

H0243

0050302

Thermo Nutech
W.O. No. N8-09-107-7018

Bechtel Hanford Inc.
SDG H0243

Case Narrative

1.0 GENERAL

Thermo Nutech Sample Delivery Group H0243 is comprised of a single solid sample designated under SAF No. B98-115 with a Project Designation of: ERDF Leachate Tank Criticality Sampling.

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

2.0 ANALYSIS NOTES

2.1 Isotopic Uranium Analyses

No problems were encountered with the analyses.

2.2 Isotopic Plutonium Analyses

The MDA's of the blank and LCS were greater than the RDL. Positive Pu activity was not detected in the sample.



T M A / R I C H M O N D
SAMPLE DELIVERY GROUP H0243

SDG 7018
Contact N. Joseph Verville

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0243

S U M M A R Y D A T A S E C T I O N

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mjc

Prepared by

N. Joseph Verville

Reviewed by

Lab id	<u>TMANC</u>
Protocol	<u>Hanford</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-TOC</u>
Version	<u>3.06</u>
Report date	<u>10/15/98</u>

SDG 7018
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0243

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

REPORT GUIDES

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/15/98

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0243

SDG 7018
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0243

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

REPORT GUIDES

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Protocol Hanford
Version Ver 1.0
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0243

SAMPLE SUMMARY

SDG 7018
Contact N. Joseph Verville

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0243

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
BOPW52	ERDF	SOLID		N809107-01	B98-115	B98-115-01	09/10/98 08:50
Method Blank		SOLID		N809107-03	B98-115		
Lab Control Sample		SOLID		N809107-02	B98-115		
Duplicate (N809107-01)	ERDF	SOLID		N809107-04	B98-115		09/10/98 08:50

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 10/15/98

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0243

SDG 7018
 Contact N. Joseph Verville

QC SUMMARY

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0243

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
7018	B98-115-01	B0PW52	SOLID				09/16/98 6	N809107-01		7018-001
		Method Blank	SOLID					N809107-03		7018-003
		Lab Control Sample	SOLID					N809107-02		7018-002
		Duplicate (N809107-01)	SOLID				09/16/98 6	N809107-04		7018-004

QC SUMMARY

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 Form DVD-QS
 Version 3.06
 Report date 10/15/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0243

SDG 7018
 Contact N. Joseph Verville

PREP BATCH SUMMARY

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0243

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Alpha Spectroscopy										
PU	SOLID	Plutonium, Isotopic in Solids	2785-172	5.0	1			1	1	1/1
U	SOLID	Uranium, Isotopic in Soil	2785-172	5.0	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.

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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0243

SDG 7018
 Contact N. Joseph Verville

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0243

WORK SUMMARY

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD	
CUSTODY	SAF No	RECEIVED			FIX					
B0PW52		N809107-01	7018-001	PU		10/06/98	10/15/98	NJV	Plutonium, Isotopic in Solids	
ERDF	SOLID	09/10/98	7018-001	U		10/01/98	10/15/98	NJV	Uranium, Isotopic in Soil	
B98-115-01	B98-115	09/16/98								
Method Blank		N809107-03	7018-003	PU		10/08/98	10/15/98	NJV	Plutonium, Isotopic in Solids	
	SOLID		7018-003	U		10/01/98	10/15/98	NJV	Uranium, Isotopic in Soil	
	B98-115									
Lab Control Sample		N809107-02	7018-002	PU		10/06/98	10/15/98	NJV	Plutonium, Isotopic in Solids	
	SOLID		7018-002	U		10/01/98	10/15/98	NJV	Uranium, Isotopic in Soil	
	B98-115									
Duplicate (N809107-01)		N809107-04	7018-004	PU		10/08/98	10/15/98	NJV	Plutonium, Isotopic in Solids	
ERDF	SOLID	09/10/98	7018-004	U		10/01/98	10/15/98	NJV	Uranium, Isotopic in Soil	
	B98-115	09/16/98								

