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River Corridor Closure Contract

100-D/H Remedial Investigation/Feasibility Study Data Quality Assessment Report

June 2012

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Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor

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Signature

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1.0 INTRODUCTION

This data quality assessment (DQA) has been prepared to support the vadose zone characterization component of the 100-D/H remedial investigation/feasibility study. The DQA was performed in accordance with EPA/240/B-06/002, *Data Quality Assessment: A Reviewer's Guide*, and EPA/240/B-06/003, *Data Quality Assessment: Statistical Methods for Practitioners*. The contents of this DQA specifically address laboratory quality control (QC) results. The laboratory QC results were evaluated against the requirements and guidelines provided in the *Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units Remedial Investigation/Feasibility Study* (SAP) (DOE/RL-2009-40) and the associated Tri-Party Agreement Change Notices (TPA-CN-368 and TPA-CN-402).

Table 1 presents information on the analytical laboratories whose work was reviewed. Table 2 presents a summary of the analytical methods.

Table 1. Analytical Laboratories.

Name	Address
Lionville Laboratory, Inc.	208 Welsh Pond Road, Exton, Pennsylvania 19341
Eberline Analytical Corporation/Eberline Services	2030 Wright Avenue, Richmond, California 94804
Test America Laboratories	2800 George Washington Way, Richland, Washington 99354
	13715 Rider Trail North, Earth City, Missouri 63045

Table 2. Laboratory Analytical Methods. (2 Pages)

Parameter	Analytical Method
ICP metals	EPA Method 6010[a] EPA Method 6020
Mercury	EPA Method 7471A
Hexavalent chromium	EPA Method 7196A
Anions	EPA Method 300.0
Nitrate/nitrite	EPA Method 353.1 EPA Method 353.2
Cyanide	EPA Method 9012A
Volatile organic compounds	EPA Method 8260B
Semivolatile organic compounds	EPA Method 8270C
pH	EPA Method 9045 (soil) EPA Method 9040 (water)
Pesticides	EPA Method 8081A

Table 2. Laboratory Analytical Methods. (2 Pages)

Parameter	Analytical Method
Polychlorinated biphenyls	EPA Method 8082
Polynuclear aromatic hydrocarbons	EPA Method 8310
Total petroleum hydrocarbons (WTPH-D)	EPA Method 8015M
Gamma-emitting radioisotopes	Gamma energy analysis
Carbon-14	LSC - C-14
Tritium	LSC - Tritium
Total radiostrontium	Gas-flow proportional counting
Nickel-63	LSC - Ni-63
Technetium-99	Gas-Flow proportional counting
Americium-241	Alpha energy analysis
Curium-242, -244	Alpha energy analysis
Neptunium-237	Alpha energy analysis
Plutonium-238, -239/240	Alpha energy analysis
Uranium-233/234, -235, -238	Alpha energy analysis
Uranium (total)	Kinetic phosphorescence analysis

[a] Analysis was performed for the expanded list of ICP metals including aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium (total), cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, phosphorous, potassium, selenium, silicon, silver, sodium, strontium, thallium, tin, vanadium, and zinc.

EPA = U.S. Environmental Protection Agency
ICP = inductively coupled plasma
LSC = liquid scintillation counting
pH = hydrogen ion concentration
WTPH-D = Washington total petroleum hydrocarbons-diesel range

2.0 LABORATORY QUALITY CONTROL PARAMETERS DISCUSSION

A total of 398 sample delivery groups (SDGs) were reviewed with a combined 1,322 field samples and 5,909 sample analyses between them.

Each SDG that was assessed contained at least one, and often several, different analytical methods that were assessed as part of the DQA. Table 3 presents the SDGs, sorted by sample authorization forms, that were reviewed. Also shown in Table 3 are the laboratory analyses, including the number of samples per analysis that were performed for each SDG.

Data assessment was not conducted for certain wet chemistry parameters (e.g., total solids and percent moisture) or physical property parameters (e.g., particle size distribution, percent moisture, porosity, bulk density, and saturated hydraulic conductivity), but these analyses are listed in Table 3 for completeness.

The QC parameters evaluated for each SDG included the following as appropriate and applicable for each analytical method:

- Holding time
- Method detection limits
- Method blank results
- Field equipment blank results
- Field trip blank results
- Matrix spikes/matrix spike duplicates
- Laboratory control sample (LCS) results
- Laboratory duplicate results
- Field duplicate results
- Field split results.

Each QC parameter was assessed and noncompliant results were summarized on DQA worksheets. Reviewer qualifications applied to the data were also noted on the worksheets. The individual worksheets as Microsoft® Excel® files are maintained in the project file.

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® Excel is a registered trademark of the Microsoft Corporation in the United States and/or other countries.

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
Sample Authorization Form RC-172 (Soil)																														
K2392	C7629	1	1													1		1								1	1			
K2393	C7629	1																												1
K2405	C7629	1		1			1	1						1	1															
K2472	C7626	1		1			1	1						1	1															
K2476	C7626	6		6			6	5						6	6															
K2480	C7628	1		1			1	1						1	1															
K2486	C7626	1		1			1	1						1	1															
	C7629	1		1			1	1						1	1															
K2493	C7626	6	6													6	6	6								6	6			
K2496	C7626	2																			2									
K2503	C7628	2	1													1		2								1	1			1
K2504	C7626	4																												4
K2506	C7628	1																												1
K2513	C7627	1		1			1	1						1	1															
	C7628	4		4			4	4						4	3															
	C7629	6		6			6	6						6	6															
K2516	C7628	2																			2									
K2517	C7628	2	2													2	2	2	2							1	1			
K2519	C7628	1																												1
K2520	C7626	1																												1
K2521	C7629	3																												3
K2526	C7629	1																			1									
K2528	C7629	1	1													1	1	1	1							1	1			
K2531	C7629	1	1													1	1	1	1							1	1			
K2537	C7628	1																												1
K2538	C7627	7																												7
K2539	C7629	2																												2
K2544	C7627	1		1			1	1						1	1															
	C7630	1		1			1	1						1	1															
K2546	C7621	1		1			1	1						1	1															
	C7627	5		5			5	5						5	5															
	C7630	1		1			1	1						1	1															
K2554	C7630	5		5			5	5						5	5															

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K2558	C7628	4	4													4	4	4	4							4	4			
K2561	C7629	3	3													3	3	3	3							3	3			
K2563	C7629	2																			2									
K2566	C7628	1	1													1	1	1	1							1	1			
K2570	C7629	2																			2									
K2576	C7627	2	2													2	2	2	2							1	1			
K2577	C7630	1	1													1	1	1	1							1	1			
K2581	C7629	1																												1
K2582	C7630	1																												1
K2583	C7627	1																												1
K2588	C7627	2																			2									
K2590	C7629	2	2													2	2	2	2							2	2			
K2591	C7626	2	2													2	2	2	2							1	1			
K2593	C7627	5	5													5	5	5	5	1						5	5			
K2594	C7621	1																												1
K2595	C7630	2																												2
K2597	C7630	1	1													1	1	1	1							1	1			
K2598	C7626	1																			1									
K2601	C7620	8		8			8	8						8	7															
K2607	C7621	1	1													1	1	1	1							1	1			
K2608	C7627	1	1													1	1	1	1							1	1			
K2609	C7630	1																			1									
K2610	C7627	5																			5									
K2620	C7620	1	1													1	1	1	1							1	1			
K2621	C7630	5	5													5	5	5	5	1						5	5			
K2622	C7630	4																			4									
K2626	C7620	1																			1									
K2627	C7623	1																												1
K2628	C7623	1	1													1	1	1	1							1	1			
K2629	C7620	5																			5									
K2630	C7620	7	7													7	7	7	7							6	6			
K2631	C7620	4																												4
K2632	C7621	2															2	2	2	1										
K2633	C7621	1																												1

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																											
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K2641	C7621	2																												2
K2643	C7630	2																												2
K2656	C7620	1		1			1	1						1	1															
	C7621	4		4			4	4						4	4															
	C7630	2		2			2	2						2	2															
	C7623	3		3			3	3						3	3															
K2659	C7623	3		3			3	3						3	2															
K2664	C7623	2		2			1	1						1	1															
	C7866	1		1			1	1						1	1															
K2665	C7620	4	1													1	1	1	4	3						1	1			
K2666	C7621	4	3													3	3	3	4							2	2			
K2667	C7623	1	1													1	1	1	1							1	1			
K2668	C7630	2	2													2	2	2	2							2	2			
K2672	C7620	1																			1									
K2673	C7621	2																			2									
K2674	C7623	1																			1									
K2675	C7630	1																			1									
K2685	C7621	2	2													2	2	2	2							2	2			
K2666	C7623	5	2													2	5	2	5	2						2	2			
K2692	C7621	1																			1									
K2693	C7623	1																			1									
K2701	C7623	4																												4
K2705	C7623	6	6													6	6	6	6							5	5			
K2712	C7623	2																			2									
K2717	C7866	4		4			4	4						4	4															
K2725	C7866	3																												3
K2726	C7866	1	1													1	1	1	1							1	1			
K2731	C7866	3		3			3	3						3	3															
K2733	C7866	1																												1
K2736	C7855	3																			3									
K2740	C7866	4	4													4	4	4	4							4	4			
K2745	C7866	5	3													3	5	5	5	2						3	3			
K2746	C7866	3																			3									
K2751	C7866	3																												3

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																											
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K2767	C7866	1		1			1	1						1	1															
K2771	C7866	4		4			4	4						4	4															
K2782	C7866	2	2													2	2	2								1	1			
K2787	C7866	2																			2									
K2794	C7866	2																			2									
K2797	C7866	2																												2
K2799	C7866	4	3													3	4	4	4	1						3	3			
K2804	C7866	5		5			5	5						5	5															
K2807	C7866	2																												2
K2812	C7866	4	4													4	4	4	4							1	4			
K2818	C7866	4																			4									
K2822	C7866	1	1													1	1		1								1			
K2826	C7866	1																			1									
K2984	C7866	1	1													1	1	1	1											
K2990	C7866	1																			1									
K2992	C7624	1		1			1	1						1	1															
K3004	C7624	2		2			2	2						2	2															
K3018	C7624	5	1													1	5	5	5	4										
K3025	C7624	2																			2									
K3030	C7624	2	2													2	2	2	2											
K3034	C7624	3		3			3	3						3	3															
K3036	C7639	7		7			7	7						7	7															
	C7624	2		2			2	2						2	2															
K3048	C7624	3	3													3	3	3	3											
K3049	C7639	4	4													4	4	4	4											
K3051	C7624	2																			2									
K3052	C7639	3																			3									
K3056	C7624	3	3													3	3	3	3											
K3057	C7624	3																			3									
K3060	C7639	4	4													4	4	4	4											
K3061	C7639	1																			1									
K3155	C7631	3		3			3	3						3	3															
K3182	C7631	2																												2
K3183	C7631	1	1													1	1	1	1							1	1			

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			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K3189	C7631	3																												3
K3191	C7631	3	3													3	3	3	3							2	2			
K3194	C7631	2																			2									
K3199	C7631	3		3			3	3						3	3															
K3201	C7631	2																												2
K3202	C7631	3																			3									
K3204	C7631	3	3													3	3	3	3							3	3			
K3212	C7625	1		1			1	1						1	1															
K3219	C7625	12		11			12	12						12	12															
K3220	C7625	5																			5									
K3221	C7625	2																			2									
K3225	C7625	3																												3
K3226	C7625	7																												7
K3227	C7625	6	6													6	6	6	6							5	5			
K3228	C7625	4																			4									
K3229	C7625	8	8													8	8	8	8	1						8	8			
K3232	C7625	3		3			3	3						3	3															
K3237	C7625	3																			3									
K3238	C7625	2																												2
K3239	C7625	3	3													3	3	3	3	1						3	3			
K3256	C7640	8		8			8	8						8	8															
K3261	C7640	5																			5									
K3262	C7640	1																			1									
K3263	C7640	9	9													9	9	9	9											
K3291	C8375	7		7			7	7						7	7															
K3301	C8375	5																			5									
K3302	C8375	8																												8
K3303	C8375	9	7													7	9	7	9	2						7	7			
K3308	C8375	12		12			12	12						12	12															
K3311	C8375	2																			2									
K3312	C8375	2	2													2	2	2	2							1	1			
K3319	C8375	13	11													11	12	11	13	3						11	11			
K3321	C8375	3																			3									
K3322	C8375	5																			5									

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K3324	C8375	7																												7
Sample Authorization Form RC-173 (Water)																														
J00843	C7862	2	2																											
J00909	C7626	1	1																											
J00916	C7628	1	1																											
J00917	C7629	1	1																											
J00928	C7627	1	1																											
J00935	C7620	1	1																											
J00938	C7621	1	1																											
J00959	C7855	2	2																											
J00974	C7866	1	1																											
J00977	C7863	2	2																											
J00995	C7639	1	1																											
J00996	C7624	1	1																											
J01000	C7857	2	2																											
J01003	C7861	2	2																											
J01010	C7864	2	2																											
J01012	C7860	2	2																											
J01016	C7631	1	1																											
J01031	C7625	1	1																											
J01036	C7640	1	1																											
J01095	C7857	1	1																											
J01136	C7860	1	1																											
J01137	C7863	1	1																											
J01138	C7861	1	1																											
K2280	C7862	2														2	2													
K2505	C7626	1														1	1													
K2532	C7628	1														1	1													
K2574	C7627	1														1	1													
K2605	C7629	1														1	1													
K2683	C7620	1														1	1													
K2684	C7621	1														1	1													
K2706	C7623	1														1	1													
K2861	C7855	2														2	1													

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K2985	C7866	1														1	1													
K3017	C7863	2														2														
K3045	C7624	1														1	1													
K3046	C7639	1														1	1													
K3085	C7857	2														2	1													
K3108	C7861	2														2	1													
K3137	C7860	2														2	1													
K3138	C7864	2														2	1													
K3192	C7631	1														1														
K3253	C7625	1														1	1													
K3265	C7640	1														1	1													
K3318	C8375	1														1	1													
K3342	C7857	1														1	1													
K3412	C7860	1														1	1													
K3417	C7861	1														1	1													
	C7863	1														1	1													
Sample Authorization Form RC-179 (Soil)																														
K2660	C7622	1		1	1	1	1	1	1	1	1	1	1	1	1															
K2702	C7622	1																												1
K2707	C7622	1	1													1	1	1	1					1	1	1	1		1	
K2805	C7622	3		3	3	3	3	3	3	3	3	3	3	3	3															
K2808	C7622	2																												2
K2813	C7622	2	2													2	2	2	2					2	2		2		2	
K2819	C7622	2																			2									
K2823	C7622	1	1													1	1	1	1					1	1		1		1	
K2827	C7622	1																			1									
K2834	C7622	2	2													2	2	2	2					2	2	2	2		2	
K2838	C7622	2																			2									
K2842	C7622	2	2													2		2	2					2	2	2	2		2	
K2845	C7622	2																			2									
K2866	C7622	3		3	3	3	3	3	3	3	3	3	3	3	3															
K2871	C7622	1		1	1	1	1	1	1	1	1	1	1	1	1															
K2959	C7622	1																												1
K2964	C7622	4																			4									

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K2969	C7622	5	5													5	5	5	5	2				5	5	5	5		5	
K2974	C7622	11		11	11	11	11	11	11	11	11	11	11	11	11															
K2986	C7622	7	7													7	7	7	7					6	6	6	6		6	
K2991	C7622	5																			5									
K3722	C8668	1		1			1	1						1	1															
K3723	C8668	1	1													1		1								1	1			
K3724	C8668	2																												2
K3728	C8668	2		2			2	2						2	2															
K3729	C8668	1																			1									
K3730	C8668	2																												2
K3731	C8668	4	4													4	3	4	4							2	2			
K3733	C8668	3		3			3	3						3	3															
K3734	C8668	4	3													3	4	3	4	2						3	3			
K3735	C8668	3																												3
K3736	C8668	3																			3									
K3739	C8668	11		11			11	11						11	11															
K3741	C8668	4																			4									
K3742	C8668	4																			4									
K3743	C8668	4																			4									
K3744	C8668	11																												1
K3745	C8668	12	12													12	12	12	12							11	11			
Sample Authorization Form RC-180 (Water)																														
J00963	C7851	2	2																											
J00965	C7850	2	2																											
J00969	C7852	2	2																											
J00970	C7622	1	1																											
J01096	C7852	2	2																											
J01298	C8668	1	1																											
K2909	C7851	2														2	1													
K2936	C7850	2														2	1													
K2987	C7622	1														1	1													
K2996	C7852	2														2														
K3343	C7852	2														2	1													

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K3747	C8668	1														1	1													
Sample Authorization Form RC-196 (Soil)																														
J00983	C7860	1																	1									1		
K2238	C7862	6		6	6		6	6	6	6	6				6															
K2251	C7862	2																												2
K2259	C7862	3																												3
K2260	C7862	10	6													6	4	6			4					6	6			
K2266	C7862	6																												6
K2271	C7862	2	1													1	1	1			1									
K2276	C7862	2		2	2		2	2	2	2	2				2															
K2286	C7862	4	2													2	2	2			2					2	2			
K2287	C7862	2																												2
K2306	C7862	5		5	5		5	5	5	5	5				5															
K2325	C7862	14	5													5	5	9			5					5	5			4
K2976	C7863	1		1	1	1	1	1	1	1	1		1		1															
K2978	C7863	1		1	1	1	1	1	1	1	1		1		1															
K2988	C7863	1	1													1	1	1	1					1		1	1			
K2995	C7863	8		8	8	8	8	8	8	8	8		8		8															
K2998	C7863	5																			5									
K2999	C7863	7																												7
K3001	C7863	6	6													6	6	6	6					6		6	6			
K3012	C7863	4																												4
K3013	C7863	3																			3									
K3015	C7863	1																			1									
K3021	C7863	4	4													4	4	4	4					3		3	3			
K3080	C7861	1																												1
K3095	C7861	2		2	2	2	2	2	2	2	2				2															
K3097	C7864	1		1	1		1	1	1	1	1				1															
	C7861	7		7	7	7	7	7	7	7	7				7															
K3102	C7861	2																			2									
K3103	C7861	3	3													3	3	3	3					2		2	2			
K3104	C7861	2																												2
K3111	C7861	7	7													7	7	7	7					7		7	7			
K3114	C7861	5																												5

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																											
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K3115	C7864	1																												1
K3117	C7861	1																			1									
K3116	C7861	5																			5									
K3121	C7864	1	1													1	1	1	1				1			1	1			
K3122	C7864	2																												2
K3130	C7864	9		9	9		9	9	9	9	9				9															
	C7860	8		8			8	8		6	8				8															
K3132	C7860	3		3			3	3		3	3				3															
K3133	C7860	4																			4									
K3134	C7860	4																			4									
K3135	C7864	4																			4									
K3136	C7864	5																			5									
K3142	C7860	9	9													9	9	9	9							8	8	8		
K3143	C7864	10	10													10	10	10	10	1			9			9	9			
K3146	C7860	8																												8
K3147	C7864	8																												8
K3158	C7860	1																			1									
K3161	C7860	3																												3
K3165	C7860	3	3													3	3	3	3							3	3	3		
K3168	C7860	1																			1									
Sample Authorization Form RC-197 (Soil)																														
J00961	C7855	1	1	1	1	1	1	1	1	1	1		1		1															
J00981	C7855	1														1	1		1					1	1	1	1		1	1
K2769	C7855	1		1	1	1	1	1	1	1	1		1		1															
K2780	C7855	1	1													1	1	1	1					1	1	1	1		1	
K2785	C7855	1																												1
K2798	C7855	2																												2
K2801	C7855	1																											1	
K2806	C7855	6		6	6	6	6	6	6	6	6		6		6															
K2810	C7855	6																												6
K2815	C7855	5	5													5	5	5	5					5	5		5		5	
K2821	C7855	5																			5									
K2825	C7855	1	1													1	1	1	1					1	1		1		1	
K2829	C7855	1																			1									

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K2830	C7855	6																												6
K2832	C7855	3	3													3	3	3	3					3	3	3	3		3	
K2835	C7855	5																			5									
K2836	C7855	1																			1									
K2843	C7855	4	4													4	4	4	4	1				4	4	4	4		4	
K2846	C7855	1																												1
K2849	C7855	4																												4
K2853	C7855	5																			5									
K2859	C7855	5	5													5	5	5	5					4	4				4	
K2865	C7851	1		1	1	1	1	1	1	1	1				1															
	C7855	11		11	11	11	11	11	11	11	11		11		11															
K2872	C7851	1		1	1	1	1	1	1	1	1				1															
	C7855	2		2	2	2	2	2	2	2	2		2		2															
K2873	C7851	9		9	9	9	9	9	9	9	9				9															
K2876	C7851	5		5	5	5	5	5	5	5	5				5															
K2880	C7850	4		4	4	4	4	4	4	4	4				4															
	C7852	1		1	1	1	1	1	1	1	1				1															
K2882	C7851	5																												5
K2883	C7855	2																												2
K2885	C7851	4																			4									
K2887	C7855	2																			2									
K2891	C7851	5	4													4	5	5	5										5	
K2893	C7851	1	1													1	1	1	1										1	
K2894	C7855	2	2													2	2	2	2					2	2				2	
K2898	C7851	4																												4
K2899	C7851	3																			3									
K2900	C7851	3	3													3	3	3	3										3	
K2906	C7851	2																			2									
K2908	C7851	2	2													2	2	2	2										2	
K2913	C7851	4																			4									
K2918	C7851	6	5													5	6	5	6	1									5	
K2919	C7850	1																												1
K2920	C7851	1																			1									
K2921	C7851	6																												6

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K2923	C7851	1	1													1	1	1	1										1	
K2925	C7850	4																			4									
K2926	C7850	1																												1
K2927	C7850	4																												4
K2928	C7850	5	5													4	5	5	5				4	4					5	
K2931	C7850	4		4	4	4	4	4	4	4	4				4															
K2933	C7850	1																												1
K2934	C7852	3																												3
K2937	C7850	1	1													1	1	1	1											
K2938	C7852	2	1													1	1		1										2	
K2940	C7850	1																			1									
K2942	C7850	9																												9
K2946	C7850	1																												1
	C7852	2																												2
K2950	C7850	1																			1									
K2951	C7850	11	11													11	11		11	2			11	11					11	
K2952	C7852	4	4													4	4		4										4	
K2956	C7850	5																			5									
K2957	C7850	5																			5									
K2958	C7852	4																			4									
K2960	C7852	9																												9
K2965	C7852	5																			5									
K2966	C7852	4																			4									
K2970	C7852	9	9													9	9	9	9							8	9		9	
K2977	C7850	7		7	7	7	7	7	7	7	7				7															
	C7852	13		13	13	13	13	13	13	13	13				13															
K3006	C7857	1		1	1	1	1	1	1	1	1		1		1															
K3016	C7852	1																			1									
K3022	C7852	1	1													1	1		1											
K3027	C7857	1	1													1	1	1	1					1		1	1			
K3037	C7857	11		11	11	11	11	11	11	11	11		11		11															
K3039	C7857	2		2	2	2	2	2	2	2	2		2		2															
K3040	C7857	3		3	3	3	3	3	3	3	3		3		3															
K3047	C7857	6																												6

Table 3. Summary of Sample Delivery Groups Subject to Data Assessment. (13 Pages)

Sample Delivery Group	Site	Number of Samples in Sample Delivery Group	Analyses Performed																										
			Cr-VI	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Plutonium	Isotopic Uranium	Americium-241	Isotopic Curium	Neptunium-237	Total Uranium	GEA	Metals	pH	Percent Solids	Percent Moisture	Physical Properties	Special Extraction	TPH - DRO	PAHs	PCBs	Pesticides	Anions	NO_2/NO_3	Cyanide	SVOA	VOA
K3050	C7857	11	11													11	11	11	11					11		11	11			
K3053	C7857	5																			5									
K3054	C7857	5																			5									
K3059	C7857	6																												6
K3067	C7857	5																												5
K3068	C7857	6	6													6	6	6	6					5		5	5			
K3069	C7857	5																			5									
K3070	C7857	1																			1									
K3081	C7857	1																												1
K3082	C7857	1	1															1												
K3086	C7857	1	1													1	1	1	1					1		1	1			
K3090	C7857	1		1	1	1	1	1	1	1	1		1		1															
Sample Authorization Form RC-203 (Soil)																														
K2691	116-H-2	9	7	7	7		7	7	7	7					7	7	6	9	6	4	4			7		7	7		8	9
	1607-H4	6	4	4			4	4		4					4	5	5	6	5	4	4		5		5	4	4		4	5
K3100	100-D-4	8	7	7	7	7	7		7	7	7				7	7	7	8	7	5	5		7	7		7	7		7	8
K3119	116-D-4	6	5	5	5	5	5		5	5					5	5	5	6	5	5	5					5	5		5	6
K3297	100-D-12	11	9	9			9	9		9					9	9	7	9	7	8	6					9	9			9

DRO = diesel range organic
GEA = gamma energy analysis
PAH = polynuclear aromatic hydrocarbons
PCB = polychlorinated biphenyl
pH = hydrogen ion concentration
SVOA = semivolatile organic analysis
TPH = total petroleum hydrocarbons
VOA = volatile organic analysis

Minor and major deficiencies were identified in the data packages. Minor deficiencies noted by the reviewer resulted in a "J" flag being assigned to the laboratory result. Major deficiencies resulted in an "R" flag being assigned to the laboratory result. In addition to the data qualifiers that have been assigned by the analytical laboratory, the following data qualifiers were assigned during data assessment:

- UJ – The compound or analyte was analyzed for and detected in the sample. However, due to a minor QC deficiency associated with method blank results, the associated results are labeled as estimated quantitation limits. The data are considered usable for decision-making purposes.

- J – Due to a minor QC deficiency identified during the data assessment, the associated concentration is an estimate. The data are considered usable for decision-making purposes.

- UR – Indicates that the constituent was analyzed for and not detected; however, due to an identified major QC deficiency, the data are not considered usable for decision-making purposes (i.e., rejected).

Due to the large volume of data that were reviewed, it is not possible to discuss in detail each of the qualifiers that were applied to the individual results. The following sections provide a general discussion of the data quality issues identified.

2.1 HOLDING TIMES

Holding times that comply with the established limit are in compliance with the requirement. Holding times between one and two times the limit defined by the method are considered minor deficiencies with all associated sample results qualified as estimated and flagged "J" for detects and "UJ" for nondetects. Holding times greater than two times the limit are considered major deficiencies with all associated detectable sample results qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR." Table 4 lists the holding times applicable to the analytical methods by matrix.

