B0W105	N907128-01		36	0.0400				100		50			22	08/10/99	08/10 LSC-005
BLK (QC ID=31427)	N907128-03		36	0.0400				100		50				08/10/99	08/10 LSC-005
LCS (QC ID=31426)	N907128-02		36	0.0400				100		50				08/10/99	08/10 LSC-005
Duplicate (N907128-01)	N907128-04		36	0.0400				100		50			22	08/10/99	08/10 LSC-005
	(QC ID=31428)														

Nominal values and limits from method 0.0400 150 180

PROCEDURES . REFERENCE C14CHEMLSC
 EP-240 Carbon-14 in Aqueous Solutions, rev 0

AVERAGES ± 2 SD MDA 36 ± 0
 FOR 4 SAMPLES YIELD 100 ± 0

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 Protocol Hanford
 Version Ver 1.0
 Form DVD-CMS
 Version 3.06
 Report date 08/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0472

METHOD SUMMARY

TRITIUM IN WATER

LIQUID SCINTILLATION COUNTING

Test H Matrix WATER

SDG 7164

Contact L.A. Johnson

Client Hanford

Contract TRB-SBB-207925

Case no SDG-H0472

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
Preparation batch 6893-031				
BOW105	N907128-01	7164-001		U
BLK (QC ID=31427)	N907128-03	7164-003		U
LCS (QC ID=31426)	N907128-02	7164-002		ok
Duplicate (N907128-01)	N907128-04	7164-004		- U

Nominal values and limits from method RDLs (pCi/L) 400
105-DR PSB-QC Sample Analysis

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6893-031 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.031															
BOW105	N907128-01		190	0.0100				100	100				16	08/02/99	08/04 LSC-005
BLK (QC ID=31427)	N907128-03		180	0.0100				100	100					08/02/99	08/04 LSC-005
LCS (QC ID=31426)	N907128-02		190	0.0100				100	100					08/02/99	08/04 LSC-005
Duplicate (N907128-01)	N907128-04		190	0.0100				100	100				16	08/02/99	08/04 LSC-005
	(QC ID=31428)														

Nominal values and limits from method 400 0.0100 25 180

PROCEDURES REFERENCE EPA906.0
EP-210 Tritium in Water by Distillation, rev 0

AVERAGES ± 2 SD MDA 190 ± 10
FOR 4 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

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TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0472

Test NI L Matrix WATER
 SDG 7164
 Contact L.A. Johnson

METHOD SUMMARY
 NICKEL-63 IN LIQUID
 LIQUID SCINTILLATION COUNTING

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0472

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Nickel 63
------------------	---------------	--------------	---------------	-----------

Preparation batch 6893-031

BOW105	N907128-01	7164-001		U
BLK (QC ID=31427)	N907128-03	7164-003		U
LCS (QC ID=31426)	N907128-02	7164-002		ok
Duplicate (N907128-01)	N907128-04	7164-004		- U

Nominal values and limits from method RDLs (pCi/L)
 105-DR FSB-QC Sample Analysis

METHOD PERFORMANCE

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

Preparation batch 6893-031 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.031

BOW105	N907128-01		1.9	0.500				88	100			16	08/03/99	08/04	LSC-005
BLK (QC ID=31427)	N907128-03		2.3	0.500				75	100				08/03/99	08/05	LSC-005
LCS (QC ID=31426)	N907128-02		1.9	0.500				90	100				08/03/99	08/04	LSC-005
Duplicate (N907128-01) (QC ID=31428)	N907128-04		1.9	0.500				89	100			17	08/03/99	08/05	LSC-005

Nominal values and limits from method 0.500 25 180

PROCEDURES	REFERENCE	NI63LSC
RP-070	Sample Dissolution - HF Method, rev 0	
RP-431	Nickel-63 Purification, rev 0	

AVERAGES ± 2 SD	MDA	<u>2.0</u>	±	<u>0.40</u>
FOR 4 SAMPLES	YIELD	<u>86</u>	±	<u>14</u>

METHOD SUMMARIES

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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-CMS</u>
Version	<u>3.06</u>
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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0472

SDG 7164
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
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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.