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
PU	B98-115	Plutonium, Isotopic in Solids	PUPLATE	1			1	1	1		4
U	B98-115	Uranium, Isotopic in Soil	UPLATE	1			1	1	1		4
TOTALS				2			2	2	2		8

WORK SUMMARY

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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0243

N809107-03

Method Blank

METHOD BLANK

SDG 7018 Client/Case no Hanford SDG H0243
 Contact N. Joseph Verville Case no TRB-SBB-207925
 Lab sample id N809107-03 Client sample id Method Blank
 Dept sample id 7018-003 Material/Matrix SOLID
 SAF No B98-115

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	0.004	0.007	0.028	0.30	U	U
Uranium 235	15117-96-1	-0.009	0.009	0.034	0.30	U	U
Uranium 238	U-238	0.011	0.015	0.028	0.30	U	U
Plutonium 238	13981-16-3	0.073	0.074	<u>0.14</u>	0.050	U	PU
Plutonium 239/240	PU-239/240	-0.018	0.037	<u>0.14</u>	0.050	U	PU

ERDF Leachate Tank Criticality Samp.

QC-BLANK 29174

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0243

N809107-02

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7018</u>	Client/Case no <u>Hanford</u>	<u>SDG H0243</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N809107-02</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7018-002</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B98-115</u>	

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Uranium 233/234	3.7	0.32	0.19	0.30	U		3.80	0.15	97	84-116	80-120
Uranium 235	3.2	0.31	0.043	0.30	U		3.12	0.12	103	82-118	80-120
Uranium 238	4.1	0.34	0.18	0.30	U		3.92	0.16	105	84-116	80-120
Plutonium 238	49	3.1	<u>0.10</u>	0.050	PU		50.6	2.0	97	87-113	80-120
Plutonium 239/240	53	3.3	<u>0.10</u>	0.050	PU		52.9	2.1	100	87-113	80-120

ERDF Leachate Tank Criticality Samp.

QC-LCS 29173

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SAMPLE DELIVERY GROUP H0243

N809107-04

B0PW52

DUPLICATE

SDG <u>7018</u>	Client/Case no <u>Hanford</u>	SDG <u>H0243</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>N809107-04</u>	Lab sample id <u>N809107-01</u>	Client sample id <u>B0PW52</u>
Dept sample id <u>7018-004</u>	Dept sample id <u>7018-001</u>	Location/Matrix <u>ERDF</u> <u>SOLID</u>
	Received <u>09/16/98</u>	Collected <u>09/10/98 08:50</u>
		Custody/SAF No <u>B98-115-01</u> <u>B98-115</u>

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Uranium 233/234	0.85	0.087	0.018	0.30		U	0.80	0.081	0.016		6	24	
Uranium 235	0.042	0.018	0.017	0.30	J	U	0.046	0.021	0.016	J	9	95	
Uranium 238	0.79	0.083	0.018	0.30		U	0.86	0.082	0.019		8	24	
Plutonium 238	0.004	0.005	0.010	0.050	U	PU	-0.001	0.003	0.011	U	-		
Plutonium 239/240	0.008	0.008	0.010	0.050	U	PU	0.016	0.011	0.011	J	67	171	

ERDF Leachate Tank Criticality Samp.

QC-DUP#1 29175

DUPLICATES

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Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>10/15/98</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0243

N809107-01

B0PW52

DATA SHEET

SDG <u>7018</u>	Client/Case no <u>Hanford</u>	SDG <u>H0243</u>
Contact <u>N. Joseph Verville</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N809107-01</u>	Client sample id <u>B0PW52</u>	
Dept sample id <u>7018-001</u>	Location/Matrix <u>ERDF</u>	<u>SOLID</u>
Received <u>09/16/98</u>	Collected <u>09/10/98 08:50</u>	
	Custody/SAF No <u>B98-115-01</u>	<u>B98-115</u>

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	0.80	0.081	0.016	0.30		U
Uranium 235	15117-96-1	0.046	0.021	0.016	0.30	J	U
Uranium 238	U-238	0.86	0.082	0.019	0.30		U
Plutonium 238	13981-16-3	-0.001	0.003	0.011	0.050	U	PU
Plutonium 239/240	PU-239/240	0.016	0.011	0.011	0.050	J	PU

ERDF Leachate Tank Criticality Samp.