Table 4. Holding Times. (2 Pages)

Parameter	Method	Soil Holding Time	Water Holding Time
ICP metals	EPA Method 6010B EPA Method 6020	6 months	6 months
Mercury	EPA Method 7471A	28 days	28 days
Hexavalent chromium	EPA Method 7196A	30 days	24 hours
Anions	EPA Method 300.0	28 days/48 hours [a]	[b]
Nitrate/nitrite	EPA Method 353.1 EPA Method 353.2	28 days	[b]
Cyanide	EPA Method 9012A	14 days	[b]
Volatile organic compounds	EPA Method 8260B	14 days	[b]
Semivolatile organic compounds	EPA Method 8270C	14 days/40 days	[b]

Table 4. Holding Times. (2 Pages)

Parameter	Method	Soil Holding Time	Water Holding Time
pH	EPA Method 9045 (soil) EPA Method 9040 (water)	As soon as possible	As soon as possible
Pesticides	EPA Method 8081A	14 days/40 days	[b]
Polychlorinated biphenyls	EPA Method 8082	1 year/1 year	[b]
Polynuclear aromatic hydrocarbons	EPA Method 8310	14 days/40 days	[b]
Total petroleum hydrocarbons	EPA Method 8015M	14 days	[b]
Gamma-emitting radioisotopes	Gamma energy analysis	6 months	[b]
Carbon-14	LSC – C-14	6 months	[b]
Tritium	LSC – Tritium	6 months	[b]
Total radiostrontium	Gas-flow proportional counting	6 months	[b]
Nickel-63	LSC – Ni-63	6 months	[b]
Technetium-99	Gas-flow proportional counting	6 months	[b]
Americium-241	Alpha energy analysis	6 months	[b]
Curium isotopes	Alpha energy analysis	6 months	[b]
Neptunium-237	Alpha energy analysis	6 months	[b]
Plutonium isotopes	Alpha energy analysis	6 months	[b]
Uranium isotopes	Alpha energy analysis	6 months	[b]
Uranium – total	Kinetic phosphorescence analysis	6 months	[b]

[a] Holding time for anions is 28 days except for nitrate, nitrite, and phosphate for which the holding time is 48 hours.
[b] Water samples did not undergo this particular analysis.
EPA = U.S. Environmental Protection Agency
ICP = inductively coupled plasma
LSC = liquid scintillation counter
pH = hydrogen ion concentration

The hexavalent chromium holding time presented a consistent, and significant, QC issue in the reviewed data packages. The holding time for hexavalent chromium as defined by the EPA Method 3060A extraction procedure for soils to be analyzed by EPA Method 7196 is 30 days. A significant number of SDGs had holding times greater than 30 days; many had holding times greater than 60 days. Based on established data qualification protocols, the Cr-VI detected results should be qualified as estimates ("J" flagged) and numerous nondetected results should be rejected ("UR" flagged). Rather than reject the data based on the above criteria, the nondetected results will instead by flagged as an "undetected-estimated value" ("UJ") flag. The technical basis supporting this decision is found in EPA/600/R-05/124, *Sample Holding Time Reevaluation*. Among other findings reported in this study, a 5% decrease in Cr-VI was estimated to require at least 140 days regardless of soil type or holding temperature, which is 5 times longer than the SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods,* prescribed maximum holding time of 30 days.

Anions with a 48-hour holding time (nitrate, nitrite, and phosphate) frequently exceeded the requirement by more than double, resulting in the qualification of data as "J" if the result is a detectable concentration or "UR" if the result is a nondetect. This was a consistent problem with the data affecting all nitrate, nitrite, and phosphate analytical results.

The pH analyses were analyzed as soon as possible by the laboratory recognizing that there would be a delay between sample collection and analysis because of shipping preparation, sample screening for radionuclides, and shipping time. Ideally, pH analysis would be performed within 24 hours of sample collection. Because this was never achieved, the pH results for all samples requiring analysis were flagged "J" as estimated quantities.

2.2 DETECTION LIMITS

Estimated quantitation limits (EQLs) for individual analytes are defined in Section 2.0 of the SAP with tables for specific methods provided in Appendix A of the SAP. Reported analytical detection levels for undetected analytes are compared against the EQLs to ensure that laboratory detection levels met the required criteria.

For most analytes, the EQLs were met. However, the EQL was regularly exceeded for several gamma-emitting radionuclides. The EQL being exceeded was minor in absolute terms, with the minimum detectable activity (MDA) achieved for the analyses being below the action levels provided in the SAP. No qualification of the gamma-emitting radionuclide results is required for exceeding the EQL and none were applied.

Similarly, the EQLs for iron and zinc were frequently exceeded with the quantitation limits achieved by the laboratory being below the action levels provided in the SAP. For iron and zinc, the concentrations in the field samples always were at detectable levels; therefore, the fact that the EQLs were exceeded was inconsequential. For field quality assurance samples such as field blanks, the iron and zinc concentrations were frequently below detection. However, this does not affect the overall quality of the data generated for the field samples themselves.

The EQLs for anions were frequently exceeded; however, as with the gamma-emitting radionuclides and the metals, the quantitation limits achieved by the laboratory were below the action levels provided in the SAP. Again, no qualification of the data is required.

For semivolatile organic analyses (SVOAs), six compounds routinely exceeded the EQLs identified in the SAP. These included 2,4-dinitrophenol, 2-nitroaniline, 3,3'-dichlorobenzidine, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol, and pentachlorophenol. Of these, only pentachlorophenol was identified in the SAP as a contaminant of interest for two sites (100-D-4 and 116-DR-9) wherein it was recognized that the available detection limits exceeded the action levels identified in the SAP for groundwater protection and river protection. As such, no qualifiers have been assigned to the SVOA results for quantitation limits being exceeded.

2.3 METHOD BLANK RESULTS

Method blank samples are analyzed to determine if positive results may be attributed to laboratory reagent, sample container, or detector contamination. At least one acceptable method blank analysis must be conducted for every 20 samples. If the method blank analysis

results indicate the presence of an analyte above the method detection limit or MDA, the following qualifiers are applied:

- All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"
- Sample results below the EQL or MDA are qualified as undetected and flagged "U"
- Sample results above the EQL or MDA and greater than five times the highest blank concentration are not qualified.

Method blank contamination was regularly observed in inductively coupled plasma metal analyses, primarily for tin. Generally, the amount observed in the blank was between the detection level and the reporting level. Because the concentration of tin detected in the sample was usually low, the method blank contamination usually required applying a "UJ" flag to the results. Magnesium and calcium were also regularly detected in the method blank, although not as often as tin and not as high a concentration relative to the sample results. These method blank issues are considered minor deficiencies.

Occasionally, blank contamination was encountered for other analyses as noted in the worksheets. The analytical data were flagged appropriately in accordance with the above criteria.

2.4 FIELD EQUIPMENT BLANK RESULTS

Field equipment blank samples are analyzed to determine if positive results may be attributed to contaminants introduced as a result of the field sampling process. If the field equipment blank analysis results indicate the presence of an analyte above the method detection limit or MDA, the following qualifiers may be applied:

- All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"
- Sample results below the EQL or MDA are qualified as undetected and flagged "U"
- Sample results above the EQL or MDA and greater than five times the highest blank concentration are not qualified.

Periodically, field equipment blanks contained detectable concentrations of specific analytes above concentrations seen in field samples. Notation was made in the individual worksheets and the data flagged in accordance with the above criteria. Only those samples in the same analytical group as the offending field equipment blank were qualified because it could not be determined whether the contamination was attributed to field sample collection techniques or laboratory analytical techniques. More often than not, the same contamination was detected in the laboratory method blank providing evidence that the discrepancy was attributed to the laboratory rather than the field.

2.5 FIELD TRIP BLANK RESULTS

Field trip blank samples are analyzed to determine if positive results may be attributed to contaminants introduced as a result of the transfer of samples from the field to the laboratory. In addition to field trip blanks, field transfer blanks were collected specifically for volatile organic analysis (VOA) samples. The two primary analytes detected in both field trip blanks and field transfer blanks are methylene chloride and acetone. These are common laboratory contaminants and are frequently detected in the laboratory method blanks as well. The analytical data have been flagged in accordance with the criteria specified above for the method blank results. The field trip blank and field transfer blank results for volatile organic analyses are provided in Table 5.

Table 5. Field Trip Blank and Field Transfer Blank Volatile Organic Analysis Results. (2 Pages)

Location	Interval	Sample	Concentration (µg/kg)			
			Methylene Chloride	Acetone	2-Hexanone	2-Butanone
Field Transfer Blanks						
C7620	I-006	B27BW9	U	U	U	U
C7621	I-005	B27RV2	4.91	U	U	U
C7622	I-002	B28BV7	1.93	1.65	U	U
C7623	I-006	B28YC9	3.78	U	U	U
C7625	I-010	B29PT2	U	4.81	U	U
C7626	I-003	B28JC3	U	U	U	U
C7627	I-001	B28MR7	3.68	U	5.35	U
C7628	I-002	B28K97	2.88	4.07	U	U
C7629	I-002	B28D10	U	U	U	U
C7630	I-004	B28KP9	U	U	U	U
C7631	I-008	B29HY0	3.21	U	U	U
C7866	I-005	B29CM5	2.14	U	U	U
C8375	I-005	B2C635	U	4.69	U	U
C7850	I-004	B27YR0	U	U	U	U
C7851	I-006	B280B4	2.07	6.13	U	U
C7852	I-002	B28052	U	4.54	U	U
C7857	I-005	B298P8	5.45	U	U	U
C7860	I-004	B29ML0	U	4.80	U	U
C7861	I-002	B29N97	10.8	4.6	U	U
C7862	I-001	B27653	U	U	U	U
C7862	I-003	B276F7	U	U	U	U
C7862 [a]	I-004	B27656	U	U	8.45	U
C7862	I-007	B27659	U	U	U	U
C7862	I-011	B27663	U	U	U	U
C7863	I-001	B28Y46	U	U	U	U
C7864	I-001	B28VD8	2.55	3.63	U	U
C8668	I-005	B2H4P8	2.52	U	U	U

Table 5. Field Trip Blank and Field Transfer Blank Volatile Organic Analysis Results. (2 Pages)

Location	Interval	Sample	Concentration (µg/kg)			
			Methylene Chloride	Acetone	2-Hexanone	2-Butanone
116-H-2	NA	J1CFP0	2.69	17	U	U
100-D-12	NA	J1D4P6	U	20.4	U	5.01
Trip Blanks						
C7621	I-007	B27RM6	U	U	U	U
C7625	I-009	B29PT1	U	U	U	U
C7631	I-002	B2B202	2.73	U	U	U
C7866	I-006	B29CN0	3.08	U	U	U
C8375	I-007	B2C636	U	4.48	U	U
C7850	I-003	B27YN3	U	3.47	U	U
C7851	I-010	B280K7	2.35	7.24	U	U
C7852	I-003	B28058	U	2.70	U	U
C7855	I-001	B297X7	1.83	3.73	U	U
C7857	I-008	B298P9	3.67	4.94	U	U
C7863	I-005	B28Y73	3.07	5.07	U	U
C7864	I-004	B2B4F7	2.01	U	U	U
100-D-12	NA	J1DXR6	U	25.2	U	U
100-D-4	NA	J1CNT9	6.23	20.1	U	5.05
116-H-2	NA	J1CXM1	1.89	17.3	U	U
116-D-4	NA	J1CY56	2.00	16.2	U	U
1607-H4	NA	J1CFM0	2.43	18.5	U	14.1

[a] For the C7862 Interval I-004 field transfer blank, styrene and xylenes were detected at concentrations of 1.12 µg/kg and 1.06 µg/kg, respectively.
NA = not applicable
U = undetect

2.6 MATRIX SPIKE RECOVERIES

Matrix spike recoveries allow for evaluation of accuracy. Measured concentrations or activities are compared to the known added amounts. The SAP defines the acceptable recovery range as 70% to 130% with data falling outside this range being flagged "J."

The accuracy criteria provided in the SAP are based on the initial guidance values for percent recoveries as defined in SW-846. As per SW-846 Method 8000 and applicable to all SW-846 organic analyses, it is essential that laboratories calculate in-house performance criteria for matrix spike recoveries and surrogate recoveries. It may also be useful to calculate such in-house criteria for LCS recoveries and for the initial demonstration of proficiency when experience indicates that the criteria recommended in specific methods are frequently missed for some analytes or matrices. The development of in-house performance criteria and the use of control charts or similar procedures to track laboratory performance cannot be over-emphasized. Many data systems and commercially-available software packages support the use of control charts. The SW-846 outlines the procedures for the calculation of in-house performance criteria for matrix spike recovery and surrogate recovery. The procedures may

also be applied to the development of in-house criteria for the initial demonstration of proficiency and for LCS recoveries. For organic analyses where the laboratory has defined acceptance criteria for matrix spike recoveries, these criteria will be used to assess the quality of the data rather than the 70% to 130% limits provided in the SAP.

For tritium and carbon-14 analyses, matrix spikes are required by the method validation procedure but are not routinely included by the analytical method. Therefore, the tritium and carbon-14 data are flagged "J" as estimated quantities because matrix spikes were not analyzed with the SDGs.

2.7 LABORATORY CONTROL SAMPLES

Laboratory control samples allow for evaluation of accuracy. Measured concentrations or activities are compared to the known added amounts. The acceptable recovery range is 70% to 130%. Results less than 70% or greater than 130% will be flagged "J" as estimated quantities. As discussed above, laboratory-established criteria were used to assess LCS results for organic analyses where such criteria are provided.

2.8 MATRIX SPIKE DUPLICATES

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. If both the sample and replicate concentrations are greater than five times the EQL and the RPD is less than 30%, no qualification is required. If either concentration is less than five times the EQL, the RPD control limit is less than or equal to two times the EQL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated nondetects and flagged "J" accordingly. Sample results greater than five times the spike concentration require no qualification.

2.9 LABORATORY DUPLICATE RESULTS

Laboratory duplicate results are a second method by which to assess analytical precision. Precision may be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both the sample and replicate concentrations are greater than five times the EQL and the RPD is less than 30%, no qualification is required. If either concentration is less than five times the EQL, the RPD control limit is less than or equal to two times the EQL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated nondetects and flagged "J" accordingly.

Out-of-compliance laboratory duplicate analyses were one of the most common deficiencies noted in the reviewed data sets. All of the laboratory duplicates that were out of compliance were minor and required applying a "J" flag to the appropriate results. No results were rejected based on the laboratory duplicates.

2.10 FIELD DUPLICATE RESULTS

Field duplicate results are a method by which to assess field precision. Precision is assessed from the analysis of a primary sample and its duplicate collected in the field. If both the sample and its field duplicate concentrations are greater than five times the EQL and the RPD is less than 30%, no qualification is required. Where direct evaluation of the sample data showed that a given analyte was not detected in the primary, duplicate, or split sample, further evaluation of the RPD was not performed.

When an analyte is detected in the primary or duplicate/split sample, but is quantified at less than five times the EQL in one or both samples, an additional parameter is evaluated. In this case, if the difference between the primary and duplicate/split results exceeds a control limit of two times the EQL, further assessment regarding the usability of the data is performed whereby the RPD control limit will be considered as less than or equal to two times the EQL.

Two calculation briefs were prepared to assess the RPD between duplicate and split sample pairs (Calculation No. 0100X-CA-V0056 and Calculation No. 0100X-CA-V-0071). These calculation briefs are presented in Appendix A.

Thirty-seven sample pairs were evaluated including 36 field duplicates and 1 split sample. Based on the methodology explained in the calculation, RPDs were calculated for 480 analyte pairs. Of these 480 RPDs, 63 exceeded the 30% guideline. Of the 63, 40 were not contaminants of interest (e.g., calcium, silicon, K-40) and were not evaluated further. The remaining 23 RPDs were further assessed as required by the method. Further assessment showed that four were below the secondary parameter being quantified at less than five times the EQL with the RPD control limit considered to be two times the EQL. The remaining 19 listed in Table 6 were reviewed for laboratory QC issues, such as matrix spikes or duplicate analyses that were out of specification. Those analytes with laboratory QC issues have been qualified as estimated by the laboratory, the analytical data validator, and/or the DQA reviewer.

Table 6. Field Duplicate Laboratory Quality Control Review. (2 Pages)

Location	Analyte	Relative Percent Difference	Laboratory Quality Control Issue
100-D-12	Chromium-total	74.0%	No
116-H-2	Barium	36.3%	No
C7623 I-006	Chromium-total	36.8%	Yes
C7624 I-014	Manganese Zinc	52.4% 37.5%	No Yes
C7628 I-005	Chromium-total Copper Manganese	198.4% 101.3% 57.7%	Yes No No
C7629 I-002	Chromium-total	51.8%	Yes
C7630 I-002	Chromium-total	61.1%	No
C7631 I-008	Chromium-total Copper Manganese	179.7% 81.3% 38.2%	Yes Yes Yes

Table 6. Field Duplicate Laboratory Quality Control Review. (2 Pages)

Location	Analyte	Relative Percent Difference	Laboratory Quality Control Issue
C7639 I-005	Chromium-total Copper	60.7% 81.6%	Yes Yes
C7850 I-009	Chromium-total	56.6%	No
C7861 I-006	Barium Copper	48.6% 34.0%	No No
C7862 I-004	Chromium-total	44.6%	Yes
C8668 I-002	Phosphorous	36.7%	Yes

Further assessment showed that 10 of the 19 were associated with analyte pairs where 1 or both had laboratory QC issues, such as matrix spikes or duplicate analyses that were out of specification. Those analytes with laboratory QC issues have been qualified as estimates by the laboratory, the validator, and/or the data reviewer. The other nine analyte pairs have no apparent laboratory QC issues.

Duplicate and split sample pair analyses results that exceed guidelines are considered a minor deficiency. No further qualification of the data is required.

3.0 DATA USABILITY

Based on the results of this DQA, all of the laboratory analytical results that were not qualified as rejected are considered useable for their intended purpose. Table 7 presents the reviewer qualifiers that were applied to the sample results for inorganic analytes including metals, anions, cyanide, and pH. Table 8 presents the qualifiers for radionuclides. Table 9 lists the qualifiers for the total petroleum hydrocarbons and polynuclear aromatic hydrocarbons. Table 10 provides the reviewer qualifiers for both polychlorinated biphenyls (PCBs) and pesticides, with Tables 11 through 13 listing those for SVOAs and VOAs, respectively.

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
Sample Authorization Form RC-172 (Soil)																																								
K2392	B28597	J						UJ				J										J												UR	UR	UR				
K2493	B28JF1		J	J							J		J														UJ	J	J						UR	UR	UR				J
	B28JH3		J	J							J		J														UJ	J	J						UR	UR	UR				J
	B28JH4		J	J							J		J														UJ	J	J						J	UR	UR				J
	B28JH5		J	J							J		J														UJ	J	J						UR	UR	UR				J
	B28JH6		J	J							J		J														UJ	J	J						UR	UR	UR				J
	B28JF2		J								J		J														UJ	J	J						UR	UR	UR				
K2496	B28JF5								J																															
K2516	B28KC7				J																																			
	B28KC9								J																															
K2517	B28KC8		J	J										J																					J	UR	UR				J
	B28KD0		J	J										J																										J
K2528	B285B7		J					J	J		J				J							J					UJ				J				J	UR	UR				J
K2531	B273L5		J		J						J				J				J	J		J		J	J		UJ				J				J	UR	UR				J
K2558	B28K90		J						J													J									UJ		J		J	UR	UR				J
	B28K93		J						J													J									UJ		J		J	UR	UR				J
	B28KB6		J						J													J									UJ		J		J	UR	UR				J
	B28KB9		J						J													J									UJ				J	UR	UR				J
K2561	B285B8		J						J													J									J		J		UR	UR	UR				J
	B285B9		J						J													J					UJ				J		J		J	UR	UR				J
	B285C1		J						J													J					UJ				J				UR	UR	UR				J
K2563	B28599								J																															
K2566	B28KB3		J						J		J	J					J	J				J					UJ				J	J	UJ	J	J	UR	UR	J	J		J
K2570	B285B0																														UJ										
	B285B2								J																						UJ										
K2576	B28MX6		J						J													J					UJ				J										J
	B28MW1		J						J													J					UJ				J				UR	UR	UR				J
K2577	B28KV5	J						J				J			J							J					UJ				J				UR	UR	UR				J
K2588	B28MX1																														UJ										
	B28MX7				J				J																						UJ										
K2590	B285C0		J						J						J			J	J								UJ				J	J	UJ	J	UR	UR	UR	J	J		J
	B285C2		J						J						J			J	J								UJ				J	J	J	J	J	UR	UR	J	J		J
K2591	B28JF0		J						J	J	J						J	J									UJ				J										J
	B28JH7		J						J	J	J						J	J									UJ				J	J	J	J	J	UR	UR	J	J		J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2593	B28MV2		J																			J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28MV3		J																			J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28MV5		J																			J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28MV6		J																			J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28MV1		J																			J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
K2597	B28KR2							J	J	J	J				J				J								UJ		J		UJ	J	J	J	UR	UR	UR	J	J		J
K2598	B28JF7								J																						UJ										
K2607	B27BX0	J			J			J				J										J					UJ				J	J	UJ	J	UR	UR	UR	J	J		J
K2608	B28MV7		J																			J					UJ				J	J	UJ	J	UR	UR	UR	J	J		J
K2609	B28KR1																														UJ										
K2610	B28MW2								J																						J										
	B28MW3								J																						J										
	B28MW5								J																						J										
	B28MW6								J																						J										
	B28MW7								J				J																		J										
K2620	B27BV5	J			J			J				J				J						J					UJ				J	J	J	J	UR	UR	UR	J	J		J
K2621	B28KV4		J					J							J												UJ		J		UJ	J	J	J	UR	UR	UR	J	J		J
	B28KV6		J					J							J												UJ		J		UJ	J	J	J	UR	UR	UR	J	J		J
	B28KV7		J					J							J												UJ		J		UJ	J	J	J	UR	UR	UR	J	J		J
	B28KV8		J					J							J												UJ		J		UJ	J	J	J	UR	UR	UR	J	J		J
	B28KV9		J					J							J												UJ		J		UJ	J	J	J	UR	UR	UR	J	J		J
K2622	B28KT5																														UJ										
	B28KT6			J					J																						UJ										
	B28KT8																														UJ										
	B28KT9								J																						UJ										
K2626	B289D8																														UJ										
K2628	B28YP3	J										J										J					UJ				J	J	J	J	UR	UR	UR	J	J		J
K2629	B27BX9			J					J				J								J		J								J										
	B27BY0								J				J								J		J								J										
	B27BY2								J												J		J								J										
	B27BY3								J												J		J								UJ										
	B27BY4			J					J												J		J								UJ										

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																														Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2630	B27BY7		J						J													J					UJ				J	J	J	J	J	UR	UR	J	J		J
	B27BY8		J						J													J					UJ				J	J	J	J	J	UR	UR	J	J		J
	B27BY9		J						J													J					UJ				J	J	J	J	UR	UR	UR	J	J		J
	B27C00		J						J													J					UJ				J	J	J	J	UR	UR	UR	J	J		J
	B27C01		J						J													J					UJ				J	J	J	J	J	UR	UR	J	J		J
	B27C02		J						J													J					UJ				J	J	J	J	J	UR	UR	J	J		J
	B27C08		J						J													J					UJ				J										J
K2632	B27RH5																																								J
	B27RH6																																								J
K2665	B27BV2	J	J	J	J			J	J						J							J					UJ	J			UJ	J	J	J	UR	UR	UR	J	J		J
K2666	B29B87	J	J						J									J	J			J					UJ				UJ										J
	B27RK9	J	J						J									J	J			J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B27RL2	J	J						J									J	J			J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
K2667	B28YH2	J	J						J									J									UJ				UJ	J	J	J	J	UR	UR	J	J		J
K2668	B28KW0	J	J																			J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28KW1	J	J																			J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
K2672	B27BV1								J																						UJ										
K2673	B27RK1																														UJ										
	B29B86								J																						UJ										
K2674	B28YD9								J																						J										
K2675	B28KV1																														UJ										
K2685	B27RK0		J					J		J						J						J					UJ				J	J	J	J	UR	UR	UR	J	J		J
	B27RL1		J					J		J						J						J					UJ				J	J	J	J	UR	UR	UR	J	J		J
K2686	B28YH3		J						J																		UJ				J	J	J	J	UR	UR	UR	J	J		J
	B28YP4		J						J																		UJ				J	J	J	J	UR	UR	UR	J	J		J
	B28YC5																																								J
	B28YC6																																								J
	B28YC7																																								J
K2692	B27RJ9								J																						UJ										
K2693	B28YF0								J																						UJ										
K2705	B28YH4		J						J									J									UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28YH5		J						J									J									UJ				UJ	J	J	J	UJ	UR	UR	J	J		J
	B28YH6		J						J									J									UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28YH7		J						J									J									UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28YJ0		J						J									J									UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28YT8		J						J									J									UJ				UJ										J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite [a]	Orthophosphate [a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2712	B28YF1			J					J																						UJ										
	B28YF7								J																						UJ										
K2728	B29CL9	J										J			UJ							J					UJ				UJ	J	UJ	J	UR	UR	UR	J	UJ		J
K2736	B29CK5																														UJ										
	B29CL0																														UJ										
	B29CL4								J																						UJ										
K2740	B29CK2	J	J					J			J			J	J				J			J				J	UJ	J	J		UJ	J	UJ	J	UR	UR	UR	J	UJ		J
	B29CK6	J	J					J			J			J	J				J			J				J	UJ	J	J		UJ	J	J	J	J	UR	UR	J	J		J
	B29CL1	J	J					J			J			J	J				J			J				J	UJ	J	J		UJ	J	UJ	J	J	UR	UR	J	J		J
	B29CL5	J	J					J			J			J	J				J			J				J	UJ	J	J		UJ	J	UJ	J	UR	UR	UR	J	J		J
K2745	B29CM4	J	J											J								J					UJ				UJ	J	J	J	UR	UR	UR	J	UJ		J
	B29CM9	J	J																			J					UJ				UJ	J	UJ	J	UR	UR	UR	J	UJ		J
	B29CN2																																								J
	B29CN6	J	J																			J					UJ				UJ	J	UJ	J	J	UR	UR	J	J		J
	B29CN8																																								J
K2746	B29CM3								J																						UJ										
	B29CM8												J																		J										
	B29CN5								J																						J										
K2782	B29CR0	J	J						J									J		J		J					UJ				UJ										J
	B29CR4	J	J						J									J		J		J					UJ				UJ	J		UJ	J	UR	UR	J	J		
K2787	B29CP9								J																						J										
	B29CR3								J																						J										
K2794	B29CR9				J				J																						J										
	B29CT4								J																						UJ										
K2799	B29CP5		J					J	J													J					UJ				UJ	J		UJ	J	UR	UR	J	J		J
	B29CR6																																								J
	B29CT0		J					J	J													J					UJ				UJ	J		UJ	J	UR	UR	J	J		J
	B29CT5		J					J	J													J					UJ				UJ	J		UJ	UR	UR	UR	J	J		J
K2812	B29CV4		J																			J					UJ				UJ								J		J
	B29CV8		J																			J					UJ				UJ								J		J
	B29CW3		J																			J					UJ				UJ								J		J
	B29CW7		J																			J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
K2818	B29CV3						J																								UJ										
	B29CV7						J																								UJ										
	B29CW2						J		J																						UJ										
	B29CW6						J																								UJ										