SDG 7164
Contact L.A. Johnson

REPORT GUIDE

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Contract TRB-SBB-207925
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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 H0472

SDG 7164
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0472

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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Lab id TMANC
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Version 3.06
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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
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GUIDE, cont.

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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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0472

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GUIDE, cont.

Client Hanford
Contract TRB-SEB-207925
Case no SDG-H0472

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.

REPORT GUIDES

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REPORT GUIDE

Client Hanford
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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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GUIDE, cont.

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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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Form DVD-RG
Version 3.06
Report date 08/18/99

SDG 7164
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0472

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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Contact L.A. Johnson

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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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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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GUIDE, cont.

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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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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Contact L.A. Johnson

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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Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-082-01	Page 1 of 1
Collector Fahlber4g/Porter		Company Contact J Adler		Telephone No. 373-4316		Project Coordinator TRENT, SJ	
Project Designation 105-DR FSB - QC Sample Analysis		Sampling Location 105 DR		SAF No. B99-082		Price Code 7L Data Turnaround 21 Days	
Ice Chest No. SMU555		Field Logbook No. EL 1281		Method of Shipment Fed. Ex			
Shipped To TMA/REGRA RE 7-19-99		Offsite Property No.		Bill of Lading/Air Bill No. 428579527742			
				COA R105D4 2870			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	HNO3 to pH <2	HCl to pH <2	HNO3 to pH <2	Cool 4C	HNO3 to pH <2		
	Type of Container	P	P	aG	P	P	aG	P		
	No. of Container(s)	1	1	1	1	1	3	5		
Special Handling and/or Storage	Volume	120mL	120mL	500mL	500mL	500mL	1000mL	IL		

SAMPLE ANALYSIS				Carbon-14	Tritium - H3	Mercury - 7470 - (CV)	Technetium-99	ICP Metals - 6010A (Add-on) (Lead)	PCBs - 8080	See item (1) in Special Instructions.
Sample No.	Matrix *	Sample Date	Sample Time							
BOW105	Water	7-19-99	1250	X	X		X			X

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By Brent Porter	Date/Time 7/20/99 14:30	Received By Ref #2A	Date/Time 7/20/99 14:30	(1) Gamma Spectroscopy(Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; Nickel-63				Soil Water Vapor Other Solid Other Liquid	
Relinquished By Brent Porter	Date/Time 7/21/99 09:00	Received By Brent Porter	Date/Time 7/21/99 09:00						
Relinquished By Brent Porter	Date/Time 7/21/99 13:00	Received By Fed Express	Date/Time 7/21/99						
Relinquished By FedEx	Date/Time 9:40 7/22/99	Received By TNU M. Goldenberg	Date/Time 9:40 7/22/99						
LABORATORY SECTION	Received By	Title						Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time			

Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: Beecham Hanford Inc. Date/Time received 7-22-99 9:40

CoC No. B99-082-01

Container I.D. No. _____ Requested TAT (Days) 21 P.O. Received Yes [] No []

INSPECTION

1. Custody seals on shipping container intact? Yes [] No [] N/A []

2. Custody seals on shipping container dated & signed? Yes [] No [] N/A []

3. Custody seals on sample containers intact? Yes [] No [] N/A []

4. Custody seals on sample containers dated & signed? Yes [] No [] N/A []

5. Cooler Temperature: _____ Packing material is: Wet [] Dry []

6. Number of samples in shipping container: 1

7. Number of containers per sample: 74 (Or see CoC _____)

8. Paperwork agrees with samples? Yes [] No []

9. Samples have: Tape [] Hazard labels [] Rad labels [] Appropriate sample labels []

10. Samples are: In good condition [] Leaking [] Broken Container [] Missing []

11. Describe any anomalies: Two samples Sample ID BOW105 120 mL on CoC B99-082-01 we have not received we received one sample BOW105 (Activity Scan) that have not included in CoC. * DID NOT RECEIVE THE BOTTLES FOR CARBON & TRITIUM

13. Was P.M. notified of any anomalies? Yes [] No [] Date 7-22-99

14. Received by: M. Goldenberg Date: 7-22-99 Time: 9:40

LOGIN

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

PROGRAM MANAGER

Sample holding time exceeded? Yes [] No []

Client Notified: _____ Date/time _____