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>10/15/98</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0243

Test PU Matrix SOLID
 SDG 7018
 Contact N. Joseph Verville

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0243

METHOD SUMMARY
 PLUTONIUM, ISOTOPIC IN SOLIDS
 ALPHA SPECTROSCOPY

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 2785-172					
B0PW52	N809107-01		7018-001	U	0.016 J
BLK (QC ID=29174)	N809107-03		7018-003	<u>0.073</u> U	U
LCS (QC ID=29173)	N809107-02		7018-002	ok	ok
Duplicate (N809107-01)	N809107-04		7018-004	- U	ok U
Nominal values and limits from method		RDLs (pCi/g)		0.050	0.050
ERDF Leachate Tank Criticality Samp.					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MAX pCi/g	MDA g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2785-172		2σ prep error 5.0 %		Reference Lab		Notebook #2785 pg. 172											
B0PW52	N809107-01		0.011	1.00					78		1037			26	10/06/98	10/06	SS-065
BLK (QC ID=29174)	N809107-03		<u>0.14</u>	0.100					58		1091			10/06/98	10/08	SS-013	
LCS (QC ID=29173)	N809107-02		<u>0.10</u>	0.100					83		1037			10/06/98	10/06	SS-066	
Duplicate (N809107-01)	N809107-04		0.010	1.00					79		1091			28	10/06/98	10/08	SS-014
(QC ID=29175)																	
Nominal values and limits from method			0.050	0.100				20-105			10	100		180			

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

AVERAGES ± 2 SD	MDA	<u>0.065</u> ± <u>0.13</u>
FOR 4 SAMPLES	YIELD	<u>74</u> ± <u>22</u>

METHOD SUMMARIES

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 Form DVD-CMS
 Version 3.06
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0243

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL
ALPHA SPECTROSCOPY

Test U Matrix SOLID
SDG 7018
Contact N. Joseph Verville

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0243

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	1: Uranium			2: Uranium			3: Uranium			RESULT RATIOS (%)			
				233/234	235	238	1+3	2σ	2+3	2σ						
Preparation batch 2785-172																
BOPW52	N809107-01		7018-001	0.80	0.046 J	0.86	93	13	5	2						
BLK (QC ID=29174)	N809107-03		7018-003	U	U	U										
LCS (QC ID=29173)	N809107-02		7018-002	ok	ok	ok										
Duplicate (N809107-01)	N809107-04		7018-004	ok	ok J	ok	108	16	5	2						
Nominal values and limits from method				RDIs (pCi/g)	0.30	0.30	0.30	100			4					
ERDF Leachate Tank Criticality Samp.							Averages 100				5					

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 2785-172														2σ prep error 5.0 %	Reference Lab	Notebook #2785 pg. 172
BOPW52	N809107-01		0.019	1.00				88	781	21	10/01/98	10/01	SS-055			
BLK (QC ID=29174)	N809107-03		0.034	0.500				80	781		10/01/98	10/01	SS-058			
LCS (QC ID=29173)	N809107-02		0.19	0.500				63	781		10/01/98	10/01	SS-056			
Duplicate (N809107-01)	N809107-04		0.018	1.00				79	781	21	10/01/98	10/01	SS-060			
	(QC ID=29175)															
Nominal values and limits from method			0.30	0.500				30-105	150	100	180					

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

AVERAGES ± 2 SD	MDA	0.065 ± 0.17
FOR 4 SAMPLES	YIELD	78 ± 21

METHOD SUMMARIES

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SDG 7018
Contact N. Joseph Verville

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.