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2822	B29CX2	J	J					J	J							J						J					UJ				UJ								J		J
K2826	B29CX1																														UJ										
K2984	B29CY3		J		J				J									J	J			J		J	J		UJ														J
K2990	B29CY2																														J										
K3018	B29PC4																																								J
	B29PC5																																								J
	B29PC6																																								J
	B29PC7																																								J
	B29PF0											J			J							J					UJ														J
K3025	B29PB4								J																						J										
	B29PC8								J																						J										
K3030	B29PB8	J	J		J				J													J					UJ			UJ											J
	B29PD0	J	J		J				J													J					UJ			UJ											J
K3048	B29PD8	J	J					J	J	J									J			J					UJ		J												J
	B29PF1	J	J					J	J	J									J			J					UJ		J												J
	B29PH1	J	J					J	J	J									J			J					UJ		J												J
K3049	B29C05	J	J					J	J										J			J					UJ														J
	B29C10	J	J					J	J										J			J					UJ				J										J
	B29BX8	J	J					J	J										J			J					UJ				UJ										J
	B29BX9	J	J					J	J										J			J					UJ				UJ										J
K3051	B29PF8			J					J																						UJ										
	B2B6M5								J																						UJ										
K3052	B29C09								J																						J										
	B29BX1								J																						J										
	B29BX2								J																						J										
K3056	B29PB9	J	J					J	J							J						J					UJ	J													J
	B29PF8	J	J					J	J							J						J					UJ	J													J
	B29PF9	J	J					J	J							J						J					UJ	J													J
K3057	B29PB5								J																						UJ										
	B29PF3								J																						UJ										
	B29PF4								J																						UJ										
K3060	B29C06		J						J		J				J	J		J				J					UJ														J
	B29BX0		J						J		J				J	J		J				J					UJ														J
	B29BY0		J						J		J				J	J		J				J					UJ														J
	B29BY1		J						J		J				J	J		J				J					UJ														J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3061	B29BX4								J														J								UJ										
K3183	B29HY9	J						UJ	J			J										J					UJ								UR	UR	UR				J
K3191	B29J01	J	J					J	J		J	J			J	J	J	J	J								UJ	J							UR	UR	UR				J
	B29J15	J	J					J	J		J	J			J	J	J	J	J								UJ	J							UR	UR	UR				J
	B29J16	J	J					J	J		J	J			J	J	J	J	J								UJ	J													J
K3194	B29J07				J				J																																
K3202	B29HY6																													J										
	B29HY7																													J										
	B29HY8								J																					J										
K3204	B29J10	J	J		J				J		J	J	J		J	J			J			J			J		UJ	J	J						UR	UR	UR				J
	B29J08	J	J		J				J		J	J	J		J	J			J			J			J		UJ	J	J						J	UR	UR				J
	B29J09	J	J		J				J		J	J	J		J	J			J			J			J		UJ	J	J						J	UR	UR				J
K3220	B29R09								J												J		J																		
	B29R10								J												J		J																		
	B29R11								J												J		J																		
	B29PW1								J												J		J																		
	B29PX0								J												J		J																		
K3227	B29PT0	J	J																		J	J					UJ														J
	B29PT5	J	J					UJ														J					UJ								UR	UR	UR				J
	B29PT6	J	J																			J					UJ						J		J	UR	UR				J
	B29PX8	J	J																		J	J					UJ						J		J	UR	UR				J
	B29PX9	J	J																			J					UJ						J		J	UR	UR				J
	B29R34	J	J																			J					UJ						J		J	UR	UR				J
K3228	B29R33			J					J																															
	B29PW4								J																															
K3229	B29PY1	J	J												J				J	J		J					UJ	J							J	UR	UR				J
	B29PY4	J	J												J				J	J		J					UJ	J							J	UR	UR				J
	B29R12	J	J												J				J	J		J					UJ	J							J	UR	UR				J
	B29R13	J	J												J				J	J		J					UJ	J							J	UR	UR				J
	B29R14	J	J												J				J	J		J					UJ	J							J	UR	UR				J
	B29R15	J	J												J				J	J		J					UJ	J							J	UR	UR				J
	B29PX5	J	J												J				J	J		J					UJ	J							J	UR	UR				J
	B29PX6	J	J												J				J	J		J					UJ	J							UR	UR	UR				J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3237	B2B8H0								J																															
	B29PW8				J																																			
K3239	B29PR8	J	J		J			J	J		J				J			J		J		J		J	J		UJ								J	UR	UR				J
	B29PY2	J	J		J			J	J		J				J			J		J		J		J	J		UJ								UR	UR	UR				J
	B29PY3	J	J		J			J	J		J				J			J		J		J		J	J		UJ								J	UR	UR				J
K3261	B29CC4								J																															
	B29C94								J																															
	B29CB2								J				J																											
K3262	B29CD6								J																					J										
K3263	B29C95		J					J	J									J									UJ													J
	B29CB3		J					J	J									J									UJ													J
	B29CB7		J					J	J									J									UJ													J
	B29CC5		J					J	J									J									UJ													J
	B29CC6		J					J	J									J									UJ													J
	B29CD2		J					UJ	J									J									UJ													J
	B29CD3		J					J	J									J									UJ													J
	B29CL8		J					J	J									J									UJ													J
	B29M05	J	J					UJ	J			J			J	J		J	J			J			J		UJ	J												J
K3301	B2C5V8								J																															
K3303	B2C611		J					J																			UJ								J	UR	UR	J			J
	B2C631		J					J																			UJ								UR	UR	UR	J			J
	B2C5W7		J					J																			UJ					J			J	UR	UR	J			J
	B2C612		J					J																			UJ					J			J	UR	UR	J			J
	B2C5W8		J					J																			UJ					J			J	UR	UR	J			J
	B2C5W9		J					J																			UJ					J			J	UR	UR	J			J
	B2C5X0		J					J																			UJ					J			J	UR	UR	J			J
	B2C637																																							J
	B2C638																																							J
K3311	B2C610								J																															
	B2C640				J				J																															
K3312	B2C619		J					J	J							J						J					UJ								J	UR	UR				J
	B2C641		J					J	J							J						J					UJ													J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3319	B2C613	J	J	J	J	J					J				J	J			J								UJ								J	UR	UR				J
	B2C614	J	J	J	J	J					J				J	J			J								UJ								J	UR	UR				J
	B2C615	J	J	J	J	J					J				J	J			J								UJ								UR	UR	UR	UJ			J
	B2C632	J	J	J	J	J					J				J	J			J								UJ								J	UR	UR				J
	B2C639																																								J
	B2C642																																								J
	B2C5X1	J	J	J	J	J					J				J	J			J								UJ								UR	UR	UR				J
	B2C5X2	J	J	J	J	J					J				J	J			J								UJ								J	UR	UR				J
	B2C5X3	J	J	J	J	J					J				J	J			J								UJ								UR	UR	UR				J
	B2C5X4	J	J	J	J	J					J				J	J			J								UJ								J	UR	UR				J
	B2C5Y1	J	J	J	J	J					J				J	J			J								UJ								J	UR	UR				J
	B2C5X5	J	J	J	J	J					J				J	J			J								UJ								UR	UR	UR				J
	B2C5X6	J	J	J	J	J					J				J	J			J								UJ								J	UR	UR				
K3321	B2C5V9								J																																
K3322	B2C604								J																																
	B2C605												J																												
	B2C5W1			J					J																																
	B2C5W2								J																																
Sample Authorization Form RC-173 (Water)																																									
J00909	B28JJ6																													J											
J01137	B2C6D5																													J											
K2280	B276H4																																								J
	B27633																																								J
K2505	B28JJ7																																								J
K2532	B28KD4	UJ																																							J
K2574	B28N32	UJ																																							J
K2605	B273L9	UJ														J																									J
K2683	B27C10																																								J
K2684	B28902																																								J
K2706	B28YV5																																								J
K2861	B298F6	UJ																UJ																							
	B298F5	UJ																UJ																							J
K2985	B29D25	UJ																																							J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3017	B28YF9	UJ																UJ																							
	B28YH1	UJ																UJ																							
K3045	B29PC3																																								J
K3046	B29C11																																								J
K3085	B29BC2																																								J
K3108	B29NJ3																J																								J
	B29NJ5																J																								
K3137	B29MT3																J																								J
	B29MT5																J										UJ														
K3138	B28VL1																J										UJ														J
	B28VL3																J										UJ														
K3253	B29R01	UJ															UJ																								J
K3265	B29C92	UJ															J																								J
K3318	B2C644																	UJ																							J
K3342	B2C691	UJ																																							J
K3412	B2C6D2	UJ																																							J
K3417	B2C6D3	UJ															J																								J
	B2C6D6	UJ																																							J
Sample Authorization Form RC-179 (Soil)																																									
K2707	B28BT9	J			J							J										J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
K2813	B28BV3		J					J											J								UJ				UJ								J		J
	B28BW4		J					J											J								UJ				UJ								J		J
K2819	B28BV2								J														J								UJ										
	B28BW3								J														J								UJ										
K2823	B28BW1		J						J		J				J				J								UJ	J			UJ								J		J
K2827	B28BW0								J																						UJ										
K2834	B28BX3		J						J		J				J			J									UJ			J	UJ	J	J	J	J	UR	UR	J	J		J
	B28BX6		J						J		J				J			J									UJ			J	UJ	J	J	J	J	UR	UR	J	J		J
K2838	B28BX2								J																						UJ										
	B28BX5								J																						UJ										
K2842	B28BW7		J																			J					UJ				UJ	J	J	J	J	UR	UR	J	J		
	B28BX0		J																			J					UJ				J	J	J	J	J	UR	UR	J	J		
K2845	B28BW6																														UJ										
	B28BW9								J																						J										

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2964	B28BY7						UJ		J																						UJ										
	B28BY4						UJ		J																						UJ										
	B28BY1						J		J																						UJ										
	B28BX8						UJ		J																						UJ										
K2969	B28BX9		J						J													J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28BY2		J						J													J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28BY5		J						J													J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28BY8		J						J													J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B2B4H5		J						J													J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
K2986	B28C01								J																		UJ					J	J	J	J	UR	UR	J	J		J
	B28C04								J																		UJ					J	J	J	J	UR	UR	J	J		J
	B28C07								J																		UJ					J	J	J	UR	UR	UR	J	J		J
	B28C10								J																		UJ					J	J	J	UR	UR	UR	J	J		J
	B28C13								J																		UJ					J	J	J	UR	UR	UR	J	J		J
	B28C16								J																		UJ					J	J	J	J	UR	UR	J	J		J
	B28C22								J																		UJ														J
K2991	B28C00								J																						UJ										
	B28C03																														UJ										
	B28C09								J																						UJ										
	B28C15								J																						UJ										
	B28C23								J																						UJ										
K3723	B2H4L9	J						J				J			J												UJ								UR	UR	UR	UJ			
K3729	B2H4V0			J					J																																
K3731	B2H4L6		J					J								J			J			J					UJ								UR	UR	UR				J
	B2H4L7		J					J								J			J			J					UJ								UR	UR	UR				
	B2H4L8		J					J								J			J			J					UJ														J
	B2H4M0		J					J								J			J			J					UJ														J
K3734	B2H4M5																																								
	B2H4M6		J					J							J				J							J	UJ								J	UR	UR	J			J
	B2H4M7		J					J							J				J							J	UJ								J	UR	UR	J			J
	B274M8		J					J							J				J							J	UJ								J	UR	UR	J			J
K3736	B2H4V5								J																																
	B2H4V6								J																																
	B2H4V7								J																																

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																														Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3741	B2H4W1			J					J																						UJ										
K3742	B2H4V4								J																																
	B2H4X0			J																																					
K3743	B2H4V1								J																																
	B2H4V2								J																																
	B2H4W3								J																																
	B2H4W4								J																																
K3745	B2H4N1		J					J														J					UJ								J	UR	UR	J			J
	B2H4N2		J					J														J					UJ								J	UR	UR	J			J
	B2H4N3		J					J														J					UJ								J	UR	UR	J			J
	B2H4N4		J					J														J					UJ								J	UR	UR	J			J
	B2H4M1		J					J														J					UJ								J	UR	UR				J
	B2H4M2		J					J														J					UJ								J	UR	UR	J			J
	B2H4N5		J					J														J					UJ								J	UR	UR	J			J
	B2H4N6		J					J														J					UJ								J	UR	UR				J
	B2H4M3		J					J														J					UJ								J	UR	UR				J
	B2H4M4		J					J														J					UJ								J	UR	UR				J
	B2H4P2		J					J														J													J	UR	UR				J
	B2H4P3		J					J														J					UJ														J
Sample Authorization Form RC-180 (Water)																																									
K2909	B280B5																					J																			J
	B280B6										UJ											J																			
K2936	B28013	UJ																	J			J																			J
	B28014	UJ																	J			J																			
K2987	B28CN4											UJ		J				UJ				J																			J
K2996	B280L0											UJ						UJ			UJ	J																			
	B280L1	UJ										UJ						UJ				J																			
K3343	B2C525	UJ											J				J				J																				J
	B280L2												J				J				J																				

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
Sample Authorization Form RC-196 (Soil)																																								
J00983	B29MJ2																																						UJ	
K2260	B276D0		J						J																									J	UR	UR				J
	B276D1		J						J																									J	UR	UR				J
	B276D2		J						J																									J	UR	UR				J
	B276D3		J						J																									J	UR	UR				J
	B276D4		J						J																									J	UR	UR				
	B27F73		J						J																									UR	UR	UR		UJ		
	B276B3			J																										UJ										
	B276B4								J																					UJ										
	B276B5								J																					UJ										
	B276B6								J																					J										
K2271	B276H0	J	J																			J																		J
	B276H2								J																					J										
K2286	B276D5	J	J																						J									J	UR	UR				J
	B276D6	J	J																						J									J	UR	UR				J
	B276B8																													UJ										
	B276B9								J																					UJ										
K2325	B276D7		J					J							J							J												J	UR	UR				J
	B276D8		J					J							J							J												J	UR	UR				J
	B276D9		J					J							J							J												J	UR	UR				J
	B276F0		J					J							J							J												UR	UR	UR				J
	B276F1		J					J							J							J												J	UR	UR				J
	B276C0								J																					UJ										
	B276C1																													UJ										
	B276C2																													UJ										
	B276C3								J																					UJ										
	B276C4																													UJ										
K2988	B28Y58	J						J				J										J					UJ				UJ	J	J	J	UR	UR	UR	J	J		J
	B28Y44						J																							UJ										
	B28Y49						J																							UJ										
	B28Y62						J																							UJ										
	B28Y66						J																							UJ										
	B28YC2						J																							UJ										

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3001	B28Y45		J								J				J				J								UJ			UJ		J	J	J	J	UR	UR	J	J		J
	B28Y50		J								J				J				J								UJ					J	J	J	J	UR	UR	J	J		J
	B28Y54		J								J				J				J								UJ			UJ		J	J	J	J	UR	UR	J	J		J
	B28Y63		J								J				J				J								UJ			UJ		J	J	J	J	UR	UR	J	J		J
	B28Y67		J								J				J				J								UJ			UJ		J	J	J	J	UR	UR	J	J		J
	B29MV3		J								J				J				J								UJ			UJ		J	J	J	J	UR	UR	J	J		J
K3013	B28Y71			UJ					J																						J										
	B28Y76			UJ																											J										
	B28YC3			UJ																											J										
K3015	B28Y81								J																						UJ										
K3021	B28Y72		J																								UJ					J	J	J	J	UR	UR	J	J		J
	B28Y77		J																								UJ			UJ		J	J	J	J	UR	UR	J	J		J
	B28Y82		J																								UJ					J	J	J	J	UR	UR	J	J		J
	B28YC4		J																								UJ														J
K3102	B29NH7												J																		J										
	B29NJ0																														J										
K3103	B29NB5		J		J			J														J		J			UJ					J	J	J	UR	UR	UR	UJ	J		J
	B29NH9		J		J			J														J		J			UJ					J	UJ	J	UR	UR	UR	J	J		J
	B29NJ1		J		J			J														J		J			UJ														J
K3111	B29NB2		J															J														J	J	J	J	UR	UR	J	J		J
	B29NB9		J															J														J	J	J	J	UR	UR	J	J		J
	B29NC4		J															J														J	J	J	J	UR	UR	J	J		J
	B29ND1		J															J														J	J	J	J	UR	UR	J	J		J
	B29NC7		J															J														J	J	J	J	UR	UR	J	J		J
	B29N96		J															J														J	J	J	UR	UR	UR	J	J		J
	B29N92		J															J														J	J	J	J	UR	UR	J	J		J
K3117	B29N90																														UJ										
K3118	B29N94			J																											J										
	B29NC9												J																		J										
	B29NC2																														J										
	B29NB0												J																		J										
	B29NB7																														J										
K3121	B28VF3							UJ														J					UJ					J	J	J	UR	UR	UR	J	UJ		J
K3134	B29MP2								J																																

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3135	B28VH4												J																											
	B28VH7												J																											
	B28VJ0												J																											
	B28VK7												J																											
K3136	B28VD3								J																															
	B28VD9								J																															
	B28VF5								J																					J										
	B28VF8								J				J																	J										
	B28VH1								J				J																											
K3142	B29ML2		J														J		J			J					UJ	J		J											J
	B29ML4		J														J		J			J					UJ	J		J		J	J	J	J	UR	UR	J			J
	B29ML8		J														J		J			J					UJ	J		J		J	J	J	UR	UR	UR	UJ			J
	B29MP8		J														J		J			J					UJ	J		J		J	J	J	J	UR	UR	J			J
	B29MP9		J														J		J			J					UJ	J		J		J	J	J	J	UR	UR	J			J
	B29MR0		J														J		J			J					UJ	J		J		J	J	J	J	UR	UR	J			J
	B29MR1		J														J		J			J					UJ	J		J		J	J	J	J	UR	UR	J			J
	B29MR2		J														J		J			J					UJ	J		J		J	J	J	J	UR	UR	J			J
	B29MR6		J														J		J			J					UJ	J		J		J	J	J	J	UR	UR	J			J
K3143	B28VD4		J																								UJ					J	J	J	J	UR	UR	J			J
	B28VD7		J																								UJ					J	J	J	J	UR	J	J			J
	B28VF1		J																								UJ					J	J	J	J	UR	UR	J			J
	B28VF6		J																								UJ					J	J	J	J	J	UR	J			J
	B28VF9		J																								UJ					J	J	J	J	UR	UR	J			J
	B28VH2		J																													J	J	J	J	UR	UR	J			J
	B28VH5		J																													J	J	J	J	UR	UR	J			J
	B28VH8		J																													J	J	J	J	UR	UR	J			J
	B28VJ1		J																													J	J	J	J	UR	UR	J			J
	B28VK8		J																																						J
K3165	B29MR4		J					J							J							J					UJ					J	J	J	J	UR	UR	J	J		J
	B29MR3		J					J							J							J					UJ					J	J	J	J	UR	UR	J	J		J
	B29ML9		J					J							J							J					UJ					J	J	J	J	UR	UR	J	J		J
K3168	B29MN9								J				J																												

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
Sample Authorization Form RC-197 (Soil)																																								
J00981	B298F2																			J		J								J						UR		J		J
K2780	B297Y0											J										J					UJ				UJ	J		UJ	UR	UR	UR	J	J		J
K2815	B29855	J	J					J																			UJ				J								J		J
	B29856	J	J					J																			UJ				J								J		J
	B29857	J	J					J																			UJ				UJ								J		J
	B29859	J	J					J																			UJ				UJ								J		J
	B29860	J	J					J																			UJ				UJ								J		J
K2821	B29813																														UJ										
	B29816			J																											J										
	B29818																														J										
	B29820																														UJ										
	B29821																														J										
K2825	B29858		J								J				J			J	J			J					UJ				UJ								J		J
K2829	B29819																						J								UJ										
K2832	B29865		J						J							J											UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B29866		J						J							J											UJ				J	J	J	J	J	UR	UR	J	J		J
	B29814		J						J							J											UJ				UJ	J	J	J	J	UR	UR	J	J		J
K2835	B29822								J																						UJ										
	B29823			J					J																						UJ										
	B29824								J																						UJ										
	B29825								J																						UJ										
	B29826								J																						UJ										
K2836	B29827						J																								UJ										
K2843	B29861		J						J										J			J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B29862		J						J										J		J	J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B29863		J						J										J			J					UJ				J	J	J	J	J	UR	UR	J	J		J
	B29864		J						J										J			J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
K2853	B29828																														UJ										
	B29829								J				J																		UJ										
	B29830																														J										
	B29831																														UJ										
	B29839																														J										

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2859	B29812		J		J				J				J									J					UJ				J										J
	B29867		J		J				J				J									J					UJ				J										J
	B29868		J		J				J				J									J					UJ				J										J
	B29869		J		J				J				J									J					UJ				J										J
	B29870		J		J				J				J									J					UJ				J										J
K2885	B280F5																														UJ										
	B280F6																														UJ										
	B280F7																														UJ										
	B280F8																														UJ										
K2887	B29832			UJ					J																						UJ										
	B29838			UJ					J																						J										
K2891	B280J3	J	J					J	J													J					UJ														J
	B280J4	J	J					J	J													J					UJ														J
	B280J5	J	J					J	J													J					UJ														J
	B280J6	J	J					J	J													J					UJ														J
	B280K6																																								J
K2893	B280H8	J										J										J					UJ														J
K2894	B29871	J	J																J								UJ														J
	B29877	J	J																J								UJ														J
K2899	B280D9																														UJ										
	B280F1																														J										
	B280F3																														J										
K2900	B280F0	J	J																								UJ														J
	B280H9	J	J																								UJ														J
	B280J1	J	J																								UJ														J
K2906	B280F4								J														J								J										
	B280H1								J														J								UJ										
K2908	B280J2	J	J					J										J									UJ														J
	B280J9	J	J					J										J									UJ														J
K2913	B280H0																														J										
	B280H4								J																						UJ										
	B280H3																														J										
	B280F9																														UJ										

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																															Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2918	B280J0		J																								UJ				J											J
	B280J7		J																								UJ				J											J
	B280K0		J																								UJ				J											J
	B280K1		J																								UJ				J											J
	B280K2		J																								UJ				J											J
	B280D5																																									J
K2919	B27YN3																																									
K2920	B280H2																														UJ											
K2923	B280J8		J					J	J																		UJ				UJ											J
K2925	B27YR1																														UJ											
	B27YR2								J																						UJ											
	B27YR3																														UJ											
	B27YR5																														UJ											
K2928	B27YV2		J		J			J	J						J				J								UJ	J														J
	B27YV3		J		J			J	J						J				J								UJ	J														J
	B27YV4		J		J			J	J						J				J								UJ	J														J
	B27YV6		J		J			J	J						J				J								UJ	J														J
	B27YT9																																									J
K2937	B27YX2		J						J		J											J					UJ															J
K2938	B28053	J										J			UJ							J					UJ															J
K2940	B27YV1								J																						UJ											
K2951	B27YV5		J					J			J				J				J			J		J			UJ															J
	B27YV7		J					J			J				J				J			J		J			UJ															J
	B27YV8		J					J			J				J				J			J		J			UJ															J
	B27YV9		J					J			J				J				J			J		J			UJ															J
	B27YW0		J					J			J				J				J		J	J		J			UJ															J
	B27YW1		J					J			J				J				J			J		J			UJ															J
	B27YW2		J					J			J				J				J			J		J			UJ															J
	B27YW3		J					J			J				J				J			J		J			UJ															J
	B27YW4		J					J			J				J				J			J		J			UJ															J
	B27YW5		J					J			J				J				J			J		J			UJ															J
	B27YW6		J					J			J				J				J			J		J			UJ															J
K2952	B280D8		J		J					J	J								J								UJ															J
	B28044		J		J					J	J								J								UJ															J
	B28055		J		J					J	J								J								UJ															J
	B28060		J		J					J	J								J								UJ															J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2956	B27YR6								J																						UJ										
	B27YR7								J																						UJ										
	B27YR8								J																						UJ										
	B27YR9								J																						UJ										
	B27YT0			J					J																						UJ										
K2957	B27YT1																														UJ										
	B27YT2																														UJ										
	B27YT3																														UJ										
	B27YT4																														UJ										
	B27YT5								J																						UJ										
K2958	B28046												J								J										UJ										
	B28051												J								J										J										
	B28058												J								J										UJ										
	B28061												J								J										UJ										
K2965	B28074								J																						UJ										
	B28077								J																						UJ										
	B28080								J																						UJ										
	B28083								J																						UJ										
	B28086								J				J																		UJ										
K2966	B28049								J																						UJ										
	B28065								J																						J										
	B28068								J																						UJ										
	B28071								J																						UJ										
K2970	B28047	J	J																								UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28063	J	J																								UJ					J	J	J	UR	UR	UR	J	J		J
	B28066	J	J																								UJ				UJ								J		J
	B28069	J	J																								UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28072	J	J																								UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28075	J	J																								UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28078	J	J																								UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28081	J	J																								UJ				UJ	J	J	J	J	UR	UR	J	J		J
	B28084	J	J																								UJ				UJ	J	J	J	J	UR	UR	J	J		J
K3016	B280B3								J																						UJ										
K3022	B280B2		J					J	J							J		J				J					UJ			UJ											J
K3027	B298R5	J						UJ														J										J	J	J	UR	UR	UR	J	J		J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3050	B298R8		J																			J										J	J	J	J	UR	UR	J	J		J
	B298Y3		J																			J					UJ				J	J	J	J	J	UR	UR	J	J		J
	B298Y4		J																			J					UJ				J	J	J	J	J	UR	UR	J	J		J
	B298Y5		J																			J					UJ				J	J	J	J	J	UR	UR	J	J		J
	B298Y6		J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	B298Y7		J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	B298Y8		J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	B298Y9		J																			J					UJ					J	J	J	UR	UR	UR	J	J		J
	B29900		J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	B29901		J																			J					UJ					J	J	J	UR	UR	UR	J	J		J
	B29948		J																			J					UJ					J	J	J	UR	UR	UR	J	J		J
K3053	B298W1																														UJ										
	B298W2																														J										
	B298W3																														J										
	B298W4																														UJ										
	B298W5																														UJ										
K3054	B298W6												J								J		J								UJ										
	B298W7												J								J		J								UJ										
	B298W8												J								J		J								UJ										
	B298W9												J								J		J								UJ										
	B29947			J									J								J		J								UJ										
K3068	B29902		J		J				J									J				J										J	J	J	J	UR	UR	J	J		J
	B29903		J		J				J									J				J					UJ					J	J	J	J	UR	UR	J	J		J
	B29904		J		J				J									J				J					UJ					J	J	J	J	UR	UR	J	J		J
	B29905		J		J				J									J				J					UJ					J	J	J	J	UR	UR	J	J		J
	B29913		J		J				J									J				J					UJ					J	J	J	J	UR	UR	J	J		J
	B298R1		J		J				J									J				J																			J
K3069	B298X0								J																						J										
	B298X1								J																						J										
	B298X2								J																						J										
	B298X3								J																						J										
	B298Y1								J																						J										
K3070	B298R0																														UJ										
K3082	B298X4																														UJ										
K3086	B29906		J					J	J																		UJ					J	J	J	J	UR	UR	J	J		J

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
Sample Authorization Form RC-203 (Soil)																																								
	J1CFL1		J		J																	J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
	J1CFL2		J		J																	J					UJ				UJ	J	J	J	J	UR	UR	J	J		J
	J1CFL3		J																								UJ				UJ	J	J	J	J	UR	UR	J	J		J
	J1CFL4		J		J																	J					UJ				J	J	J	J	J	UR	UR	J	J		J
	J1CFL5																																								J
	J1CFN3		J												J												UJ					J	J	J	J	UR	UR	J	J		J
	J1CFN4		J												J												UJ					J	J	J	J	UR	UR	J	J		J
	J1CFN5		J												J												UJ					J	J	J	J	UR	UR	J	J		J
	J1CFN6		J												J												UJ					J	J	J	J	UR	UR	J	J		J
	J1CFN7		J												J												UJ					J	J	J	J	UR	UR	J	J		J
	J1CFN8		J												J												UJ					J	J	J	J	UR	UR	J	J		J
	J1CFN9							UJ				J		UJ	UJ							J					UJ				UJ	J	J	J	UR	UR	UR	J	J		
	J1CFL3-1																														UJ										
	J1CFL3-2																														UJ										
	J1CFL3-3																														UJ										
	J1CFL3-4																														UJ										
	J1CFN4-1								J																						UJ										
K2691	J1CFN4-2								J																						UJ										
	J1CFN4-3								J																						UJ										
	J1CFN4-4								J																						UJ										
	J1CFN5-1								J																						UJ										
	J1CFN5-2								J																						UJ										
	J1CFN5-3								J																						UJ										
	J1CFN5-4								J																						UJ										
	J1CFN6-1								J																						UJ										
	J1CFN6-2								J																						UJ										
	J1CFN6-3								J																						UJ										
	J1CFN6-4								J																						UJ										
	J1CFN7-1								J																						UJ										
	J1CFN7-2								J																						UJ										
	J1CFN7-3								J																						UJ										
	J1CFN7-4								J																						UJ										
	J1CFL1-1																														UJ										
	J1CFL1-2																														UJ										
	J1CFL1-3																														UJ										

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K2691	J1CFL1-4																														UJ										
	J1CFL2-1																														UJ										
	J1CFL2-2																														UJ										
	J1CFL2-3																														UJ										
	J1CFL2-4																														UJ										
	J1CFL4-1																														J										
	J1CFL4-2																														UJ										
	J1CFL4-3																														UJ										
	J1CFL4-4																														UJ										
K3100	J1CNT4		J																								UJ				J	J	J	J	J	UR	UR	J	J		J
	J1CNT5		J																								UJ				J	J	J	J	J	UR	UR	J	J		J
	J1CNT6		J																								UJ				J	J	J	J	J	UR	UR	J	J		J
	J1CNT7		J																								UJ				J	J	J	J	J	UR	UR	J	J		J
	J1CNT8		J																								UJ				J	J	J	J	J	UR	UR	J	J		J
	J1CNV0		J																								UJ				J	J	J	J	J	UR	UR	J	J		J
	J1CNV1		J																								UJ				J	J	J	J	UR	UR	UR	J	J		J
K3119	J1CY51		J					J											J			J					UJ	J	J			J	J	J	J	UR	UR	J	J		J
	J1CY52		J					J											J			J					UJ	J	J			J	J	J	J	UR	UR	J	J		J
	J1CY53		J					J											J			J					UJ	J	J			J	J	J	J	UR	UR	J	J		J
	J1CY54		J					J											J			J					UJ	J	J			J	J	J	J	UR	UR	J	J		J
	J1CY55		J					J											J			J					UJ	J	J			J	J	J	J	UR	UR	J	J		J
	J1CY51-1								J																																
	J1CY51-2								J																																
	J1CY51-3								J																																
	J1CY51-4								J																																

Table 7. 100-D/H Review Qualifiers for Inorganic Analytes. (22 Pages)

Sample Delivery Group Number	Sample Number	Metals																													Anions									
		Aluminum	Antimony	Arsenic	Barium	Bismuth	Cadmium	Calcium	Chromium-total	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorous	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Vanadium	Zinc	Mercury	Cr-VI	Bromide	Chloride	Fluoride	Nitrate[a]	Nitrite[a]	Orthophosphate[a]	Sulfate	Nitrate/Nitrite	Cyanide	pH
K3297	J1D4N8	J	J																			J					UJ					J	J	J	J	UR	UR	UJ	J		J
	J1D4N9	J	J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	J1D4P0	J	J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	J1D4P1	J	J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	J1D4P2	J	J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	J1D4P3	J	J																			J					UJ					J	J	J	J	UR	UR	UJ	J		
	J1D4P4	J	J																			J					UJ					J	J	J	J	UR	UR	J	J		J
	J1D4P5	J	J																			J					UJ					J	J	J	J	UR	UR	UJ	J		
	J1D4P7	J	J																			J					UJ					J	J	J	J	UR	UR	UJ	J		J

[a] The data flags for nitrate, nitrite, and orthophosphate are primarily attributed to the hold time being exceeded as discussed in Section 2.1.

J = Due to a minor quality control deficiency identified during the data assessment, the associated concentration is an estimate. The data are considered usable for decision-making purposes.

UJ = The compound or analyte was analyzed for and detected in the sample. However, due to a minor quality control deficiency associated with method blank results, the associated results are labeled as estimated quantitation limits. The data are considered usable for decision-making purposes.

UR = Indicates that the constituent was analyzed for and not detected; however, due to an identified quality control issue, the data should be considered unusable for decision-making purposes.

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
Sample Authorization Form RC-172 (Soil)															
K2405	B26JW6	J													
K2472	B28JB9	J													
K2476	B28JB8	J												a	
	B28JC0	J												a	
	B28JC1	J												a	
	B28JC2	J													
	B28JC4	J													
	B28K76	J													
K2480	B28K84	J													
K2486	B26JW5	J													
	B28JC5	J													
K2513	B273H4	J													
	B273H5	J													
	B273H6	J													
	B273H7	J													
	B273H8	J													
	B28K74	J													
	B28K75	J													
	B28K79	J													
	B28K80	J													
	B28K81	J													
	B28MP7	J													
K2544	B28KP0	J													
	B28MR6	J													
K2546	B27TP4	J													
	B28KT7	J												a	
	B28MP6	J												a	
	B28MP8	J												a	
	B28MR0	J												a	
	B28MR1	J												a	
	B28MR2	J												a	
K2554	B28KN9	J													
	B28KP1	J													
	B28KP2	J													
	B28KP3	UJ													
	B28KP4	J													

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K2601	B27BW0	J													
	B27BW1	J												a	
	B27BW2	J												a	
	B27BW3	J												a	
	B27BW4	J												a	
	B27BW5	J												a	
	B27BW6	J												a	
	B28YP5	J												a	
K2656	B27BV9	J													
	B27RL7	J													
	B27RL8	J													
	B27RM0	J													
	B27RM1	J													
	B28KP5	J													
	B28KP6	J													
	B28YN2	J													
	B28YN3	J													
	B28YP6	J													
K2659	B28YN4	J													
	B28YN5	J													
	B28YP0	J													
K2664	B28YN6	J													
	B28YN7	J													
	B29CL6	J													
K2717	B29CJ9	J													
	B29CK3	J													
	B29CK8	J													
	B29CL2	J													
K2731	B29CM1	J													
	B29CM6	J													
	B29CN3	J													
K2767	B29CP7	J													
K2771	B29CP3	J													
	B29CR1	J													
	B29CR7	J													
	B29CT2	J													

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K2804	B29CV1	J													
	B29CV5	J													
	B29CW0	J													
	B29CW4	J													
	B29CW9	J													
K2992	B29PD1	J			J										
K3004	B29PB0	J													
	B29PC9	J													
K3034	B29PB1	J													
	B29PD2	J													
	B29PD4	J													
K3036	B29BW8	J													
	B29BY5	J													
	B29BY6	J												a	
	B29BY7	J												a	
	B29BY8	J												a	
	B29C07	J													
	B29C08	J												a	
	B29PD3	J												a	
	B29PD6	J													
K3155	B29J20	J													
	B29J22	J												a	
	B29J26	J												a	
K3199	B29J17	J													
	B29J18	J													
	B29J19	J													
K3212	B29PP4	J													
K3219	B29PN8	J													
	B29PN9	J													
	B29PP0	J													
	B29PP1	J													
	B29PP2	J													
	B29PP3	J													
	B29PP6	J													
	B29PP7	J													
	B29PP8	J													
	B29PR0	J													
	B29PR3	J													
	B29R35	J													

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K3232	B29PR1	J												J	J
	B29PR2	J												J	J
	B2B6M4	J												J	J
K3256	B29C96	J												a	
	B29CB8	J												a	
	B29CC2	J												a	
	B29CC7	J												a	
	B29CC8	J												a	
	B29CD4	J													
	B29CD5	J												a	
	B29M06	J												a	
K3291	B2C5R1	J													
	B2C5R2	J													
	B2C5R3	J												a	
	B2C5R4	J												a	
	B2C620	J													
	B2C621	J													
	B2C633	J													
K3308	B2C5R5	J													
	B2C5R6	J													
	B2C5R7	J													
	B2C5R8	J													
	B2C5R9	J													
	B2C5T0	J													
	B2C5Y2	J													
	B2C622	J													
	B2C623	J													
	B2C624	J													
	B2C628	J													
	B2C634	J													
Sample Authorization Form RC-179 (Soil)															
K2660	B28BP2	J	J												
K2805	B28BP3	J	J												
	B28BP6	J	J												
	B28BP7	J	J												
K2866	B28BP8	J	J												
	B28BP9	J	J												
	B28BR0	J	J												
K2871	B28BR1	J	J												

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K2974	B28BR2	J	J					a							
	B28BR3	J	J					a							
	B28BR4	J	J					a							
	B28BR5	J	J					a							
	B28BR6	J	J					a							
	B28BR7	J	J					a							
	B28BR8	J	J					a							
	B28BR9	J	J					a							
	B28BT0	J	J					a							
	B28BT1	J	J					a							
	B2B4H6	J	J												
K3722	B2H501	J													
K3728	B2H4J3	J													
	B2H4J4	J													
K3733	B2H4J9	J													
	B2H4K0	J													
	B2H4K1	J													
K3739	B2H4J5	J													
	B2H4J6	J													
	B2H4J7	J													
	B2H4J8	J													
	B2H4K3	J													
	B2H4K4	J													
	B2H4K5	J													
	B2H4K6	J													
	B2H4K7	J													
	B2H4K8	J													
	B2H4L4	J													
Sample Authorization Form RC-196 (Soil)															
K2238	B27669	J	J												
	B27670	J	J												
	B27671	J	J												
	B27672	J	J												
	B27673	J	J												
	B27F70	J	J												
K2276	B27674	J	J												
	B27675	J	J												

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K2306	B27676	J	J												
	B27677	J	J												
	B27678	J	J												
	B27679	J	J												
	B27680	J	J												
K2976	B28Y55	J	J												
K2978	B29MV4	J	J							J					
K2995	B28Y42	J	J										UJ		
	B28Y47	J	J												
	B28Y51	J	J												
	B28Y60	J	J												
	B28Y64	J	J										UJ		
	B28Y69	J	J												
	B28Y74	J	J												
	B28Y79	J	J												
K3095	B29NB3	J	J												
	B29NH6	J	J					a							
K3097	B28VC1	J	J												
	B29N89	J	J												
	B29N93	J	J												
	B29N99	J	J												
	B29NB6	J	J												
	B29NC1	J	J												
	B29NC5	J	J												
	B29NC8	J	J												
K3130	B28VB8	J	J												
	B28VB9	J	J												
	B28VC0	J	J												
	B28VC2	J	J												
	B28VC3	J	J												
	B28VC4	J	J												
	B28VC5	J	J												
	B28VC6	J	J												
	B28VC7	J	J												
	B29MJ3	J						a							
	B29MJ4	J						a							
	B29MJ5	J													
	B29MJ6	J						a							
	B29MJ7	J						a							
	B29MJ8	J						a							

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K3130	B29MJ9	J						[a]							
	B29MK4	J						[a]							
K3132	B29MK0	J													
	B29MK1	J													
	B29MK2	J													
Sample Authorization Form RC-197 (Soil)															
J00961	B298F0	J	J												
K2769	B29881	J	J												
K2806	B29878	J	J												
	B29880	J	J												
	B29882	J	J												
	B29898	J	J												
	B29899	J	J												
	B298B0	J	J												
K2865	B280K4	J	J												
	B29879	J	J												
	B298B1	J	J												
	B298B2	J	J												
	B298B3	J	J												
	B298B4	J	J												
	B298B5	J	J												
	B298B6	J	J												
	B298B7	J	J												
	B298B8	J	J												
	B298B9	J	J												
	B298C0	J	J												
K2872	B28170	J	J												
	B298C1	J	J												
	B298C7	J	J												
K2873	B28161	J	J												
	B28162	J	J												
	B28164	J	J												
	B28165	J	J												
	B28166	J	J												
	B28167	J	J												
	B28168	J	J												
	B28169	J	J												
	B28172	J	J												

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K2876	B28163	J	J												
	B28171	J	J												
	B28173	J	J												
	B28174	J	J												
	B28175	J	J												
K2880	B27YX3	J	J												
	B27YX4	J	J												
	B27YX5	J	J												
	B27YX8	J	J												
	B28029	J	J												
K2931	B27YX9	J	J												
	B27YY0	J	J												
	B27YY1	J	J												
	B27YY2	J	J												
K2977	B27YX6	J	J												
	B27YY3	J	J												
	B27YY4	J	J												
	B27YY5	J	J												
	B27YY6	J	J												
	B27YY7	J	J												
	B27YY8	J	J												
	B28026	J	J												
	B28027	J	J												
	B28028	J	J												
	B28030	J	J												
	B28031	J	J												
	B28032	J	J												
	B28033	J	J												
	B28034	J	J												
	B28035	J	J												
	B28036	J	J												
	B28037	J	J												
	B28038	J	J												
	B28039	J	J												
K3006	B298R6	J	J												

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K3037	B298R9	J	J												
	B29914	J	J												
	B29915	J	J												
	B29916	J	J												
	B29917	J	J												
	B29918	J	J												
	B29919	J	J												
	B29920	J	J												
	B29921	J	J												
	B29922	J	J												
	B29949	J	J												
K3039	B29923	J	J												
	B29924	J	J												
K3040	B29925	J	J												
	B29926	J	J												
	B29934	J	J												
K3090	B29927	J	J												
Sample Authorization Form RC-203 (Soil)															
K2691	J1CFL1	J													
	J1CFL2	J													
	J1CFL3	J													
	J1CFL4	J													
	J1CFN3	J	J												
	J1CFN4	J	J												
	J1CFN5	J	J												
	J1CFN6	J	J												
	J1CFN7	J	J												
	J1CFN8	J	J												
	J1CFN9	J	J												
K3100	J1CNT4	J	J												
	J1CNT5	J	J												
	J1CNT6	J	J												
	J1CNT7	J	J												
	J1CNT8	J	J												
	J1CNV0	J	J												
	J1CNV1	J	J												

Table 8. 100-D/H Review Qualifiers for Radionuclides. (10 Pages)

Sample Delivery Group Number	Sample Number	Tritium	Carbon-14	Nickel-63	Total Radiostrontium	Technetium-99	Isotopic Pu	Uranium-234	Uranium-235	Uranium-238	Americium-241	Isotopic Cm	Neptunium-237	Uranium Metal	GEA
K3119	J1CY51	J	J					J							
	J1CY52	J	J					J							
	J1CY53	J	J					J							
	J1CY54	J	J					J							
	J1CY55	J	J					J							
K3297	J1D4N8	J													
	J1D4N9	J													
	J1D4P0	J													
	J1D4P1	J													
	J1D4P2	J													
	J1D4P3	J													
	J1D4P4	J													
	J1D4P5	J													
	J1D4P7	J													

[a] This analyte was also detected in the equipment blank. Because the equipment blank consists of silica sand, which is known to contain the analyte in question, no flag is assigned to the sample's analytical result.

GEA = gamma energy analysis

J = Indicates that the constituent was analyzed for and detected. The associated value is estimated due to a quality control quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

UJ = The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation, the value reported may not accurately reflect the minimum detection limit. The data should be usable for decision-making purposes.

Table 9. 100-D/H Review Qualifiers for Total Petroleum Hydrocarbons and Polynuclear Aromatic Hydrocarbons.

Sample Delivery Group Number	Sample Number	TPH			Polynuclear Aromatic Hydrocarbons																
		Diesel Range Organics	Motor Oil	Kerosene	Acenapththene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo[b]fluoranthene	Benzo]k\fluoranthene	Benzo[a]pyrene	Benzo[g,h,i]perylene	Chrysene	Dibenz[a,h]anthracene	Fluoranthene	Fluorene	Indeno[1,2,3-cd]pyrene	Naphthalene	Phenanthrene	Pyrene
Sample Authorization Form RC-203 (Soil)																					
K2691	J1CFL1				J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	J1CFL2				J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	J1CFL4				J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	J1CFL5				J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J

J = Indicates that the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
TPH = total petroleum hydrocarbons

Table 10. 100-D/H Review Qualifiers for Polychlorinated Biphenyls and Pesticides. (2 Pages)

Sample Delivery Group Number	Sample Number	PCBs							Pesticides																					
		Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260	alpha-BHC	beta-BHC	delta-BHC	gamma-BHC	alpha-Chlordane	gamma-Chlordane	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	Dieldrin	Endosulfan I	Endosulfan II	Endrin	Endrin Aldehyde	Endrin ketone	Endosulfan Sulfate	Heptachlor	Heptachlor Epoxide	Methoxychlor	Toxaphene
Sample Authorization Form RC-179 (Soil)																														
K2707	B28BT9														J								J							
K2813	B28BV3										J			J		J		J	J			J								
	B28BW4										J			J		J		J	J			J								
K2834	B28BX3	J	J	J	J	J	J	J															J							
	B28BX6	J	J	J	J	J	J	J																						
K2842	B28BW7										J							J												
	B28BX0										J							J												
K2969	B28BX9																				J									
	B28BY2																				J									
	B28BY5																				J									
	B28BY8																				J									
	B2B4H5																				J									
K2986	B28C01	J	J	J	J	J	J	J															J							
	B28C04	J	J	J	J	J	J	J															J							
	B28C07	J	J	J	J	J	J	J															J							
	B28C10	J	J	J	J	J	J	J															J							
	B28C13	J	J	J	J	J	J	J															J							
	B28C16	J	J	J	J	J	J	J															J							

Table 10. 100-D/H Review Qualifiers for Polychlorinated Biphenyls and Pesticides. (2 Pages)

Sample Delivery Group Number	Sample Number	PCBs							Pesticides																				
		Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260	alpha-BHC	beta-BHC	delta-BHC	gamma-BHC	alpha-Chlordane	gamma-Chlordane	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	Dieldrin	Endosulfan I	Endosulfan II	Endrin	Endrin Aldehyde	Endrin ketone	Endosulfan Sulfate	Heptachlor	Heptachlor Epoxide	Methoxychlor	Toxaphene
Sample Authorization Form RC-197 (Soil)																													
K2825	B29858																J						J			J			
K2843	B29861								J			J		J				J	J	J		J				J	J		
	B29862								J			J		J				J	J	J		J				J	J		
	B29863								J			J		J				J	J	J		J				J	J		
	B29864								J		J	J		J				J	J	J		J				J	J		
K2859	B29867								J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	B29868								J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	B29869								J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	B29870								J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
K2894	B29871																	J					J						
	B29877																	J					J						
Sample Authorization Form RC-203 (Soil)																													
K2691	J1CFL1								J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	J1CFL2								J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	J1CFL4								J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
	J1CFL5								J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J

BHC = benzene hexachloride
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
J = Indicates that the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
PCB = polychlorinated biphenyl

Table 11. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part A. (5 Pages)

Sample Delivery Group Number	Sample Number	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2,4-Trichlorobenzene	2-Chloronaphthalene	2-Chlorophenol	2-Methylnaphthalene	2-Methylphenol	2-Nitrophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dinitrotoluene	3-Chloro-3-methylphenol	3-Nitroaniline	3,3'-Dichlorobenzidine	3- and/or 4-Methylphenol	4-Bromophenyl Phenyl Ether	4-Chloroaniline	4-Chlorophenyl Phenyl Ether	4-Chloro-3-methylphenol	4-Methylnaphthalene	4-Nitrophenol	4,6-Dinitro-2-methylphenol	Acenaphthalene	Acenaphthylene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene
Sampling Authorization Form RC-179 (Soil)																																	
K2707	B28BT9									J			J														J	J					
K2813	B28BV3				J			J		J	J	J													J		J						
	B28BW4				J			J		J	J	J													J		J						
K2823	B28BW1											J	J										J					J					
K2969	B28BX9												J																				
	B28BY2												J																				
	B28BY5												J																				
	B28BY8												J																				
	B2B4H5												J																				
K2986	B28C01												J												J								
	B28C04												J												J								
	B28C07												J												J								
	B28C10												J												J								
	B28C13												J												J								
	B28C16												J												J								
Sampling Authorization Form RC-197 (Soil)																																	
J00981	B298F2												J						J	J			J					J					
K2801	B29815																											J					

Table 11. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part A. (5 Pages)

Sample Delivery Group Number	Sample Number	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2,4-Trichlorobenzene	2-Chloronaphthalene	2-Chlorophenol	2-Methylnaphthalene	2-Methylphenol	2-Nitrophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dinitrotoluene	3-Chloro-3-methylphenol	3-Nitroaniline	3,3'-Dichlorobenzidine	3- and/or 4-Methylphenol	4-Bromophenyl Phenyl Ether	4-Chloroaniline	4-Chlorophenyl Phenyl Ether	4-Chloro-3-methylphenol	4-Methylnaphthalene	4-Nitrophenol	4,6-Dinitro-2-methylphenol	Acenaphthalene	Acenaphthylene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene
K2815	B29855														J	J																	
	B29856														J	J																	
	B29857														J	J																	
	B29859														J	J																	
	B29860														J	J																	
K2832	B29865												J															J					
	B29866												J															J					
	B29814												J															J					
K2843	B29861												J															J					
	B29862												J															J					
	B29863												J															J					
	B29864												J															J					
K2891	B280J3														J	J																	
	B280J4														J	J																	
	B280J5														J	J																	
	B280J6														J	J																	
	B280K6														J	J																	
K2893	B280H8																						J										
K2900	B280F0																											J					
	B280H9																											J					
	B280J1																											J					

Table 11. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part A. (5 Pages)

Sample Delivery Group Number	Sample Number	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2,4-Trichlorobenzene	2-Chloronaphthalene	2-Chlorophenol	2-Methylnaphthalene	2-Methylphenol	2-Nitrophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dinitrotoluene	3-Chloro-3-methylphenol	3-Nitroaniline	3,3'-Dichlorobenzidine	3- and/or 4-Methylphenol	4-Bromophenyl Phenyl Ether	4-Chloroaniline	4-Chlorophenyl Phenyl Ether	4-Chloro-3-methylphenol	4-Methylnaphthalene	4-Nitrophenol	4,6-Dinitro-2-methylphenol	Acenaphthalene	Acenaphthylene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene
K2908	B280J2			J		J		J		J		J		J		J	J					J		J				J	J	J	J	J	J
	B280J9			J		J		J		J		J		J		J	J					J		J				J	J	J	J	J	J
K2918	B280J0														J			J															
	B280J7														J			J															
	B280K0														J			J															
	B280K1														J			J															
	B280K2														J			J															
K2928	B27YV2	J	J	J	J	J	J	J	J	J	J	J									J												
	B27YV3	J	J	J	J	J	J	J	J	J	J	J									J												
	B27YV4	J	J	J	J	J	J	J	J	J	J	J									J												
	B27YV6	J	J	J	J	J	J	J	J	J	J	J									J												
	B27YT9	J	J	J	J	J	J	J	J	J	J	J									J												
K2970	B28047														J																		
	B28063														J																		
	B28066														J																		
	B28069														J																		
	B28072														J																		
	B28075														J																		
	B28078														J																		
	B28081														J																		
	B28084														J																		

Table 11. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part A. (5 Pages)