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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0243

SDG 7018
Contact N. Joseph Verville

REPORT GUIDE

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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.

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TMA/RICHMOND
SAMPLE DELIVERY GROUP H0243

SDG 7018
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
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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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Report date 10/15/98

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0243

SDG 7018
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0243

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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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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- * 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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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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- * 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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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				B98-115-01	Page 1 of 1
Collector R. Fahlberg	Company Contact M. Cashon	Telephone No. 373-7328	Project Coordinator TRENT, SJ		Data Turnaround 45 Days		
Project Designation ERDF Leachate Tank Criticality Sampling	Sampling Location ERDF	Field Logbook No. EL 1309-3	SAF No. B98-115		Method of Shipment Fed Ex		
Ice Chest No.	Offsite Property No. A980084	BILL of Lading/Air Bill No.					
Shipped To TMA/RECRA	COA						
Waste Designation F001 and F003	PRESERVATION						
POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	None			
	Type of Container	P	sg				
Special Handling and/or Storage	No. of Container(s)	1	1	1			
	Volume	20mL	20mL	20mL			
SAMPLE ANALYSIS	Activity Scan	Isotopic Plutonium; Isotopic Uranium					
	Sample No.	Matrix *	Sample Date	Sample Time			
BOP WSE	soil	9-10-98	0850	X			1300 WES
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS ** Close SDG upon receipt of samples.			
Relinquished By R. Fahlberg	Received By F. E. [Signature]	Date/Time 9-16-98 11:30	Date/Time				
Relinquished By [Signature]	Received By [Signature]	Date/Time	Date/Time				
Relinquished By	Received By	Date/Time	Date/Time				
Relinquished By	Received By	Date/Time	Date/Time				
LABORATORY SECTION	Received By	Title					
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By					

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 9-16-98 11:30 S.G.#: H0243

Work Order Number: 08-09-106 107 SAF #: B98-115-01

Shipping Container ID: D212a-1 Chain of Custody # B98-114-07

- 1. Custody Seals on shipping container intact? Yes No
- 2. Custody Seals dated and signed? Yes No
- 3. Chain-of-Custody record present? Yes No
- 4. Cooler temperature _____
- 5. Vermiculite/packing materials is Wet Dry
- 6. Number of samples in shipping container: 2 (10 Bottles)
- 7. Sample holding times exceeded? Yes No

<p>8. Samples have:</p> <table style="width: 100%;"> <tr> <td style="width: 50%;"><input type="checkbox"/> tape</td> <td style="width: 50%;"><input type="checkbox"/> hazard labels</td> </tr> <tr> <td><input checked="" type="checkbox"/> custody seals</td> <td><input type="checkbox"/> appropriate sample labels</td> </tr> </table>	<input type="checkbox"/> tape	<input type="checkbox"/> hazard labels	<input checked="" type="checkbox"/> custody seals	<input type="checkbox"/> appropriate sample labels
<input type="checkbox"/> tape	<input type="checkbox"/> hazard labels			
<input checked="" type="checkbox"/> custody seals	<input type="checkbox"/> appropriate sample labels			

<p>9. Samples are:</p> <table style="width: 100%;"> <tr> <td style="width: 50%;"><input checked="" type="checkbox"/> in good condition</td> <td style="width: 50%;"><input type="checkbox"/> leaking</td> </tr> <tr> <td><input type="checkbox"/> broken</td> <td><input type="checkbox"/> have air bubbles</td> </tr> </table>	<input checked="" type="checkbox"/> in good condition	<input type="checkbox"/> leaking	<input type="checkbox"/> broken	<input type="checkbox"/> have air bubbles
<input checked="" type="checkbox"/> in good condition	<input type="checkbox"/> leaking			
<input type="checkbox"/> broken	<input type="checkbox"/> have air bubbles			

10. Where any anomalies identified in sample receipt? Yes No

11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: _____ Date: _____

Telephoned To: _____ On _____ By _____