Sample Delivery Group Number	Sample Number	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2,4-Trichlorobenzene	2-Chloronaphthalene	2-Chlorophenol	2-Methylnaphthalene	2-Methylphenol	2-Nitrophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dinitrotoluene	3-Chloro-3-methylphenol	3-Nitroaniline	3,3'-Dichlorobenzidine	3- and/or 4-Methylphenol	4-Bromophenyl Phenyl Ether	4-Chloroaniline	4-Chlorophenyl Phenyl Ether	4-Chloro-3-methylphenol	4-Methylnaphthalene	4-Nitrophenol	4,6-Dinitro-2-methylphenol	Acenaphthalene	Acenaphthylene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene
Sample Authorization Form RC-203 (Soil)																																	
K2691	J1CFL1												J		J													J					
	J1CFL2												J		J													J					
	J1CFL4												J		J													J					
	J1CFN3																											J					
	J1CFN4																											J					
	J1CFN5																											J					
	J1CFN6																											J					
	J1CFN7																											J					
	J1CFN8																											J					
	J1CFN9												J															J					
	J1CXM1												J															J					
K3100	J1CNT4														J	J				J													
	J1CNT5														J	J				J													
	J1CNT6														J	J				J													
	J1CNT7														J	J				J													
	J1CNT8														J	J				J													
	J1CNV0														J	J				J													
	J1CNV1														J	J				J													

Table 11. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part A. (5 Pages)

Sample Delivery Group Number	Sample Number	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2,4-Trichlorobenzene	2-Chloronaphthalene	2-Chlorophenol	2-Methylnaphthalene	2-Methylphenol	2-Nitrophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dinitrotoluene	3-Chloro-3-methylphenol	3-Nitroaniline	3,3'-Dichlorobenzidine	3- and/or 4-Methylphenol	4-Bromophenyl Phenyl Ether	4-Chloroaniline	4-Chlorophenyl Phenyl Ether	4-Chloro-3-methylphenol	4-Methylnaphthalene	4-Nitrophenol	4,6-Dinitro-2-methylphenol	Acenaphthalene	Acenaphthylene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene
K3119	J1CY51	J	J	J																													
	J1CY52	J	J	J																													
	J1CY53	J	J	J																													
	J1CY54	J	J	J																													
	J1CY55	J	J	J																													

J = Indicates that the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

Table 12. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part B. (4 Pages)

Sample Delivery Group Number	Sample Number	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Bis(2-chloroethoxy)methane	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl)ether	Bis(2-ethylhexyl)phthalate	Butyl Benzyl Phthalate	Carbazole	Chrysene	Dibenz[a,h]anthracene	Dibenzofuran	Diethyl Phthalate	Dimethyl Phthalate	Di-n-butyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno[1,2,3-cd]pyrene	Isophorone	Naphthalene	Nitrobenzene	N-Nitrosodi-n-propylamine	N-Nitrosodiphenylamine	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	SVOA Holding Time Missed
Sample Authorization Form RC-179 (Soil)																																	
K2707	B28BT9													UJ															J				
K2813	B28BV3				J			J												J				J	J	J			J				
	B28BW4				J			J												J				J	J	J			J				
K2823	B28BW1																												J				
K2834	B28BX3																				J												
	B28BX6																				J												
K2986	B28C01			J																	J												
	B28C04			J																	J												
	B28C07			J																	J												
	B28C10			J																	J												
	B28C13			J																	J												
	B28C16			J																	J												
Sample Authorization Form RC-197 (Soil)																																	
K2801	B29815		J					J				J									J		J										
K2859	B29867		J																														
	B29868		J																														
	B29869		J																														
	B29870		J																														

Table 12. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part B. (4 Pages)

Sample Delivery Group Number	Sample Number	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Bis(2-chloroethoxy)methane	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl)ether	Bis(2-ethylhexyl)phthalate	Butyl Benzyl Phthalate	Carbazole	Chrysene	Dibenz[a,h]anthracene	Dibenzofuran	Diethyl Phthalate	Dimethyl Phthalate	Di-n-butyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno[1,2,3-cd]pyrene	Isophorone	Naphthalene	Nitrobenzene	N-Nitrosodi-n-propylamine	N-Nitrosodiphenylamine	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	SVOA Holding Time Missed
K2900	B280F0																				J												
	B280H9																				J												
	B280J1																				J												
K2908	B280J2	J	J	J						J	J	J	J	J	J	J		J	J	J	J	J	J	J	J	J	J	J		J		J	
	B280J9	J	J	J						J	J	J	J	J	J	J		J	J	J	J	J	J	J	J	J	J	J		J		J	
K2918	B280J0																J																
	B280J7																J																
	B280K0																J																
	B280K1																J																
	B280K2																J																
K2928	B27YV2				J	J	J													J		J		J	J	J	J				J		
	B27YV3				J	J	J													J		J		J	J	J	J				J		
	B27YV4				J	J	J													J		J		J	J	J	J				J		
	B27YV6				J	J	J													J		J		J	J	J	J				J		
	B27YT9				J	J	J													J		J		J	J	J	J				J		
K2951	B27YV5																				J												
	B27YV7																				J												
	B27YV8																				J												
	B27YV9																				J												
	B27YW0																				J												
	B27YW1																				J												

Table 12. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part B. (4 Pages)

Sample Delivery Group Number	Sample Number	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Bis(2-chloroethoxy)methane	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl)ether	Bis(2-ethylhexyl)phthalate	Butyl Benzyl Phthalate	Carbazole	Chrysene	Dibenz[a,h]anthracene	Dibenzofuran	Diethyl Phthalate	Dimethyl Phthalate	Di-n-butyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno[1,2,3-cd]pyrene	Isophorone	Naphthalene	Nitrobenzene	N-Nitrosodi-n-propylamine	N-Nitrosodiphenylamine	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	SVOA Holding Time Missed
K2951	B27YW2																				J												
	B27YW3																				J												
	B27YW4																				J												
	B27YW5																				J												
	B27YW6																				J												
Sample Authorization Form RC-203 (Soil)																																	
K2691	J1CFL1							UJ													J												J
	J1CFL2							UJ													J												J
	J1CFL3							UJ	J												J								J				
	J1CFL4							UJ													J												J
	J1CFN3							UJ	J												J												
	J1CFN4							J	J												J												
	J1CFN5							UJ	J												J												
	J1CFN6							UJ	J												J												
	J1CFN7							UJ	J												J												
	J1CFN8								J												J												
	J1CFN9							J									J				J												J
	J1CXM1							J									J				J												J

Table 12. 100-D/H Review Qualifiers for Semivolatile Organic Compounds – Part B. (4 Pages)

Sample Delivery Group Number	Sample Number	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Bis(2-chloroethoxy)methane	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl)ether	Bis(2-ethylhexyl)phthalate	Butyl Benzyl Phthalate	Carbazole	Chrysene	Dibenz[a,h]anthracene	Dibenzofuran	Diethyl Phthalate	Dimethyl Phthalate	Di-n-butyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno[1,2,3-cd]pyrene	Isophorone	Naphthalene	Nitrobenzene	N-Nitrosodi-n-propylamine	N-Nitrosodiphenylamine	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	SVOA Holding Time Missed
K3119	J1CY51					J	J													J	J	J											
	J1CY52					J	J													J	J	J											
	J1CY53					J	J													J	J	J											
	J1CY54					J	J													J	J	J											
	J1CY55					J	J													J	J	J											

J = Indicates that the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

SVOA = semivolatile organic analysis

UJ = The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation, the value reported may not accurately reflect the minimum detection limit. The data should be usable for decision-making purposes.

Table 13. 100-D/H Review Qualifiers for Volatile Organic Compounds. (8 Pages)

Sample Delivery Group Number	Sample Number	All VOCs	1,1,2,2-Tetrachloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	4-Methyl-2-Pentanone	Acetone	Methylene Chloride	Styrene	2-Butanone	2-Hexanone	Bromoform	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloromethane	Cis-1,3-Dichloropropene	Dibromochloromethane	Ethylbenzene	Toluene	Trans-1,2-Dichloropropene	Trans-1,3-Dichloropropene	Trichloroethene	Vinyl Chloride	Xylenes (total)
Sample Authorization Form RC-172 (Soil)																											
K2393	B27TL4							UJ							J												
K2504	B28JC3						UJ																				
	B28JD0						UJ																				
	B28JD1						UJ																				
	B28JD2						UJ																				
K2506	B28K97							UJ																			
K2519	B28KC6							UJ																			
K2520	B28JD5							UJ																			
K2521	B28D10						J																				
	B27TL6						J																				
	B27TL7						J																				
K2537	B28KB7										J																
K2538	B28MR8						UJ	UJ			UJ		UJ				UJ	UJ								UJ	
	B28MT0						UJ		UJ		UJ		UJ				UJ	UJ								UJ	
	B28MT2						UJ						UJ				UJ	UJ								UJ	
	B28MT3						UJ	UJ					UJ				UJ	UJ								UJ	
	B28MT4						UJ						UJ				UJ	UJ								UJ	
	B28MR7						J				UJ																
	B28MR9						J																				
K2539	B27TL9										UJ																
K2583	B28MT8			J																							
K2594	B27RJ0						J	UJ			UJ																
K2595	B28KP9			J										J													
	B28KR0			J										J													

Table 13. 100-D/H Review Qualifiers for Volatile Organic Compounds. (8 Pages)

Sample Delivery Group Number	Sample Number	All VOCs	1,1,2,2-Tetrachloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	4-Methyl-2-Pentanone	Acetone	Methylene Chloride	Styrene	2-Butanone	2-Hexanone	Bromoform	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloromethane	Cis-1,3-Dichloropropene	Dibromochloromethane	Ethylbenzene	Toluene	Trans-1,2-Dichloropropene	Trans-1,3-Dichloropropene	Trichloroethene	Vinyl Chloride	Xylenes (total)
K2641	B27RH9			J				UJ	J							J			J	J	J	J	J				J
	B27RV2			J				UJ	J							J			J	J	J	J	J				J
K2643	B28KR9	J	J		J		J		J							J	J		J	J	J	J					J
	B28KT0	J	J		J		J		J							J	J		J	J	J	J					J
K2701	B28YC9							UJ																			
	B28YD1							UJ																			
	B28YD2							UJ																			
	B28YP2							UJ																			
K2725	B29CL7							UJ																			
	B29CM5							UJ																			
	B29CN0							UJ																			
K2733	B29CK9							UJ																			
K2751	B29CM2							UJ																			
	B29CM7							UJ																			
	B29CN4							UJ																			
K2797	B29CP4							UJ																			
	B29CR8							UJ																			
K2807	B29CV6		J					UJ																	J		
	B29CW5		J					UJ																	J		
K3182	B29HX7							UJ																			
	B2B202							UJ																			
K3189	B29HX9							UJ																			
	B29HY4							UJ																			
K3201	B29HX4						UJ																				
	B29HX5						UJ																				

Table 13. 100-D/H Review Qualifiers for Volatile Organic Compounds. (8 Pages)

Sample Delivery Group Number	Sample Number	All VOCs	1,1,2,2-Tetrachloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	4-Methyl-2-Pentanone	Acetone	Methylene Chloride	Styrene	2-Butanone	2-Hexanone	Bromoform	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloromethane	Cis-1,3-Dichloropropene	Dibromochloromethane	Ethylbenzene	Toluene	Trans-1,2-Dichloropropene	Trans-1,3-Dichloropropene	Trichloroethene	Vinyl Chloride	Xylenes (total)
K3238	B2B8F9							J									UJ	UJ								UJ	
	B29PV5							J									UJ	UJ								UJ	
K3302	B2C629						UJ			UJ																	
	B2C635						UJ			UJ																	
	B2C636						UJ			UJ																	
	B2C5Y4						UJ			UJ																	
	B2C5T3						UJ			UJ																	
	B2C5T4						UJ			UJ																	
	B2C5T6						UJ			UJ																	
	B2C5Y3						UJ			UJ																	
K3324	B2C5T7						UJ																				
	B2C5T8						UJ																				
	B2C5T9						UJ																				
	B2C5V0						UJ																				
Sample Authorization Form RC-179 (Soil)																											
K2702	B28BT8							UJ																			
K2808	B28BV7							UJ																			
	B28BW2							UJ																			
K3724	B2H4P7					J	J	UJ																J			
	B2H4P8					J	J	UJ																J			
K3730	B2H4P5					J																		J			
	B2H4P6					J																		J			

Table 13. 100-D/H Review Qualifiers for Volatile Organic Compounds. (8 Pages)

Sample Delivery Group Number	Sample Number	All VOCs	1,1,2,2-Tetrachloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	4-Methyl-2-Pentanone	Acetone	Methylene Chloride	Styrene	2-Butanone	2-Hexanone	Bromoform	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloromethane	Cis-1,3-Dichloropropene	Dibromochloromethane	Ethylbenzene	Toluene	Trans-1,2-Dichloropropene	Trans-1,3-Dichloropropene	Trichloroethene	Vinyl Chloride	Xylenes (total)
Sample Authorization Form RC-196 (Soil)																											
K2259	B27686						UJ																				
K2266	B27656								UJ																		
K2325	B27663						J																				
	B27695						J																				
	B27696						J																				
	B27697						J																				
K2999	B28Y43							UJ																			
	B28Y48							UJ																			
	B28Y56							UJ																			
	B28Y65							UJ																			
	B28Y73							UJ																			
K3080	B29N97						J	J																			
K3104	B29NB4											UJ															
	B29NH8						UJ	UJ																			
K3114	B29NC3						UJ																				
	B29NC6						UJ																				
	B29ND0						UJ																				
K3115	B28VF2						UJ																				
K3122	B28VD8						UJ	UJ																			
	B2B4F7							UJ																			

Table 13. 100-D/H Review Qualifiers for Volatile Organic Compounds. (8 Pages)

Sample Delivery Group Number	Sample Number	All VOCs	1,1,2,2-Tetrachloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	4-Methyl-2-Pentanone	Acetone	Methylene Chloride	Styrene	2-Butanone	2-Hexanone	Bromoform	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloromethane	Cis-1,3-Dichloropropene	Dibromochloromethane	Ethylbenzene	Toluene	Trans-1,2-Dichloropropene	Trans-1,3-Dichloropropene	Trichloroethene	Vinyl Chloride	Xylenes (total)
K3146	B29ML0						UJ																				
	B29ML3						UJ																				
	B29ML6						UJ																				
	B29MM1						UJ																				
	B29MM2							UJ																			
	B29MM4							UJ																			
K3161	B29MM5		UJ					UJ																	UJ		
	B29MM6		UJ					UJ																	UJ		
	B29ML7		UJ					UJ																	UJ		
Sample Authorization Form RC-197 (Soil)																											
J00981	B298F1										J																
K2798	B297X7		J																						J		
	B297X9		J																						J		
K2846	B297Y9							UJ																			
K2882	B280B4						UJ	UJ																			
	B280C0						UJ	UJ																			
	B280C7						UJ	UJ																			
	B280C8						UJ	UJ																			
	B280K7						UJ	UJ																			
K2933	B27YP3						UJ	UJ																			

Table 13. 100-D/H Review Qualifiers for Volatile Organic Compounds. (8 Pages)

Sample Delivery Group Number	Sample Number	All VOCs	1,1,2,2-Tetrachloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	4-Methyl-2-Pentanone	Acetone	Methylene Chloride	Styrene	2-Butanone	2-Hexanone	Bromoform	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloromethane	Cis-1,3-Dichloropropene	Dibromochloromethane	Ethylbenzene	Toluene	Trans-1,2-Dichloropropene	Trans-1,3-Dichloropropene	Trichloroethene	Vinyl Chloride	Xylenes (total)
K2934	B28052						UJ																				
	B28054						UJ																				
	B28058						UJ																				
K3047	B298P8							UJ																			
	B298P9							UJ																			
	B298R4							UJ																			
	B298T1							UJ																			
	B298T2						UJ	UJ																			
	B298T3							UJ																			
K3059	B298R7							UJ																			
	B298T4							UJ																			
	B298T6							UJ																			
	B298T7							UJ																			
	B298T8							UJ																			
	B29946							UJ																			
K3067	B298T9							UJ																	UJ		
	B298V0							UJ																	UJ		
	B298V1							UJ																	UJ		
	B298V2							UJ																	UJ		
	B298W0						UJ	UJ					UJ														

Table 13. 100-D/H Review Qualifiers for Volatile Organic Compounds. (8 Pages)

Sample Delivery Group Number	Sample Number	All VOCs	1,1,2,2-Tetrachloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	4-Methyl-2-Pentanone	Acetone	Methylene Chloride	Styrene	2-Butanone	2-Hexanone	Bromoform	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloromethane	Cis-1,3-Dichloropropene	Dibromochloromethane	Ethylbenzene	Toluene	Trans-1,2-Dichloropropene	Trans-1,3-Dichloropropene	Trichloroethene	Vinyl Chloride	Xylenes (total)
Sampling Authorization Form RC-203 (Soil)																											
K2691	J1CFL1							UJ																			
	J1CFL2							UJ																			
	J1CFL3							UJ																			
	J1CFL4							UJ																			
	J1CFN3							UJ																			
	J1CFN4							UJ																			
	J1CFN5							UJ																			
	J1CFN6							UJ																			
	J1CFN7							UJ																			
	J1CFN8							UJ																			
	J1CFN9							UJ																			
	J1CFM0							UJ																			
	J1CXM1							UJ																			
	J1CFP0							UJ																			
K3100	J1CNT4							UJ																			
	J1CNT5						UJ																				
	J1CNT7						UJ	UJ																			
	J1CNT8						UJ																				
	J1CNV0						UJ	UJ																			
	J1CNT9						J	UJ	UJ																		

Table 13. 100-D/H Review Qualifiers for Volatile Organic Compounds. (8 Pages)

Sample Delivery Group Number	Sample Number	All VOCs	1,1,2,2-Tetrachloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	4-Methyl-2-Pentanone	Acetone	Methylene Chloride	Styrene	2-Butanone	2-Hexanone	Bromoform	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloromethane	Cis-1,3-Dichloropropene	Dibromochloromethane	Ethylbenzene	Toluene	Trans-1,2-Dichloropropene	Trans-1,3-Dichloropropene	Trichloroethene	Vinyl Chloride	Xylenes (total)
K3119	J1CY51						UJ	UJ																			
	J1CY52						UJ	J																			
	J1CY53							UJ																			
	J1CY54						UJ	UJ																			
	J1CY55						UJ	UJ																			
	J1CY56						J	UJ																			

J = Indicates that the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

UJ = The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation, the value reported may not accurately reflect the minimum detection limit. The data should be usable for decision-making purposes.

4.0 REFERENCES

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APPENDIX A

100-D AND 100-H REMEDIAL INVESTIGATION RELATIVE PERCENT DIFFERENCE CALCULATIONS

Acrobat 8.0

CALCULATION COVER SHEET

Project Title: 100-D and 100-H Remedial Investigation **Job No. 14655**

Area: 100-D and 100-H

Discipline: Environmental *Calculation No: 0100X-CA-V0056

Subject: 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Computer Program: Excel Program No: Excel 2007

The attached calculations have been generated for a specific purpose and task. Use of the calculations by persons who do not have access to all pertinent facts may lead to incorrect conclusions and/or results. Before applying these calculations to your work, the underlying basis, rationale, and other pertinent information relevant to these calculations must be thoroughly reviewed with appropriate Washington Closure Hanford LLC (WCH) officials or other authorized personnel. WCH is not responsible for the use of a calculation not under its direct control.

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Sheets = 41 Total = 42	P. L. Benjamin	H. M. Sulloway		J. M. Capron	9/19/11

SUMMARY OF REVISION

WCH-DE-019 (05/08/2007) *Obtain Calc. No. from Document Control and Form from Intranet

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB	**Date** 9/12/2011	**Calc. No.** 0100X-CA-V0056	**Rev. No.** 0
Project 100-D and 100-H Remedial Investigation	**Job No.** 14655	**Checked** H. M. Sulloway	**Date** 9/16/11
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculation			**Sheet No.** 1 of 41

Summary

PURPOSE:

Provide documentation to support the calculation of the relative percent difference (RPD) for primary-duplicate and primary-split sample pairs from 100-D and 100-H Area remedial investigation sample results, as necessary.

TABLE OF CONTENTS:

Sheets 1 to 4 – Summary
Sheet 5 - 100-D-4 Test Pit Samples
Sheet 6 - 100-D-12 Test Pit Samples
Sheet 7 - 116-H-2 Test Pit Samples
Sheet 8 - 1607-H4 Test Pit Samples
Sheet 9 - C7620 Interval 5 Soil Samples
Sheet 10 - C7623 Interval 6 Soil Samples
Sheet 11 - C7624 Interval 14 Soil Samples
Sheet 12 - C7625 Interval 7 Soil Samples
Sheet 13 - C7626 Interval 2 Soil Samples
Sheet 14 - C7628 Interval 5 Soil Samples
Sheet 15 - C7629 Interval 2 Soil Samples
Sheet 16 - C7630 Interval 2 Soil Samples
Sheet 17 - C7631 Interval 8 Soil Samples
Sheet 18 - C7639 Interval 5 Soil Samples
Sheet 19 - C7640 Interval 3 Soil Samples
Sheet 20 - C7850 Interval 9 Soil Samples
Sheet 21 - C7850 Interval 19 Groundwater Samples
Sheet 22 - C7851 Interval 10 Soil Samples
Sheet 23 - C7851 Interval 17 Groundwater Samples
Sheet 24 - C7852 Interval 7 Soil Samples
Sheet 25 - C7852 Interval 19 Groundwater Samples
Sheet 26 - C7855 Interval 12 Soil Samples
Sheet 27 - C7855 Interval 15 Soil Samples
Sheet 28 - C7855 Interval 24 Groundwater Samples
Sheet 29 - C7857 Interval 5 Soil Samples
Sheet 30 - C7857 Interval 23 Groundwater Samples
Sheet 31 - C7860 Interval 7 Soil Samples
Sheet 32 - C7860 Interval 16 Groundwater Samples
Sheet 33 - C7861 Interval 6 Soil Samples
Sheet 34 - C7861 Interval 13 Groundwater Samples
Sheet 35 - C7862 Interval 4 Soil Samples
Sheet 36 - C7862 Interval 18 Groundwater Samples
Sheet 37 - C7863 Interval 2 Soil Samples
Sheet 38 - C7863 Interval 15 Groundwater Samples
Sheet 39 - C7864 Interval 1 Soil Samples
Sheet 40 - C7864 Interval 15 Groundwater Samples
Sheet 41 - C7866 Interval 14 Soil Samples

GIVEN/REFERENCES:

1) DOE-RL, 2010, *Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, and 100-HR-2, and 100-HR-3 Operable Units Remedial Investigation/ Feasibility Study*, Rev. 0, DOE/RL-2009-40, Department of Energy, Richland Operations Office, Richland, Washington.

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB	**Date** 9/12/2011	**Calc. No.** 0100X-CA-V0056	**Rev. No.** 0
Project 100-D and 100-H Remedial Investigation	**Job No.** 14655	**Checked** H. M. Sullaway	**Date** 9/16/11
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculation			**Sheet No.** 2 of 41

Summary

SOLUTION:

1) Use data obtained from remedial investigation soil, aquifer sediment, and groundwater samples to perform the RPD calculations for primary-duplicate and primary-split sample pairs, as required.

METHODOLOGY:

The RPD is calculated when both the primary sample value and either the duplicate or split sample value for a given analyte are above detection limits and are greater than 5 times the target detection limit (TDL). The TDL is a laboratory detection limit pre-determined for each analytical method. The 100-D and 100-H SAP lists laboratory performance standards as estimated quantitation limits (EQLs) for soil/aquifer sediment samples from sampling targets in Tables 2-3 through 2-19 of the SAP (DOE-RL 2010) for selected constituents. Where TDL values lower than those listed in the SAP were available, the lower values were used.

Where direct evaluation of the attached sample data showed that a given analyte was not detected in the primary, duplicate, and/or split sample, further evaluation of the RPD value was not performed.

The RPD calculations use the following formula:

$$RPD = [\,|M-D|/((M+D)/2)]*100$$

where, M = main sample value D = duplicate (or split) sample value

When an analyte is detected in the primary or duplicate/split sample, but is quantified at less than 5 times the TDL in one or both samples, an additional parameter is evaluated. In this case, if the difference between the primary and duplicate/split results exceeds a control limit of 2 times the TDL, further assessment regarding the usability of the data is performed as part of the overall quality assessment.

For quality assurance/quality control (QA/QC) duplicate RPD calculations, a value less than 30% indicates the data compare favorably. If the RPD is greater than 30%, further investigation regarding the usability of the data is performed. Additional discussion is provided in the data quality assessment.

RESULTS:

The results presented in the tables that follow include the summary of the results of the RPD calculations and are for use in data quality assessment of the remedial investigation sampling.

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB **Date** 9/12/2011 **Calc. No.** 0100X-CA-V0056 **Rev. No.** 0
Project 100-D and 100-H Remedial Investigation **Job No.** 14655 **Checked** H. M Sulloway **Date** 9/15/11
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations **Sheet No.** 3 of 41

1 **Summary (continued)**
2
3 **Relative Percent Difference Results and**
4 **QA/QC Analysis**

5 Analyte	100-D-4, Test Pit	100-D-12, Test Pit	116-H-2, Test Pit	1607-H4, Test Pit	C7620, Soil, Interval 5	C7623, Soil, Interval 6	C7624, Soil, Interval 14	C7625, Soil, Interval 7	C7628, Soil, Interval 2	C7628, Soil, Interval 5	C7629, Soil, Interval 2	C7630, Soil, Interval 2	C7631, Soil, Interval 8	C7639, Soil, Interval 5	C7640, Soil, Interval 3	C7850, Soil, Interval 9	C7850, Groundwater, Interval 19	C7851, Soil, Interval 10	C7851, Groundwater, Interval 17
6	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis
7 Cesium-137	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8 Europium-152	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9 Potassium-40	9.0%	8.7%	11.6%	--	10.1%	67.3%	60.4%	10.3%	4.7%	14.1%	3.6%	18.7%	7.0%	9.8%	5.1%	5.0%	--	2.0%	--
10 Radium-226	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11 Aluminum	4.5%	20.2%	11.1%	--	14.2%	2.7%	0.4%	11.7%	11.5%	31.5%	0.4%	5.2%	30.8%	9.5%	11.2%	35.0%	--	0.0%	--
12 Arsenic	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13 Barium	2.8%	18.0%	36.3%	--	5.3%	3.4%	38.3%	5.5%	4.0%	12.6%	51.0%	17.8%	6.5%	24.0%	5.3%	18.9%	1.9%	1.2%	6.5%
14 Calcium	9.7%	19.2%	5.3%	--	7.9%	14.5%	5.8%	34.6%	7.8%	27.8%	1.1%	7.8%	4.9%	24.1%	2.1%	30.8%	0.1%	3.1%	4.2%
15 Chromium	9.7%	74.0%	3.2%	--	37.1%	36.8%	14.6%	12.2%	8.9%	198.4%	51.8%	61.1%	179.7%	60.7%	11.4%	56.6%	6.5%	8.3%	54.3%
16 Copper	2.4%	19.8%	1.7%	--	3.8%	0.7%	17.0%	1.3%	14.4%	101.3%	7.3%	13.8%	81.3%	81.6%	1.9%	21.9%	--	2.9%	--
17 Hexavalent chromium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18 Iron	5.7%	11.6%	5.0%	--	1.1%	11.1%	34.8%	9.2%	9.8%	45.6%	2.3%	5.7%	38.3%	23.7%	1.3%	7.6%	--	6.8%	--
19 Lead	--	--	42.0%	--	--	14.3%	--	14.1%	--	--	--	--	--	--	--	3.2%	--	10.7%	--
20 Magnesium	15.2%	23.0%	1.6%	--	5.6%	13.7%	30.2%	15.5%	3.2%	24.2%	1.9%	7.4%	47.8%	29.9%	7.3%	16.2%	0.0%	1.1%	5.7%
21 Manganese	7.2%	6.6%	2.7%	--	7.1%	2.4%	52.4%	9.3%	7.5%	57.7%	4.7%	1.2%	38.2%	22.1%	0.4%	3.9%	1.0%	4.0%	0.3%
22 Phosphorus	8.0%	34.4%	6.4%	--	2.5%	7.1%	--	12.5%	7.7%	3.0%	3.0%	12.9%	47.9%	--	2.1%	9.3%	--	3.4%	--
23 Silicon	15.1%	18.2%	17.8%	--	17.4%	13.9%	52.3%	17.0%	12.7%	62.0%	34.7%	4.3%	5.9%	56.0%	15.4%	71.7%	0.7%	1.3%	1.7%
24 Sodium	4.8%	7.2%	--	--	14.8%	12.6%	28.1%	23.4%	5.9%	--	20.9%	14.9%	--	28.6%	16.9%	57.4%	0.7%	4.5%	10.5%
25 Strontium	5.3%	4.4%	14.9%	--	7.3%	10.8%	79.7%	23.2%	21.6%	44.0%	12.8%	4.6%	65.2%	13.0%	16.2%	35.6%	0.3%	7.3%	3.3%
26 Vanadium	4.0%	6.1%	9.6%	--	6.2%	16.0%	28.4%	12.2%	19.5%	11.1%	2.1%	9.0%	20.2%	24.0%	6.5%	8.0%	--	6.6%	--
27 Zinc	6.0%	6.8%	7.1%	--	4.3%	5.8%	37.5%	2.2%	3.0%	0.3%	4.4%	11.0%	26.0%	13.7%	6.0%	6.8%	--	2.7%	--
28 Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29 Nitrate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30 Nitrogen in Nitrite and Nitrate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31 Sulfate	--	--	--	--	--	--	--	72.9%	--	--	--	--	--	--	--	--	--	--	--
32 Benzo(b)fluoranthene	--	--	--	185.4%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

33
34 -- = RPD Analysis not required

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB — Date 9/12/2011 — Calc. No. 0100X-CA-V0056 — Rev. No. 0
Project 100-D and 100-H Remedial Investigation — Job No. 14655 — Checked H. M Sullaway HMS — Date 9/15/11
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations — Sheet No. 4 of 41

1 Summary (continued)
2
3 Relative Percent Difference Results and
4 QA/QC Analysis

5 Analyte	C7852, Soil, Interval 7	C7852, Groundwater, Interval 19	C7855, Soil, Interval 12	C7855, Soil, Interval 16	C7855, Groundwater, Interval 24	C7857, Soil, Interval 5	C7857, Groundwater, Interval 23	C7860, Soil, Interval 7	C7860, Groundwater, Interval 16	C7861, Soil, Interval 6	C7861, Groundwater, Interval 13	C7862, Soil, Interval 4	C7862, Groundwater, Interval 16	C7863, Soil, Interval 2	C7863, Groundwater, Interval 15	C7864, Soil, Interval 1	C7864, Groundwater, Interval 15	C7866, Soil, Interval 14
6	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Split Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis	Duplicate Analysis
7 Cesium-137	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.4%	--	--
8 Europium-152	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.8%	--	--
9 Potassium-40	6.9%	--	24.2%	31.6%	--	31.4%	--	7.0%	--	32.7%	--	16.5%	--	8.6%	--	6.6%	--	14.8%
10 Radium-226	--	--	--	--	--	--	--	--	--	--	--	--	--	25.5%	--	--	--	--
11 Aluminum	7.7%	--	17.7%	5.1%	--	11.7%	--	8.3%	--	13.7%	--	19.3%	--	3.6%	--	3.6%	--	1.3%
12 Arsenic	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26.9%	--	--
13 Barium	1.6%	2.9%	17.5%	6.4%	0.9%	2.6%	1.9%	12.7%	--	48.6%	0.6%	27.6%	2.5%	2.3%	0.9%	8.5%	3.8%	22.2%
14 Calcium	3.5%	2.6%	0.8%	10.1%	0.3%	33.6%	2.8%	5.0%	1.2%	23.0%	0.3%	26.8%	1.1%	2.1%	0.8%	13.0%	6.2%	13.8%
15 Chromium	16.9%	4.3%	6.2%	0.9%	0.7%	14.3%	2.6%	15.8%	--	24.9%	--	44.6%	--	0.7%	3.5%	17.3%	--	20.5%
16 Copper	3.7%	--	2.7%	1.3%	--	22.5%	--	11.4%	--	34.0%	--	25.4%	--	8.5%	--	5.8%	--	0.0%
17 Hexavalent chromium	--	--	--	--	0.7%	--	1.3%	--	--	--	--	--	--	--	--	--	--	--
18 Iron	1.1%	--	8.5%	1.1%	--	24.3%	--	7.1%	--	18.8%	--	10.1%	--	4.6%	--	1.9%	--	7.7%
19 Lead	3.5%	--	2.4%	25.8%	--	--	--	--	--	25.8%	--	12.3%	--	2.4%	--	43.6%	--	--
20 Magnesium	4.9%	2.5%	8.8%	10.0%	0.5%	25.1%	3.0%	10.1%	3.4%	8.5%	0.9%	16.7%	2.1%	5.1%	1.1%	6.2%	4.5%	3.8%
21 Manganese	0.8%	1.6%	11.3%	0.4%	0.7%	6.7%	--	8.7%	2.0%	0.7%	--	8.9%	0.7%	0.7%	5.0%	0.8%	5.7%	7.2%
22 Phosphorus	2.6%	--	--	--	--	17.4%	--	6.3%	--	52.9%	--	4.1%	--	8.4%	--	4.4%	--	--
23 Silicon	30.2%	4.0%	31.2%	79.4%	0.6%	28.2%	2.3%	17.5%	3.7%	40.7%	2.6%	33.4%	0.0%	1.9%	2.7%	10.6%	6.6%	27.4%
24 Sodium	7.1%	2.2%	17.4%	34.3%	0.0%	19.1%	2.0%	12.3%	2.5%	18.7%	0.0%	--	0.5%	0.7%	0.5%	9.8%	3.7%	5.6%
25 Strontium	2.4%	2.8%	11.3%	35.9%	0.8%	6.2%	1.2%	23.1%	1.0%	17.9%	1.4%	10.9%	1.4%	4.4%	0.7%	3.2%	5.9%	7.7%
26 Vanadium	6.3%	--	17.4%	13.1%	--	1.7%	--	8.8%	--	20.2%	--	7.9%	--	2.6%	--	1.9%	--	8.5%
27 Zinc	2.2%	7.1%	5.5%	12.3%	--	23.7%	--	1.8%	--	6.8%	--	21.5%	--	4.7%	--	3.6%	--	2.3%
28 Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	16.5%	--	--	--	--
29 Nitrate	--	--	--	--	--	--	--	6.4%	--	--	--	--	--	--	--	--	--	--
30 Nitrogen in Nitrite and Nitrate	--	--	--	--	--	--	--	5.5%	--	--	--	--	--	--	--	--	--	--
31 Sulfate	--	--	--	--	--	--	--	9.6%	--	--	--	--	--	13.3%	--	--	--	--
32 Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

33
34 -- = RPD Analysis not required

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14855

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway

Rev. No. 0
Date 9/15/11
Sheet No. 5 of 41

1 **Duplicate Analysis - 100-D-4 Test Pit**

	Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Uranium-233/234			Uranium-238			Aluminum			Arsenic			Barium			Beryllium		
3				pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
4	100-D-4	J1CNT4	1/31/11	8.52		0.225	0.345		0.037	0.519		0.095	0.671		0.223	0.496		0.223	4360		3.70	1.61		0.74	58.3		0.37	0.176		0.15
5	100-D-4 DUP	J1CNV0	1/31/11	9.32		0.163	0.327		0.031	0.519		0.059	0.447		0.190	0.648		0.190	4170		3.53	1.42		0.71	57.9		0.35	0.196		0.14

6 **Analysis:**

7		TDL	0.5			0.1			0.2			1			1			5			1			0.5			0.2		
8	Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
9		Both >5xTDL?	Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)		
10		RPD	9.0%															4.5%						2.8%					
11		Difference > 2 TDL?	Not applicable			No - acceptable			No - acceptable			No - acceptable			No - acceptable			Not applicable			No - acceptable			Not applicable			No - acceptable		

12

	Sampling Area	HEIS Number	Sample Date	Bismuth			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead			Lithium		
14				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	100-D-4	J1CNT4	1/31/11	0.768	B	7.40	0.065	B	0.15	6360		74.0	4.10		0.15	7.68		1.48	12.2		0.74	27000		14.8	2.12		0.37	2.36		1.85
16	100-D-4 DUP	J1CNV0	1/31/11	1.11	B	7.07	0.073	B	0.14	6770		70.7	3.72		0.14	7.75		1.41	12.5		0.71	25500		14.1	2.43		0.35	2.37		1.77

17 **Analysis:**

18		TDL	10			0.2			100			0.2			2			1			5			0.5			2.5		
19	Duplicate Analysis	Both > PQL?	No-Stop (acceptable)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
20		Both >5xTDL?							Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)		
21		RPD							9.7%			9.7%						2.4%			5.7%								
22		Difference > 2 TDL?	No - acceptable			No - acceptable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable		

23

	Sampling Area	HEIS Number	Sample Date	Magnesium			Manganese			Molybdenum			Nickel			Phosphorus			Potassium			Silicon			Sodium			Strontium		
25				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	100-D-4	J1CNT4	1/31/11	4380		55.5	304		3.70	0.304	B	1.48	5.70		2.96	1320		37.0	537		296	460		1.48	513		37.0	23.2		0.74
27	100-D-4 DUP	J1CNV0	1/31/11	3760		53.0	283		3.53	0.312	B	1.41	5.71		2.83	1430		35.3	519		283	535		1.41	489		35.3	22.0		0.71

28 **Analysis:**

29		TDL	75			5			2			4			100			400			2			50			1		
30	Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
31		Both >5xTDL?	Yes (calc RPD)			Yes (calc RPD)						No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)			Yes (calc RPD)		
32		RPD	15.2%			7.2%									8.0%						15.1%			4.8%			5.3%		
33		Difference > 2 TDL?	Not applicable			Not applicable			No - acceptable			No - acceptable			Not applicable			No - acceptable			Not applicable			Not applicable			Not applicable		

34

	Sampling Area	Sample Number	Sample Date	Tin			Vanadium			Zinc			Methylene chloride			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
36				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
37	100-D-4	J1CNT4	1/31/11	1.42	B	7.40	74.0		1.85	45.5		7.40	2.44	J	6.30	6.6		5.1	1.85		0.51	5.5		5.1
38	100-D-4 DUP	J1CNV0	1/31/11	1.87	B	7.07	77.0		1.77	48.3		7.07	2.06	J	5.94	6.2		5.0	1.58		0.50	6.2		5.0

39 **Analysis:**

40		TDL	10			2.5			1			5			2.5			0.75			5		
41	Duplicate Analysis	Both > PQL?	No-Stop (acceptable)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)		
42		Both >5xTDL?				Yes (calc RPD)			Yes (calc RPD)						No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)		
43		RPD				4.0%			6.0%															
44		Difference > 2 TDL?	No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable			No - acceptable			No - acceptable		

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sullaway HMS

Rev. No. 0
Date 9/15/11
Sheet No. 6 of 41

1 **Duplicate Analysis - 100-D-12 Test Pit**

	Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Uranium-233/234			Uranium-238			Aluminum			Arsenic			Barium		
3				pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
4	100-D-12	J1D4N8	4/6/11	10.0		0.613	0.301		0.126	0.566		0.242	0.468		0.296	0.312		0.298	4710		5.21	1.96		1.04	55.6		0.52
5	100-D-12 DUP	J1D4P7	4/6/11	9.17		0.509	0.472		0.146	0.580		0.300	0.395		0.252	0.263		0.252	5770		4.77	1.49		0.95	66.6		0.48

6 **Analysis:**

7		TDL	0.5			0.1			0.2			1			1			5			1			0.5		
8	Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
9		Both >5xTDL?	Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)		
10		RPD	8.7%															20.2%						18.0%		
11		Difference > 2 TDL?	Not applicable			No - acceptable			No - acceptable			No - acceptable			No - acceptable			Not applicable			No - acceptable			Not applicable		

	Sampling Area	HEIS Number	Sample Date	Beryllium			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead		
14				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	100-D-12	J1D4N8	4/6/11	0.200	B	0.21	0.067	B	0.21	6510		104	5.06		0.21	8.49		2.08	13.2		1.04	25600		20.8	2.54		0.52
16	100-D-12 DUP	J1D4P7	4/6/11	0.183	B	0.19	0.067	B	0.19	5370		95.3	11.0		0.19	8.45		1.91	16.1		0.95	22800		19.1	2.29		0.48

17 **Analysis:**

18		TDL	0.2			0.2			100			0.2			2			1			5			0.5		
19	Duplicate Analysis	Both > PQL?	No-Stop (acceptable)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
20		Both >5xTDL?							Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)		
21		RPD							19.2%			74.0%						19.6%			11.6%					
22		Difference > 2 TDL?	No - acceptable			No - acceptable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable		

	Sampling Area	HEIS Number	Sample Date	Lithium			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus			Potassium			Silicon		
25				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	100-D-12	J1D4N8	4/6/11	4.53		2.60	4300		78.1	328		5.21	0.371	B	2.08	7.87		4.17	1220		52.1	695		417	816		2.08
27	100-D-12 DUP	J1D4P7	4/6/11	7.08		2.38	5420		71.5	307		4.77	0.251	B	1.91	9.39		3.81	862		47.7	1490		381	680		1.91

28 **Analysis:**

29		TDL	2.5			75			5			2			4			100			400			2		
30	Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
31		Both >5xTDL?	No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)						No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)		
32		RPD				23.0%			8.6%									34.4%						18.2%		
33		Difference > 2 TDL?	No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable			Not applicable			No - acceptable			Not applicable		

	Sampling Area	Sample Number	Sample Date	Sodium			Strontium			Tin			Vanadium			Zinc			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
36				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
37	100-D-12	J1D4N8	4/6/11	373		52.1	23.3		1.04	1.86	B	10.4	65.8		2.60	43.8		10.4	1.6	B	5.2	0.22	B	0.52	3.3	B	5.2
38	100-D-12 DUP	J1D4P7	4/6/11	347		47.7	22.3		0.95	1.60	B	9.53	62.0		2.38	40.9		9.53	2.0	B	5.2	0.28	B	0.52	3.7	B	5.2

39 **Analysis:**

40		TDL	50			1			10			2.5			1			2.5			0.75			5		
41	Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)		
42		Both >5xTDL?	Yes (calc RPD)			Yes (calc RPD)						Yes (calc RPD)			Yes (calc RPD)											
43		RPD	7.2%			4.4%						6.1%			8.8%											
44		Difference > 2 TDL?	Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable			No - acceptable		

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14665

Calc. No. 0100X-CA-V0056
Checked H. M. Sullaway

Rev. No. 0
Date 9/15/11
Sheet No. # of 41

1 **Duplicate Analysis - 116-H-2 Test Pit**

	Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Uranium-233/234			Uranium-238			Aluminum			Arsenic			Barium			Beryllium		
3				pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
4	116-H-2	J1CFN6	11/20/10	13.7		0.578	0.450		0.101	0.423		0.281	0.523		0.211	0.661		0.211	5110		3.32	3.02		0.66	37.4		0.33	0.205		0.13
5	116-H-2 DUP	J1CFN8	11/20/10	12.2		0.534	0.398		0.136	0.714		0.259	0.413		0.243	0.444		0.243	5710		4.19	4.05		0.84	54.0		0.42	0.228		0.17

6 **Analysis:**

7	TDL			0.5			0.1			0.2			1			1			5			1			0.5			0.2		
8	Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
9		Both >5xTDL?		Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)		
10		RPD		11.6%															11.1%						36.3%					
11		Difference > 2 TDL?		Not applicable			No - acceptable			No - acceptable			No - acceptable			No - acceptable			Not applicable			No - acceptable			Not applicable			No - acceptable		

12

	Sampling Area	HEIS Number	Sample Date	Boron			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead			Lithium		
14				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	116-H-2	J1CFN6	11/20/10	0.890	B	1.33	0.068	B	0.13	6100		66.4	9.29		0.13	4.73		1.33	11.7		0.66	13600		13.3	6.15		0.33	6.03		1.66
16	116-H-2 DUP	J1CFN8	11/20/10	2.62		1.67	0.096	B	0.17	6430		83.7	9.59		0.17	4.85		1.67	11.6		0.84	14300		16.7	9.42		0.42	7.29		2.09

17 **Analysis:**

18	TDL			2			0.2			100			0.2			2			1			5			0.5			2.5		
19	Duplicate Analysis	Both > PQL?		No-Stop (acceptable)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
20		Both >5xTDL?								Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)		
21		RPD								5.3%			3.2%						1.7%			5.0%			42.0%					
22		Difference > 2 TDL?		No - acceptable			No - acceptable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable			Not applicable			No - acceptable		

23

	Sampling Area	HEIS Number	Sample Date	Magnesium			Manganese			Molybdenum			Nickel			Phosphorus			Potassium			Silicon			Sodium			Strontium		
25				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	116-H-2	J1CFN6	11/20/10	3770		49.8	226		3.32	0.266	B	1.33	8.94		2.66	545		33.2	779		266	487		1.33	201		33.2	27.4		0.66
27	116-H-2 DUP	J1CFN8	11/20/10	3830		62.8	220		4.19	0.272	B	1.67	8.98		3.35	581		41.9	845		335	582		1.67	258		41.9	31.8		0.84

28 **Analysis:**

29	TDL			75			5			2			4			100			400			2			50			1		
30	Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
31		Both >5xTDL?		Yes (calc RPD)			Yes (calc RPD)						No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)		
32		RPD		1.6%			2.7%									6.4%						17.8%						14.9%		
33		Difference > 2 TDL?		Not applicable			Not applicable			No - acceptable			No - acceptable			Not applicable			No - acceptable			Not applicable			No - acceptable			Not applicable		

34

	Sampling Area	Sample Number	Sample Date	Tin			Vanadium			Zinc			Methylene chloride			Fluoride			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
36				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
37	116-H-2	J1CFN6	11/20/10	2.26	B	6.64	36.6		1.66	30.0		6.64	2.89	BJ	7.05	0.7	B	2.4	8.7		2.4	2.45		0.48	5.5		2.4
38	116-H-2 DUP	J1CFN8	11/20/10	2.54	B	8.37	40.3		2.09	32.2		8.37	1.65	BJ	4.34	0.9	B	2.4	8.7		2.4	2.70		0.47	5.4		2.4

39 **Analysis:**

40	TDL			10			2.5			1			5			5			2.5			0.75			5					
41	Duplicate Analysis	Both > PQL?		No-Stop (acceptable)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)					
42		Both >5xTDL?					Yes (calc RPD)			Yes (calc RPD)									No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)					
43		RPD					9.6%			7.1%																				
44		Difference > 2 TDL?		No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable			No - acceptable			No - acceptable			No - acceptable					

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

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Sheet No. 8 of 41

1 **Duplicate Analysis - 1607-H4 Test Pit**

2 Sampling Area	Sample Number	Sample Date	Acenaphthene			Anthracene			Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b) fluoranthene			Benzo(ghi) perylene			Benzo(k) fluoranthene		
3			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
4 1607-H4	J1CFL2	11/19/10	35.9		3.27	17.7		3.27	61.7		3.27	62.3		3.27	79.8		3.27	53.6		3.27	33.4		3.27
5 1607-H4 DUP	J1CFL5	11/19/10	2630	D	32.8	754	D	32.8	2090	D	32.8	2120	D	32.8	2100	D	32.8	1780	D	32.8	1140	D	32.8

6 **Analysis:**

7	TDL	100	50	15	15	15	30	15
8 Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
10	RPD					*185.4%*		
11	Difference > 2 TDL?	Yes - assess further	Yes - assess further	Yes - assess further	Yes - assess further	Not applicable	Yes - assess further	Yes - assess further

12

13 Sampling Area	HEIS Number	Sample Date	Chrysene			Dibenz[a,h] anthracene			Fluoranthene			Fluorene			Indeno(1,2,3-cd) pyrene			Phenanthrene			Pyrene		
14			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
15 1607-H4	J1CFL2	11/19/10	28.7		3.27	12.7		3.27	134		3.27	3.11	J	3.27	35.6		3.27	37.4		3.27	179		3.27
16 1607-H4 DUP	J1CFL5	11/19/10	1640	D	32.8	241	D	32.8	4370	D	32.8	234	D	32.8	1280	D	32.8	2880	D	32.8	4310	D	32.8

17 **Analysis:**

18	TDL	100	30	50	30	30	50	50
19 Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
20	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)		No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
21	RPD							
22	Difference > 2 TDL?	Yes - assess further	Yes - assess further	Yes - assess further	Yes - assess further	Yes - assess further	Yes - assess further	Yes - assess further

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

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Sheet No. 5 of 41

1 **Duplicate Analysis - C7620 Interval 5 Soil Samples**

	Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Total Uranium (chemical) ug/g	Q	MDA
4	C7620; I-005	B27BW1	11/16/10	9.06		0.34	0.394		0.057	0.652		0.134	1.33		0.112
5	C7620; I-005 DUP	B27BW2	11/16/10	8.19		0.78	0.494		0.136	0.701		0.243	1.40		0.112

6 **Analysis:**

7	TDL	0.5	0.1	0.2	1
8	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
10	Duplicate Analysis: RPD	10.1%			
11	Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable

12

	Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL	Iron mg/kg	Q	PQL
15	C7620; I-005	B27BY7	11/16/10	4300		4.30	2.11		0.86	67.6		0.43	0.192		0.17	5200		85.9	3.25		0.17	7.96		1.72	12.9		0.86	27400		17.2
16	C7620; I-005 DUP	B27BY8	11/16/10	5060		4.86	1.81		0.97	64.1		0.49	0.187	B	0.19	5630		97.2	4.73		0.19	8.14		1.94	13.4		0.97	27100		19.4

17 **Analysis:**

18	TDL	5	1	0.5	0.2	100	0.2	2	1	5
19	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
20	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
21	Duplicate Analysis: RPD	14.2%		5.3%		7.9%	37.1%		3.6%	1.1%
22	Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

23

	Sampling Area	HEIS Number	Sample Date	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL
26	C7620; I-005	B27BY7	11/16/10	1.89		0.43	2.65		2.15	3660		64.4	316		4.30	0.514	B	1.72	5.22		3.44	1170		43.0	514		344	194		1.72
27	C7620; I-005 DUP	B27BY8	11/16/10	2.20		0.49	3.41		2.43	3870		72.9	339		4.86	0.662	B	1.94	6.16		3.89	1200		48.6	524		389	231		1.94

28 **Analysis:**

29	TDL	0.5	2.5	75	5	2	4	100	400	2
30	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
31	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
32	Duplicate Analysis: RPD			5.6%	7.0%			2.5%		17.4%
33	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable

34

	Sampling Area	Sample Number	Sample Date	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Fluoride mg/kg	Q	PQL	Nitrate mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL
37	C7620; I-005	B27BY7	11/16/10	444		43.0	22.5		0.86	2.51	B	8.59	78.4		2.15	45.6		8.59	4.8		2.6	0.4	B	2.6	1.8	B	2.6	0.74		0.51
38	C7620; I-005 DUP	B27BY8	11/16/10	515		48.6	24.2		0.97	2.51	B	9.72	83.4		2.43	47.6		9.72	5.8		2.6	0.4	B	2.6	2.1	B	2.6	0.86		0.52

39 **Analysis:**

40	TDL	50	1	10	2.5	1	2	5	2.5	0.75
41	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
42	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)			No-Stop (acceptable)
43	Duplicate Analysis: RPD	14.6%	7.3%		6.2%	4.3%				
44	Duplicate Analysis: Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

45

	Sampling Area	Sample Number	Sample Date	Sulfate mg/kg	Q	PQL
48	C7620; I-005	B27BY7	11/16/10	14.0		2.6
49	C7620; I-005 DUP	B27BY8	11/16/10	15.4		2.6

50 **Analysis:**

51	TDL	5
52	Duplicate Analysis: Both > PQL?	Yes (continue)
53	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)
54	Duplicate Analysis: RPD	
55	Duplicate Analysis: Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford
Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14855

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway

Rev. No. 0
Date 9/15/11
Sheet No. 10 of 41

1 **Duplicate Analysis - C7623 Interval 6 Soil Samples**

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Total Uranium (chemical) ug/g	Q	MDA
C7623; I-006	B28YN3	11/29/10	9.71		0.899	0.306		0.155	0.641		0.311	1.13		0.103
C7623; I-006 DUP	B28YP6	11/29/10	4.82		0.564	0.383		0.142	0.575		0.278	1.09		0.103

Analysis:

TDL		0.5	0.1	0.2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	67.3%			
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL
C7623; I-006	B28YH3	11/29/10	5400		4.20	1.57		0.84	120		0.42	0.179		0.17	0.514	B	1.68	0.096	B	0.17	3710		84.1	19.0		0.17	5.95		1.68	14.6		0.84
C7623; I-006 DUP	B28YP4	11/29/10	5550		3.48	1.42		0.70	118		0.35	0.167		0.14	0.431	B	1.39	0.087	B	0.14	4290		69.6	13.1		0.14	6.19		1.39	14.5		0.70

Analysis:

TDL		5	1	0.5	0.2	2	0.2	100	0.2	2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)			Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	2.7%		3.4%				14.5%	36.8%		0.7%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

Sampling Area	HEIS Number	Sample Date	Hexavalent chromium mg/kg	Q	PQL	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL
C7623; I-006	B28YH3	11/29/10	0.85		0.52	17800		16.8	2.93		0.42	5.46		2.10	3060		63.1	249		4.20	0.323	B	1.68	13.6		3.36	545		42.0	842		336
C7623, I-006 DUP	B28YP4	11/29/10	0.66		0.52	19900		13.9	2.54		0.35	5.36		1.74	3610		62.2	255		3.48	0.284	B	1.39	10.9		2.79	585		34.8	611		279

Analysis:

TDL		0.5	5	0.5	2.5	75	5	2	4	100	400
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)
	RPD		11.1%	14.3%		13.7%	2.4%			7.1%	
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable

Sampling Area	Sample Number	Sample Date	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Fluoride mg/kg	Q	PQL	Nitrate mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
C7623; I-006	B28YH3	11/29/10	517		1.68	573		42.0	27.4		0.84	2.78	B	8.41	62.8		2.10	31.8		8.41	7.2		2.5	0.5	B	2.5	5.8		2.5	1.63		0.50	15.2		2.5
C7623; I-006 DUP	B28YP4	11/29/10	594		1.39	650		34.8	24.8		0.70	3.33	B	6.96	62.0		1.74	33.7		6.96	8.2		2.6	0.8	B	2.6	4.7		2.6	1.49		0.52	24.1		2.6

Analysis:

TDL		2	50	1	10	2.5	1	2	5	2.5	0.75	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)		No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	13.9%	12.6%	10.8%		16.0%	5.8%					
	Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Methylene chloride ug/kg	Q	PQL
C7623; I-006	B28YD1	11/29/10	3.38	BJ	5.12
C7623; I-006 DUP	B28YP2	11/29/10	4.37	BJ	5.59

Analysis:

TDL		5
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)
	Both >5xTDL?	
	RPD	
	Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sullaway HMS

Rev. No. 0
Date 09/15/11
Sheet No. 11 of 41

Duplicate Analysis - C7624 Interval 14 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Total beta radiostrontium pCi/g	Q	MDA	Total Uranium (chemical) ug/g	Q	MDA
C7624; I-014	B29PD6	1/21/11	9.33		0.700	0.337		0.120	0.496		0.193	0.906		0.244	1.34		0.107
C7624; I-014 DUP	B29PD3	1/21/11	17.4		0.392	0.624		0.154	1.06		0.292	0.326		0.252	1.08		0.107

Analysis:

TDL		0.5	0.1	0.2	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	60.4%				
	Difference > 2 TDL?	Not applicable	Yes - assess further	Yes - assess further	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Antimony mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL
C7624; I-014	B29PH1	1/21/11	6700		4.92	0.372	B	0.59	1.18		0.99	70.3		0.49	0.179	B	0.20	4500		98.5	12.1		0.20	4.59		1.97
C7624; I-014 DUP	B29PF1	1/21/11	6730		3.80	0.371	B	0.46	0.846		0.76	47.7		0.38	0.148	B	0.15	4770		75.9	14.0		0.15	3.26		1.52

Analysis:

TDL		5	0.6	1	0.5	0.2	100	0.2	2
Duplicate Analysis	Both > PQL?	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)		No-Stop (acceptable)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	0.4%			38.3%		5.8%	14.6%	
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Copper mg/kg	Q	PQL	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL
C7624; I-014	B29PH1	1/21/11	9.84		0.99	13400		19.7	1.83		0.49	4.68		2.46	2550		73.9	183		4.92	0.454	B	1.97	8.27		3.94
C7624; I-014 DUP	B29PF1	1/21/11	8.30		0.76	9430		15.2	1.29		0.38	3.01		1.90	1880		56.9	107		3.80	0.732	B	1.52	8.75		3.04

Analysis:

TDL		1	5	0.5	2.5	75	5	2	4
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)
	RPD	17.0%	34.8%			30.2%	52.4%		
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL	Selenium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL
C7624; I-014	B29PH1	1/21/11	425		49.2	619		394	0.475		0.30	875		1.97	791		49.2	26.5		0.99	1.45	B	9.85	40.6		2.46	26.8		9.85
C7624; I-014 DUP	B29PF1	1/21/11	428		38.0	458		304	0.468		0.23	512		1.52	1050		38.0	81.8		0.76	1.26	B	7.59	30.5		1.90	18.2		7.59

Analysis:

TDL		100	400	1	2	50	1	10	2.5	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)
	RPD				52.3%	28.1%	79.7%		28.4%	37.5%
	Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

CALCULATION SHEET

Washington Closure Hanford
Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sullaway

Rev. No. 0
Date 9/15/11
Sheet No. 12 of 41

1 **Duplicate Analysis - C7625 Interval 7 Soil Samples**

	Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Tritium			Total Uranium (chemical)		
3				pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	ug/g	Q	MDA
4	C7625; I-007	B29R35	2/28/11	10.8		0.614	0.511		0.122	0.732		0.304	18.6		3.13	1.22		0.132
5	C7625; I-007 DUP	B29PP6	2/28/11	9.74		0.751	0.426		0.121	0.625		0.282	18.0		3.22	1.16		0.132

6 **Analysis:**

7	TDL	0.5	0.1	0.2	10	1
8	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
10	Duplicate Analysis: RPD	10.3%				
11	Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

12

	Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium			Cobalt		
13																														
14				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	C7625; I-007	B29R34	2/28/11	5930		4.20	2.56		0.84	80.9		0.42	0.177		0.17	0.571	B	1.68	0.134	B	0.17	37500		83.9	16.2		0.17	6.99		1.68
16	C7625; I-007 DUP	B29PT6	2/28/11	6670		5.34	2.94		1.07	85.5		0.53	0.148	B	0.21	0.608	B	2.14	0.183	B	0.21	53200		107	18.3		0.21	6.50		2.14

17 **Analysis:**

18	TDL	5	1	0.5	0.2	2	0.2	100	0.2	2
19	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
20	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)				Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
21	Duplicate Analysis: RPD	11.7%		5.5%				34.6%	12.2%	
22	Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable

23

	Sampling Area	HEIS Number	Sample Date	Copper			Iron			Lead			Lithium			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus		
24																														
25				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	C7625; I-007	B29R34	2/28/11	15.6		0.84	20500		16.8	2.96		0.42	7.51		2.10	4520		63.0	380		4.20	0.785	B	1.68	13.9		3.36	780		42.0
27	C7625; I-007 DUP	B29PT6	2/28/11	15.8		1.07	18700		21.4	3.41		0.53	9.89		2.67	5280		80.1	417		5.34	0.544	B	2.14	16.0		4.27	688		53.4

28 **Analysis:**

29	TDL	1	5	0.5	2.5	75	5	2	4	100
30	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
31	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	Yes (calc RPD)
32	Duplicate Analysis: RPD	1.3%	9.2%	14.1%		15.5%	9.3%			12.5%
33	Duplicate Analysis: Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable

34

	Sampling Area	Sample Number	Sample Date	Potassium			Silicon			Sodium			Strontium			Tin			Vanadium			Zinc			Chloride			Nitrate		
35																														
36				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
37	C7625; I-007	B29R34	2/28/11	969		336	467		1.68	363		42.0	43.0		0.84	1.00	B	8.39	59.3		2.10	37.0		8.39	2.1	B	5.4	7.0		5.4
38	C7625; I-007 DUP	B29PT6	2/28/11	1070		427	554		2.14	287		53.4	54.3		1.07	1.14	B	10.7	52.5		2.67	36.2		10.7	4.1	B	5.2	7.6		5.2

39 **Analysis:**

40	TDL	400	2	50	1	10	2.5	1	2	2.5
41	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
42	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)
43	Duplicate Analysis: RPD		17.0%	23.4%	23.2%		12.2%	2.2%		
44	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

45

	Sampling Area	Sample Number	Sample Date	Nitrogen in Nitrite and Nitrate			Sulfate		
46									
47				mg/kg	Q	PQL	mg/kg	Q	PQL
48	C7625; I-007	B29R34	2/28/11	1.31		0.54	28.7		5.4
49	C7625; I-007 DUP	B29PT6	2/28/11	1.50		0.52	61.8		5.2

50 **Analysis:**

51	TDL	0.75	5
52	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)
53	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)
54	Duplicate Analysis: RPD		72.9%
55	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
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Checked H. M. Sullaway

Rev. No. 0
Date 9/15/11
Sheet No. 13 of 41

Duplicate Analysis - C7626 Interval 2 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Total Uranium (chemical) ug/g	Q	MDA
C7626; I-002	B28JC0	11/1/10	12.5		0.330	0.372		0.069	0.690		0.146	0.937		0.122
C7626; I-002 DUP	B28JC1	11/1/10	13.1		0.206	0.403		0.041	0.480		0.086	1.07		0.122

Analysis:

	TDL	0.5	0.1	0.2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	4.7%			
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL	Iron mg/kg	Q	PQL
C7626; I-002	B28JH3	11/1/10	4360		4.56	0.911	B	0.91	48.5		0.46	0.142	B	0.18	2840		91.2	9.14		0.18	4.23		1.82	9.52		0.91	13600		18.2
C7626; I-002 DUP	B28JH4	11/1/10	4880		4.23	1.14		0.85	50.5		0.42	0.155	B	0.17	3070		84.6	8.36		0.17	5.07		1.69	11.0		0.85	15000		16.9

Analysis:

	TDL	5	1	0.5	0.2	100	0.2	2	1	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	11.5%		4.0%		7.8%	8.9%		14.4%	9.8%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

Sampling Area	HEIS Number	Sample Date	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL
C7626; I-002	B28JH3	11/1/10	3.10		0.48	7.63		2.28	3430		68.4	277		4.56	0.267	B	1.82	7.67		3.65	521		45.6	1070		365	598		1.82
C7626; I-002 DUP	B28JH4	11/1/10	1.97		0.42	6.86		2.12	3540		83.5	257		4.23	0.317	B	1.69	7.53		3.39	563		42.3	933		339	679		1.69

Analysis:

	TDL	0.5	2.5	75	5	2	4	100	400	2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD			3.2%	7.5%			7.7%		12.7%
	Difference > 2 TDL?	Yes - assess further	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable

Sampling Area	Sample Number	Sample Date	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Fluoride mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
C7626; I-002	B28JH3	11/1/10	359		45.6	16.1		0.91	3.19	B	9.12	33.8		2.28	29.6		9.12	1.5	B	2.4	0.6	B	2.4	0.48		0.47	10.2		2.4
C7626; I-002 DUP	B28JH4	11/1/10	381		42.3	20.0		0.85	3.40	B	8.46	41.1		2.12	30.5		8.46	1.1	B	2.3	0.4	B	2.3	0.16	B	0.46	8.2		2.3

Analysis:

	TDL	50	1	10	2.5	1	2	5	0.75	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)				No-Stop (acceptable)
	RPD	5.9%	21.6%		19.5%	3.0%				
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford
Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

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Job No. 14655

Calc. No. 0100X-CA-V0058
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Date 9/15/11
Sheet No. 14 of 41

1 **Duplicate Analysis - C7628 Interval 5 Soil Samples**

2 Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Total Uranium (chemical) ug/g	Q	MDA
4 C7628; I-005	B28K80	11/4/10	14.4		0.828	0.413		0.146	0.690		0.371	1.15		0.122
5 C7628; I-005 DUP	B28K74	11/4/10	12.5		0.608	0.310		0.114	0.444		0.212	0.559		0.122

6 **Analysis:**

7					
	TDL	0.5	0.1	0.2	1
8 Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
10	RPD	14.1%			
11	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable

12

13 Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL	Iron mg/kg	Q	PQL
15 C7628; I-005	B28KB6	11/4/10	4340		4.14	44.7		0.41	0.14	B	0.17	1.04	B	1.66	2940		82.8	2900		0.17	18.1		1.66	45.2		0.83	24500		16.6
16 C7628; I-005 DUP	B28K90	11/4/10	5960		3.71	50.7		0.37	0.18		0.15	1.00	B	1.48	3890		74.2	12.0		0.15	5.40		1.48	14.8		0.74	15400		14.8

17 **Analysis:**

18								
	TDL	5	0.5	0.2	2	100	0.2	2	1	5
19 Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
20	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)			Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
21	RPD	31.5%	12.6%			27.8%	198.4%		101.3%	45.6%
22	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	Yes - assess further	Not applicable	Not applicable

23

24 Sampling Area	HEIS Number	Sample Date	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL
26 C7628; I-005	B28KB6	11/4/10	2.56		0.41	5.62		2.07	3450		62.1	480		4.14	43.6		1.66	1390		3.31	574		41.4	698		331	414		1.66
27 C7628; I-005 DUP	B28K90	11/4/10	2.21		0.37	5.80		1.85	4400		55.6	266		3.71	0.889	B	1.48	10.3		2.97	557		37.1	616		297	218		1.48

28 **Analysis:**

29								
	TDL	0.5	2.5	75	5	2	4	100	400	2
30 Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
31	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
32	RPD			24.2%	57.7%			3.0%		62.0%
33	Difference > 2 TDL?	No - acceptable	No - acceptable	Not applicable	Not applicable	Yes - assess further	Yes - assess further	Not applicable	No - acceptable	Not applicable

34

35 Sampling Area	Sample Number	Sample Date	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Nitrate mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
37 C7628; I-005	B28KB6	11/4/10	230		41.4	15.8		0.83	2.53	B	8.28	50.5		2.07	29.6		8.28	1.5	B	2.4	1.1	B	2.4	0.33	B	0.47	13.1		2.4
38 C7628; I-005 DUP	B28K90	11/4/10	266		37.1	24.7		0.74	2.72	B	7.42	45.2		1.85	29.5		7.42	1.5	B	2.4	1.1	B	2.4	0.36	B	0.48	11.6		2.4

39 **Analysis:**

40								
	TDL	50	1	10	2.5	1	2	2.5	0.75	5
41 Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
42	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)				No-Stop (acceptable)
43	RPD		44.0%		11.1%	0.3%				
44	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

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Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sullaway

Rev. No. 0
Date 9/15/11
Sheet No. 15 of 41

1 **Duplicate Analysis - C7629 Interval 2 Soil Samples**

	Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Total Uranium (chemical) ug/g	Q	MDA
4	C7629; I-002	B273H4	11/4/10	11.2		0.464	0.367		0.086	0.571		0.146	0.995		0.122
5	C7629; I-002 DUP	B273H5	11/4/10	10.8		0.684	0.410		0.134	0.485		0.260	1.08		0.122

6 **Analysis:**

		Potassium-40	Radium-228	Radium-226	Total Uranium
7	TDL	0.5	0.1	0.2	1
8	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
10	Duplicate Analysis: RPD	3.6%			
11	Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable

12

13	Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL
15	C7629; I-002	B28588	11/4/10	5440		5.15	1.24		1.03	27.0		0.52	0.140	B	0.21	0.571	B	2.06	0.070	B	0.21	5260		103	14.7		0.21	5.07		2.06
16	C7629; I-002 DUP	B28589	11/4/10	5460		5.14	1.32		1.03	45.5		0.51	0.157	B	0.21	0.613	B	2.06	0.072	B	0.21	5310		103	8.85		0.21	4.64		2.06

17 **Analysis:**

		Aluminum	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt
18	TDL	5	1	0.5	0.2	2	0.2	100	0.2	2
19	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
20	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)				Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
21	Duplicate Analysis: RPD	0.4%		57.0%				1.1%	51.8%	
22	Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable

23

24	Sampling Area	HEIS Number	Sample Date	Copper mg/kg	Q	PQL	Hexavalent chromium mg/kg	Q	PQL	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL
26	C7629; I-002	B28588	11/4/10	12.7		1.03	0.95		0.51	13400		20.6	1.94		0.52	5.59		2.57	3600		77.2	216		5.15	1.21	B	2.06	10.4		4.12
27	C7629; I-002 DUP	B28589	11/4/10	11.8		1.03	0.53		0.51	13100		20.6	2.13		0.51	6.18		2.57	3670		77.1	206		5.14	0.545	B	2.06	7.57		4.11

28 **Analysis:**

		Copper	Hexavalent chromium	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel
29	TDL	1	0.5	5	0.5	2.5	75	5	2	4
30	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
31	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)
32	Duplicate Analysis: RPD	7.3%		2.3%			1.9%	4.7%		
33	Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

34

35	Sampling Area	Sample Number	Sample Date	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
37	C7629; I-002	B28588	11/4/10	524		51.5	562		412	269		2.06	491		51.5	24.2		1.03	38.2		2.57	26.7		10.3	0.7	B	2.5	0.35	B	0.51	6.7		2.5
38	C7629; I-002 DUP	B28589	11/4/10	540		51.4	843		411	382		2.06	396		51.4	27.5		1.03	39.0		2.57	27.9		10.3	0.6	B	2.4	0.49		0.48	9.0		2.4

39 **Analysis:**

		Phosphorus	Potassium	Silicon	Sodium	Strontium	Vanadium	Zinc	Chloride	Nitrogen in Nitrite and Nitrate	Sulfate
40	TDL	100	400	2	50	1	2.5	1	2	0.75	5
41	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
42	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)			No-Stop (acceptable)
43	Duplicate Analysis: RPD	3.0%		34.7%	20.9%	12.8%	2.1%	4.4%			
44	Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford
Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

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Rev. No. 0
Date 9/15/11
Sheet No. 18 of 41

1 **Duplicate Analysis - C7630 Interval 2 Soil Samples**

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Total Uranium (chemical) ug/g	Q	MDA
C7630; I-002	B28KP1	1/11/10	9.45		0.625	0.320		0.125	0.493		0.259	1.50		0.116
C7630; I-002 DUP	B28KP2	1/11/10	11.4		0.413	0.406		0.093	0.470		0.214	1.37		0.116

Analysis:

	TDL	0.5	0.1	0.2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	18.7%			
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL
C7630; I-002	B28KV6	1/11/10	4520		3.95	3.62		0.79	40.4		0.40	0.141	B	0.16	0.476	B	1.58	4920		79.1	7.29		0.16	5.74		1.58	12.7		0.79
C7630; I-002 DUP	B28KV7	1/11/10	4760		3.53	2.04		0.71	33.8		0.35	0.146		0.14	0.453	B	1.41	5320		70.8	13.7		0.14	6.35		1.41	14.6		0.71

Analysis:

	TDL	5	1	0.5	0.2	2	100	0.2	2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)			Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	5.2%		17.8%			7.8%	61.1%		13.9%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

Sampling Area	HEIS Number	Sample Date	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Mercury mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL
C7630; I-002	B28KV6	1/11/10	16800		15.8	1.74		0.40	3.95		1.98	4050		59.3	260		3.95	0.013	B	0.03	0.345	B	1.58	7.41		3.16	744		39.5
C7630; I-002 DUP	B28KV7	1/11/10	19900		14.1	1.75		0.35	3.56		1.76	3780		52.9	257		3.53	0.010	B	0.03	1.33	B	1.41	8.26		2.82	847		35.3

Analysis:

	TDL	5	0.5	2.5	75	5	0.2	2	4	100
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)			No-Stop (acceptable)	Yes (calc RPD)
	RPD	5.7%			7.4%	1.2%				12.9%
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable

Sampling Area	Sample Number	Sample Date	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Fluoride mg/kg	Q	PQL
C7630; I-002	B28KV6	1/11/10	543		316	453		1.58	299		39.5	23.6		0.79	2.22	B	7.91	51.7		1.98	31.0		7.91	0.8	B	2.4	0.6	B	2.4
C7630; I-002 DUP	B28KV7	1/11/10	480		282	434		1.41	347		35.3	24.7		0.71	2.05	B	7.06	58.6		1.76	34.6		7.06	0.7	B	2.7	0.3	B	2.7

Analysis:

	TDL	400	2	50	1	10	2.5	1	2	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)		
	RPD		4.3%	14.9%	4.6%		9.0%	11.0%		
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
C7630; I-002	B28KV6	1/11/10	0.30	B	0.48	9.5		2.4
C7630; I-002 DUP	B28KV7	1/11/10	0.27	B	0.55	13.4		2.7

Analysis:

	TDL	0.75	5
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?		No-Stop (acceptable)
	RPD		
	Difference > 2 TDL?	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford
Originator P. L. Benjamin
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14656

Calc. No. 0100X-CA-V0056
Checked H. M. Sullowey

Rev. No. 0
Date 7/15/11
Sheet No. 17 of 41

1 Duplicate Analysis - C7631 Interval 6 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Total Uranium (chemical) ug/g	Q	MDA
C7631; I-008	B29J26	2/16/11	14.8		1.23	0.405		0.214	1.18		0.128
C7631; I-008 DUP	B29J22	2/16/11	13.8		0.744	0.589		0.198	1.30		0.128

6 Analysis:

	TDL	0.6	0.1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	7.0%		
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL
C7631; I-008	B29J15	2/16/11	5580		4.28	2.11		0.86	84.6		0.43	0.233		0.17	0.077	B	0.17	3380		85.6	6.14		0.17	5.39		1.71	13.2		0.86
C7631; I-008 DUP	B29J01	2/16/11	4090		4.57	2.24		0.92	79.3		0.46	0.184		0.18	0.064	B	0.18	3550		91.5	115		0.18	5.42		1.83	31.3		0.92

17 Analysis:

	TDL	5	1	0.5	0.2	0.2	100	0.2	2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	30.8%		6.8%			4.9%	179.7%		81.3%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

Sampling Area	HEIS Number	Sample Date	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL
C7631; I-008	B29J15	2/16/11	17100		17.1	2.44		0.43	6.02		2.14	3450		64.2	252		4.28	0.41	B	1.71	7.77		3.43	558		42.8	531		343
C7631; I-008 DUP	B29J01	2/16/11	25200		18.3	2.47		0.46	4.10		2.29	2120		68.6	371		4.57	23.0		1.83	17.1		3.66	909		45.7	446		366

28 Analysis:

	TDL	5	0.5	2.5	75	5	2	4	100	400
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	38.3%			47.8%	38.2%			47.9%	
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	Yes - assess further	Yes - assess further	Not applicable	No - acceptable

Sampling Area	Sample Number	Sample Date	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
C7631; I-008	B29J15	2/16/11	463		1.71	221		42.8	30.9		0.86	2.01	B	8.56	47.4		2.1	31.7		8.56	1.6	B	5.6	19.8		5.6
C7631; I-008 DUP	B29J01	2/16/11	491		1.83	198		45.7	15.7		0.92	3.06	B	9.15	38.7		2.3	24.4		9.15	2.0	B	5.6	5.8		5.6

39 Analysis:

	TDL	2	50	1	10	2.5	1	2	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)
	RPD	5.9%		65.2%		20.2%	26.0%		
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	Yes - assess further

Sampling Area	Sample Number	Sample Date	Acetone ug/kg	Q	PQL	Methylene chloride ug/kg	Q	PQL
C7631; I-008	B29HY4	2/16/11	5.46	J	10.2	2.06	J	5.12
C7631; I-008 DUP	B29HX9	2/16/11	5.46	J	10.7	1.96	J	5.33

50 Analysis:

	TDL	20	5
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	No-Stop (acceptable)
	Both >5xTDL?		
	RPD		
	Difference > 2 TDL?	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056r
Checked H. M. Sulloway HMS

Rev. No. 0
Date 9/15/11
Sheet No. 18 of 41

1 **Duplicate Analysis - C7639 Interval 5 Soil Samples**

	Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Total beta radiostrontium			Total Uranium (chemical)		
3				pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	ug/g	Q	MDA
4	C7639; I-005	B29BY7	1/20/11	10.8		0.927	0.405		0.207	0.555		0.478	3.98		0.241	0.801		0.107
5	C7639; I-005 DUP	B29C06	1/20/11	9.79		0.827	0.444		0.116	0.567		0.277	0.324		0.227	0.783		0.107

6 **Analysis:**

7	TDL	0.5	0.1	0.2	1	1
8	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
10	RPD	9.8%				
11	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	Yes - assess further	No - acceptable

12

	Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Bismuth			Boron			Cadmium			Calcium			Chromium		
14				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	C7639; I-005	B29BY0	1/20/11	5120		3.32	1.53		0.66	60.9		0.33	0.125	B	0.13	0.403	B	6.63	0.793	B	1.33	0.056	B	0.13	3210		66.3	20.1		0.13
16	C7639; I-005 DUP	B29C06	1/20/11	5630		4.01	1.64		0.80	77.5		0.40	0.165		0.16	0.598	B	8.01	1.23	B	1.60	0.064	B	0.16	4090		80.1	37.6		0.16

17 **Analysis:**

18	TDL	5	1	0.5	0.2	10	2	0.2	100	0.2
19	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
20	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)					Yes (calc RPD)	Yes (calc RPD)
21	RPD	9.5%		24.0%					24.1%	60.7%
22	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable

23

	Sampling Area	HEIS Number	Sample Date	Cobalt			Copper			Hexavalent chromium			Iron			Lead			Lithium			Magnesium			Manganese			Molybdenum		
25				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	C7639; I-005	B29BY0	1/20/11	4.76		1.33	11.1		0.66	0.45	B	0.50	14900		13.3	2.39		0.33	6.61		1.66	3020		49.8	221		3.32	1.55		1.33
27	C7639; I-005 DUP	B29C06	1/20/11	6.39		1.60	26.4		0.80	0.41	B	0.50	18900		16.0	2.51		0.40	7.54		2.00	4080		60.1	276		4.01	2.23		1.60

28 **Analysis:**

29	TDL	2	1	0.5	5	0.5	2.5	75	5	2
30	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
31	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)		Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
32	RPD		81.6%		23.7%			29.9%	22.1%	
33	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable

34

	Sampling Area	Sample Number	Sample Date	Nickel			Phosphorus			Potassium			Silicon			Sodium			Strontium			Tin			Vanadium			Zinc		
36				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
37	C7639; I-005	B29BY0	1/20/11	12.8		2.65	483		33.2	766		265	485		1.33	405		33.2	18.0		0.66	1.25	B	6.63	41.1		1.7	31.9		6.63
38	C7639; I-005 DUP	B29C06	1/20/11	27.6		3.21	612		40.1	799		321	862		1.60	540		40.1	20.5		0.80	1.62	B	8.01	52.3		2.0	36.6		8.01

39 **Analysis:**

40	TDL	4	100	400	2	50	1	10	2.5	1
41	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
42	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)
43	RPD				56.0%	28.6%	13.0%		24.0%	13.7%
44	Difference > 2 TDL?	Yes - assess further	No - acceptable	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100-CA-V0056
Checked H. M. Sulloway HMS

Rev. No. 0
Date 9/15/11
Sheet No. 19 of 41

1 **Duplicate Analysis - C7640 Interval 3 Soil Samples**

	Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Total Uranium (chemical)		
3				pCi/g	Q	MDA	pCi/g	Q	MDA	ug/g	Q	MDA
4	C7640; I-003	B29C96	3/14/11	12.1		0.467	0.431		0.105	1.09		0.119
5	C7640; I-003 DUP	B29CD5	3/14/11	11.5		0.748	0.355		0.101	0.95		0.119

6 **Analysis:**

7		TDL	0.5	0.1	1
8	Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)
9		Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
10		RPD	5.1%		
11		Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable

12

	Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium			Cobalt		
14				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	C7640; I-003	B29C95	3/14/11	4910		4.02	1.54		0.80	53.6		0.40	0.179		0.16	0.433	B	1.61	0.069	B	0.16	4420		80.4	10.8		0.16	5.33		1.61
16	C7640; I-003 DUP	B29CD3	3/14/11	5490		3.84	1.43		0.77	56.5		0.38	0.165		0.15	0.428	B	1.54	0.056	B	0.15	4330		76.9	12.1		0.15	5.15		1.54

17 **Analysis:**

18		TDL	5			1			0.5			0.2			2			0.2			100			0.2			2		
19	Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)		
20		Both >5xTDL?	Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)									Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)		
21		RPD	11.2%						5.3%												2.1%			11.4%					
22		Difference > 2 TDL?	Not applicable			No - acceptable			Not applicable			No - acceptable			No - acceptable			No - acceptable			Not applicable			Not applicable			No - acceptable		

23

	Sampling Area	HEIS Number	Sample Date	Copper			Iron			Lead			Lithium			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus		
25				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	C7640; I-003	B29C95	3/14/11	10.6		0.80	16000		16.1	1.89		0.40	5.83		2.01	3540		60.3	223		4.02	0.257	B	1.61	10.6		3.21	507		40.2
27	C7640; I-003 DUP	B29CD3	3/14/11	10.8		0.77	15800		15.4	1.90		0.38	6.76		1.92	3810		57.7	224		3.84	0.231	B	1.54	9.28		3.08	518		38.4

28 **Analysis:**

29		TDL	1			5			0.5			2.5			75			5			2			4			100		
30	Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)		
31		Both >5xTDL?	Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)						No-Stop (acceptable)			Yes (calc RPD)		
32		RPD	1.9%			1.3%									7.3%			0.4%									2.1%		
33		Difference > 2 TDL?	Not applicable			Not applicable			No - acceptable			No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable			Not applicable		

34

	Sampling Area	Sample Number	Sample Date	Potassium			Silicon			Sodium			Strontium			Tin			Vanadium			Zinc		
36				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
37	C7640; I-003	B29C95	3/14/11	858		321	353		1.61	277		40.2	21.5		0.80	1.03	B	8.04	44.4		2.01	32.7		8.04
38	C7640; I-003 DUP	B29CD3	3/14/11	792		306	412		1.54	328		38.4	25.3		0.77	1.49	B	7.69	41.6		1.92	30.8		7.69

39 **Analysis:**

40		TDL	400			2			50			1			10			2.5			1		
41	Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)		
42		Both >5xTDL?	No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)			Yes (calc RPD)						Yes (calc RPD)			Yes (calc RPD)		
43		RPD				15.4%			16.9%			16.2%						6.5%			6.0%		
44		Difference > 2 TDL?	No - acceptable			Not applicable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable		

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14855

Calc. No. 0100-CA-V0056
Checked H. M. Sulloway

Rev. No. 0
Date 9/15/11
Sheet No. 26 of 41

1 Duplicate Analysis - C7850 Interval 9 Soil Samples

2	Sampling	Sample	Sample	Carbon-14			Potassium-40			Radium-226			Radium-228			Total beta radiostrontium			Uranium-233/234			Uranium-238		
3	Area	Number	Date	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
4	C7850; I-009	B27YY3	1/6/11	4.25		3.58	9.76		0.749	0.419		0.185	0.516		0.301	0.314		0.293	0.430		0.219	0.430		0.219
5	C7850; I-009 DUP	B27YX8	1/6/11	4.68		3.83	9.28		0.075	0.353		0.066	0.433		0.192	0.386		0.243	0.421		0.215	0.477		0.215
6	Analysis:																							
7	TDL			1			0.5			0.1			0.2			1			1			1		
8	Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
9		Both >5xTDL?		No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)		
10		RPD		5.0%																				
11		Difference > 2 TDL?		No - acceptable			Not applicable			No - acceptable			No - acceptable			No - acceptable			No - acceptable			No - acceptable		
12																								

13	Sampling	HEIS	Sample	Aluminum			Arsenic			Barium			Beryllium			Bismuth			Cadmium			Calcium			Chromium			Cobalt		
14	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	C7850; I-009	B27YW1	1/6/11	5190		3.37	1.68		0.67	73.4		0.34	0.246		0.14	1.18	B	6.73	0.122	B	0.14	4340		67.3	17.6		0.14	6.54		1.35
16	C7850; I-009 DUP	B27YV5	1/6/11	7390		3.83	1.74		0.77	88.7		0.38	0.293		0.15	1.70	B	7.67	0.134	B	0.15	5920		76.7	9.84		0.15	7.12		1.53
17	Analysis:																													
18	TDL			5			1			0.5			0.2			10			0.2			100			0.2			2		
19	Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)		
20		Both >5xTDL?		Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)									Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)		
21		RPD		35.0%						18.9%												30.8%			56.6%					
22		Difference > 2 TDL?		Not applicable			No - acceptable			Not applicable			No - acceptable			No - acceptable			No - acceptable			Not applicable			Not applicable			No - acceptable		
23																														

24	Sampling	HEIS	Sample	Copper			Hexavalent chromium			Iron			Lead			Lithium			Magnesium			Manganese			Molybdenum			Nickel		
25	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	C7850; I-009	B27YW1	1/6/11	12.6		0.67	0.29	B	0.53	21500		13.5	3.06		0.34	4.79		1.66	3910		50.5	278		3.37	6.68		1.35	6.43		2.69
27	C7850; I-009 DUP	B27YV5	1/6/11	15.7		0.77	0.29	B	0.53	23200		15.3	3.16		0.38	5.44		1.92	4600		57.5	289		3.83	0.883	B	1.53	7.57		3.07
28	Analysis:																													
29	TDL			1			0.5			5			0.5			2.5			75			5			2			4		
30	Duplicate Analysis	Both > PQL?		Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)		
31		Both >5xTDL?		Yes (calc RPD)						Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)						No-Stop (acceptable)		
32		RPD		21.9%						7.6%			3.2%						16.2%			3.9%								
33		Difference > 2 TDL?		Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable			Yes - assess further			No - acceptable		
34																														

35	Sampling	Sample	Sample	Phosphorus			Potassium			Silicon			Sodium			Strontium			Tin			Vanadium			Zinc		
36	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
37	C7850; I-009	B27YW1	1/6/11	678		33.7	786		269	424		1.35	360		33.7	20.8		0.67	3.51	B	6.73	56.3		1.68	39.9		6.73
38	C7850; I-009 DUP	B27YV5	1/6/11	964		38.3	950		307	896		1.53	650		38.3	29.8		0.77	4.04	B	7.67	61.0		1.92	42.7		7.67
39	Analysis:																										
40	TDL			100			400			2			50			1			10			2.5			1		
41	Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)		
42		Both >5xTDL?		Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)			Yes (calc RPD)						Yes (calc RPD)			Yes (calc RPD)		
43		RPD		9.3%						71.7%			57.4%			35.6%						8.0%			6.8%		
44		Difference > 2 TDL?		Not applicable			No - acceptable			Not applicable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable		
45																											

46	Sampling	Sample	Sample	Acetone		
47	Area	Number	Date	ug/kg	Q	PQL
48	C7850; I-009	B27YN9	1/6/11	4.57	J	11.1
49	C7850; I-009 DUP	B27YN2	1/6/11	5.90	J	14.7
50	Analysis:					
51	TDL			20		
52	Duplicate Analysis	Both > PQL?		No-Stop (acceptable)		
53		Both >5xTDL?				
54		RPD				
55		Difference > 2 TDL?		No - acceptable		

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway HMS

Rev. No. 0
Date 9/15/11
Sheet No. 21 of 41

1 **Duplicate Analysis - C7850 Interval 19 Groundwater Samples**

2	Sampling Area	Sample Number	Sample Date	Aluminum			Barium			Boron			Calcium			Chromium			Cobalt		
3				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
4	C7850; I-019	B28013	1/7/11	52.2		50	78.4		2	19.2		10	76400		100	33.5		2	0.642	B	2
5	C7850; I-019 DUP	B28014	1/7/11	35.9	B	50	79.9		2	20.0		10	78300		100	31.4		2	0.533	B	2

6 **Analysis:**

7		TDL	50	5	20	1000	2	20
8	Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
9		Both >5xTDL?		Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	
10		RPD		1.9%		0.1%	6.5%	
11		Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

12

13	Sampling Area	HEIS Number	Sample Date	Iron			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus		
14				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
15	C7850; I-019	B28013	1/7/11	74.6		50	15800		100	105		2	7.73		2	6.12		5	12.7	B	50
16	C7850; I-019 DUP	B28014	1/7/11	37.0	B	50	15800		100	104		2	9.33		2	5.39		5	11.5	B	50

17 **Analysis:**

18		TDL	50	750	5	20	40	100
19	Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
20		Both >5xTDL?		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	
21		RPD		0.0%	1.0%			
22		Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable

23

24	Sampling Area	HEIS Number	Sample Date	Potassium			Silicon			Sodium			Strontium			Vanadium			Zinc		
25				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
26	C7850; I-019	B28013	1/7/11	5240		500	13500		50	13700		100	390		5	13.2		5	33.8		20
27	C7850; I-019 DUP	B28014	1/7/11	5310		500	13600		50	13800		100	391		5	13.3		5	26.2		20

28 **Analysis:**

29		TDL	4000	20	500	10	25	10
30	Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
31		Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
32		RPD		0.7%	0.7%	0.3%		
33		Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable

34

35	Sampling Area	Sample Number	Sample Date	Hexavalent chromium		
36				mg/L	Q	PQL
37	C7850; I-019	B28015	1/7/11	0.023		0.0037
38	C7850; I-019 DUP	B28016	1/7/11	0.039		0.0037

39 **Analysis:**

40		TDL	0.01
41	Duplicate Analysis	Both > PQL?	Yes (continue)
42		Both >5xTDL?	No-Stop (acceptable)
43		RPD	
44		Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway HMS

Rev. No. 0
Date 9/15/11
Sheet No. 22 of 41

Duplicate Analysis - C7851 Interval 10 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Tritium			Uranium-233/234			Uranium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
C7851; I-010	B28171	12/30/10	9.63		0.319	0.395		0.102	0.366		0.271	4.99		2.52	0.421		0.161	0.231		0.161
C7851; I-010 DUP	B28183	12/30/10	9.44		0.797	0.254		0.132	0.625		0.283	7.06		2.62	0.353		0.159	0.374		0.159

Analysis:

TDL		0.5	0.1	0.2	10	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	2.0%					
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium			Cobalt		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7851; I-010	B280J8	12/30/10	7920		4.38	1.81		0.88	165		0.44	0.263		0.18	0.899	B	1.75	0.106	B	0.18	4730		87.5	21.3		0.18	6.98		1.75
C7851; I-010 DUP	B280J0	12/30/10	7920		4.86	2.00		0.97	163		0.49	0.270		0.19	0.806	B	1.94	0.101	B	0.19	4880		97.2	19.6		0.19	7.22		1.94

Analysis:

TDL		5	1	0.5	0.2	2	0.2	100	0.2	2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)			Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	0.0%		1.2%				3.1%	8.3%	
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Copper			Iron			Lead			Lithium			Magnesium			Manganese			Molybdenum			Nickel		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7851; I-010	B280J8	12/30/10	16.9		0.88	18500		17.5	2.56		0.44	5.92		2.19	4420		85.6	270		4.38	1.24	B	1.75	15.2		3.50
C7851; I-010 DUP	B280J0	12/30/10	17.4		0.97	19600		19.4	2.65		0.49	6.20		2.43	4370		72.9	281		4.86	1.06	B	1.94	14.1		3.89

Analysis:

TDL		1	5	0.5	2.5	75	5	2	4
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)
	RPD	2.9%	6.8%	10.7%		1.1%	4.0%		
	Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Phosphorus			Potassium			Silicon			Sodium			Strontium			Tin			Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7851; I-010	B280J8	12/30/10	601		43.8	674		350	519		1.75	684		43.8	34.3		0.88	2.42	B	8.75	57.4		2.19	34.3		8.75
C7851; I-010 DUP	B280J0	12/30/10	622		48.6	666		389	526		1.94	654		48.6	31.9		0.97	2.02	B	9.72	61.3		2.43	33.4		9.72

Analysis:

TDL		100	400	2	50	1	10	2.5	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)
	RPD	3.4%		1.3%	4.5%	7.3%		6.6%	2.7%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

Sampling Area	Sample Number	Sample Date	Acetone		
			ug/kg	Q	PQL
C7851; I-010	B280D0	12/30/10	7.13	J	11.1
C7851; I-010 DUP	B280C2	12/30/10	6.18	J	13.0

Analysis:

TDL		20
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)
	Both >5xTDL?	
	RPD	
	Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway HMS

Rev. No. 0
Date 9/15/11
Sheet No. 23 of 41

1 **Duplicate Analysis - C7851 Interval 17 Groundwater Samples**

	Sampling Area	Sample Number	Sample Date	Barium			Boron			Calcium			Chromium			Cobalt		
3				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
4	C7851; I-017	B280B5	1/3/11	104		2	19.6		10	81300		100	18.9		2	0.703	B	2
5	C7851; I-017 DUP	B280B6	1/3/11	111		2	21.1		10	84800		100	33.0		2	1.59	B	2

6 **Analysis:**

7		TDL	5	20	1000	2	20
8	Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
9		Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	
10		RPD	6.5%		4.2%	54.3%	
11		Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

12

	Sampling Area	HEIS Number	Sample Date	Iron			Magnesium			Manganese			Molybdenum			Nickel		
14				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
15	C7851; I-017	B280B5	1/3/11	16.6	B	50	12000		100	312		2	13.3		2	4.08	B	5
16	C7851; I-017 DUP	B280B6	1/3/11	67.6		50	12700		100	311		2	11.9		2	4.80	B	5

17 **Analysis:**

18		TDL	50	750	5	20	40
19	Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
20		Both >5xTDL?		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	
21		RPD		5.7%	0.3%		
22		Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

23

	Sampling Area	HEIS Number	Sample Date	Potassium			Silicon			Sodium			Strontium			Vanadium		
25				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
26	C7851; I-017	B280B5	1/3/11	6320		500	11400	J	50	11700		100	329		5	7.44		5
27	C7851; I-017 DUP	B280B6	1/3/11	6990		500	11600	J	50	13000		100	340		5	8.16		5

28 **Analysis:**

29		TDL	4000	20	500	10	25
30	Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
31		Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
32		RPD		1.7%	10.5%	3.3%	
33		Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable

34

	Sampling Area	Sample Number	Sample Date	Hexavalent chromium		
36				mg/L	Q	PQL
37	C7851; I-017	B280B7	1/3/11	0.008		0.0037
38	C7851; I-017 DUP	B280B8	1/3/11	0.011		0.0037

39 **Analysis:**

40		TDL	0.01
41	Duplicate Analysis	Both > PQL?	Yes (continue)
42		Both >5xTDL?	No-Stop (acceptable)
43		RPD	
44		Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
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Rev. No. 0
Date 9/15/11
Sheet No. 24 of 41

Duplicate Analysis - C7852 Interval 7 Soil Samples

Sampling Area	Sample Number	Sample Date	Carbon-14 pCi/g	Q	MDA	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Uranium-233/234 pCi/g	Q	MDA	Uranium-238 pCi/g	Q	MDA
C7852; I-007	B28034	1/7/11	3.31		3.22	13.5		0.379	0.503		0.103	0.638		0.251	0.682		0.200	0.784		0.200
C7852; I-007 DUP	B28027	1/7/11	4.43		3.16	12.6		0.605	0.469		0.134	0.601		0.287	0.625		0.208	0.544		0.208

Analysis:

TDL		1	0.5	0.1	0.2	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD		6.9%				
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL
C7852; I-007	B28069	1/7/11	6370		4.45	3.64		0.89	51.6		0.45	0.202		0.18	0.686	B	1.78	0.075	B	0.18	7180		89.0	12.2		0.18	5.33		1.78	9.73		0.89
C7852; I-007 DUP	B28047	1/7/11	6880		3.56	2.95		0.71	50.8		0.36	0.229		0.14	0.661	B	1.42	0.069	B	0.14	6930		71.1	10.3		0.14	5.33		1.42	10.1		0.71

Analysis:

TDL		5			1			0.5			0.2			2			0.2			100			0.2			2			1		
Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
	Both >5xTDL?	Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)									Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)		
	RPD	7.7%						1.6%												3.5%			16.9%						3.7%		
	Difference > 2 TDL?	Not applicable			No - acceptable			Not applicable			No - acceptable			No - acceptable			No - acceptable			Not applicable			Not applicable			No - acceptable			Not applicable		

Sampling Area	HEIS Number	Sample Date	Hexavalent chromium mg/kg	Q	PQL	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL
C7852; I-007	B28069	1/7/11	0.26	B	0.52	17400		17.8	3.06		0.45	8.47		2.23	4990		56.8	259		4.45	2.19		1.78	7.68		3.56	563		44.5	1160		356
C7852; I-007 DUP	B28047	1/7/11	0.29	B	0.52	17600		14.2	3.17		0.36	9.90		1.78	5240		53.3	261		3.56	1.06	B	1.42	8.09		2.85	578		35.6	1250		285

Analysis:

TDL		0.5			5			0.5			2.5			75			5			2			4			100			400		
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)		
	Both >5xTDL?				Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)						No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)		
	RPD				1.1%			3.5%						4.9%			0.8%									2.6%					
	Difference > 2 TDL?	No - acceptable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable			Not applicable			No - acceptable		

Sampling Area	Sample Number	Sample Date	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Nitrate mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
C7852; I-007	B28069	1/7/11	621		1.78	337		44.5	24.3		0.89	1.67	B	8.90	44.0		2.23	32.0		8.90	2.9	B	5	12.4		5	2.73		0.5	21.9		5
C7852; I-007 DUP	B28047	1/7/11	458		1.42	314		35.6	24.9		0.71	1.26	B	7.11	41.3		1.78	32.7		7.11	3.1	B	5	12.3		5	2.86		0.5	21.7		5

Analysis:

TDL		2			50			1			10			2.5			1			2			2.5			0.75			5		
Duplicate Analysis	Both > PQL?	Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)		
	Both >5xTDL?	Yes (calc RPD)			Yes (calc RPD)			Yes (calc RPD)						Yes (calc RPD)			Yes (calc RPD)						No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)		
	RPD	30.2%			7.1%			2.4%						6.3%			2.2%															
	Difference > 2 TDL?	Not applicable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable			No - acceptable			No - acceptable		

Sampling Area	Sample Number	Sample Date	Acetone µg/kg	Q	PQL
C7852; I-007	B28070	1/7/11	6.32	J	11.8
C7852; I-007 DUP	B28048	1/7/11	4.46	J	9.37

Analysis:

TDL		20
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)
	Both >5xTDL?	
	RPD	
	Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway

Rev. No. 0
Date 9/15/11
Sheet No. 25 of 41

Duplicate Analysis - C7852 Interval 19 Groundwater Samples

Sampling Area	Sample Number	Sample Date	Barium ug/L	Q	PQL	Boron ug/L	Q	PQL	Cadmium ug/L	Q	PQL	Calcium ug/L	Q	PQL	Chromium ug/L	Q	PQL	Iron ug/L	Q	PQL
C7852; I-019	B280L0	1/12/11	103		2	15.2		10	0.271	B	1	115000		100	34.1		2	47.5	B	50
C7852; I-019 DUP	B280L1	1/12/11	106		2	16.9		10	0.216	B	1	118000		100	35.6		2	37.6	B	50

Analysis:

	TDL	5	20	2	1000	2	50
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)		Yes (calc RPD)	Yes (calc RPD)	
	RPD	2.9%			2.6%	4.3%	
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Lithium ug/L	Q	PQL	Magnesium ug/L	Q	PQL	Manganese ug/L	Q	PQL	Molybdenum ug/L	Q	PQL	Nickel ug/L	Q	PQL	Phosphorus ug/L	Q	PQL
C7852; I-019	B280L0	1/12/11	6.85	B	20	15600		100	87.1		2	4.91		2	2.59	B	5	10.9	B	50
C7852; I-019 DUP	B280L1	1/12/11	7.79	B	20	16000		100	88.5		2	6.53		2	2.44	B	5	12.1	B	50

Analysis:

	TDL	25	750	5	20	40	100
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)
	Both >5xTDL?		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)		
	RPD		2.5%	1.6%			
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Potassium ug/L	Q	PQL	Silicon ug/L	Q	PQL	Sodium ug/L	Q	PQL	Strontium ug/L	Q	PQL	Vanadium ug/L	Q	PQL	Zinc ug/L	Q	PQL
C7852; I-019	B280L0	1/12/11	6230		500	14600		50	13800		100	532		5	13.9		5	62.5		20
C7852; I-019 DUP	B280L1	1/12/11	6480		500	15200		50	14100		100	547		5	13.6		5	67.1		20

Analysis:

	TDL	4000	20	500	10	25	10
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD		4.0%	2.2%	2.8%		7.1%
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable

Sampling Area	Sample Number	Sample Date	Hexavalent chromium mg/L	Q	PQL
C7852; I-019	B280K8	1/12/11	0.027		0.0037
C7852; I-019 DUP	B280K9	1/12/11	0.027		0.0037

Analysis:

	TDL	0.01
Duplicate Analysis	Both > PQL?	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)
	RPD	
	Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sullaway HMS

Rev. No. 0
Date 9/15/11
Sheet No. 26 of 41

Duplicate Analysis - C7855 Interval 12 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Total beta radiostrontium			Uranium-233/234			Uranium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
C7855; I-012	B298B6	12/20/10	10.9		0.736	0.303		0.165	0.786		0.364	1.79		0.205	0.397		0.169	0.375		0.169
C7623; I-006 DUP	B29879	12/20/10	13.9		0.548	0.366		0.119	0.678		0.205	1.79		0.310	0.388		0.156	0.408		0.156

Analysis:

	TDL	0.5	0.1	0.2	1	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	24.2%					
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium			Cobalt			Copper		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7855; I-012	B29866	12/20/10	5000		4.66	1.95		0.93	75.7		0.47	0.163	B	0.190	0.62	B	1.86	0.096	B	0.19	12800		93.2	14.9		0.19	4.13		1.86	11.1		0.93
C7623; I-006 DUP	B29814	12/20/10	5970		4.59	1.85		0.92	90.2		0.46	0.168	B	0.180	0.54	B	1.83	0.102	B	0.18	12900		91.7	14.0		0.18	3.97		1.83	10.8		0.92

Analysis:

	TDL	5	1	0.5	0.2	2	0.2	100	0.2	2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)				Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	17.7%		17.5%				0.8%	6.2%		2.7%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

Sampling Area	HEIS Number	Sample Date	Iron			Lead			Lithium			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus			Potassium			Silicon		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7855; I-012	B29866	12/20/10	12400		18.6	3.64		0.47	8.66		2.33	3460		69.9	183		4.66	1.04	B	1.86	14.1		3.73	378		46.6	1190		373	640		1.86
C7623; I-006 DUP	B29814	12/20/10	13500		18.3	3.73		0.46	9.86		2.29	3780		68.8	205		4.59	0.809	B	1.83	12.0		3.67	408		45.9	1570		367	877		1.83

Analysis:

	TDL	5	0.5	2.5	75	5	2	4	100	400	2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	8.5%	2.4%		8.8%	11.3%					31.2%
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable

Sampling Area	Sample Number	Sample Date	Sodium			Strontium			Tin			Vanadium			Zinc			Chloride			Fluoride			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7855; I-012	B29866	12/20/10	320		46.6	23.4		0.93	1.81	B	9.32	26.2		2.3	30.0		9.32	13.0		2.2	0.6	B	2.2	5.4		2.2	0.97		0.45	9.9		2.2
C7623; I-006 DUP	B29814	12/20/10	381		46.9	26.2		0.92	1.60	B	9.17	31.2		2.3	31.7		9.17	2.2	B	2.4	1.1	B	2.4	2.6		2.4	0.65		0.48	11.0		2.4

Analysis:

	TDL	50	1	10	2.5	1	2	5	2.5	0.75	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)			No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	17.4%	11.3%		17.4%	5.5%					
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	Yes - assess further	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Methylene chloride		
			ug/kg	Q	PQL
C7855; I-012	B29800	12/20/10	2.68	J	5.73
C7623; I-006 DUP	B297X8	12/20/10	3.11	J	6.00

Analysis:

	TDL	5
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)
	Both >5xTDL?	
	RPD	
	Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. Sulloway 9/16/15

Rev. No. 0
Date 9/5/11
Sheet No. 27 of 41

Split Analysis - C7855 Interval 15 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Total beta pCi/g	Q	MDA	Uranium-233/234 pCi/g	Q	MDA	Uranium-238 pCi/g	Q	MDA
C7855; I-015	B298B9	12/21/10	9.16		0.558	0.514		0.179	1.38		0.218	0.496		0.146	0.400		0.146
C7855; I-015 SPLIT	B298F0	12/21/10	12.6		0.296	0.515		0.127	1.37		0.133	0.811		0.0281	0.730		0.0404

Analysis:

		Potassium-40	Radium-228	Total beta	Uranium-233/234	Uranium-238
TDL		0.5	0.2	1	1	1
Split Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	37.6%				
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL	Iron mg/kg	Q	PQL
C7855; I-015	B29869	12/21/10	7880		5.16	1.76		1.03	146		0.52	0.10	B	0.21	9670		103	22.9		0.21	6.46		2.07	15.3		1.03	17900		20.7
C7855; I-015 SPLIT	B298F2	12/21/10	7490		29.0	1.2	B	0.66	137		0.52	0.73	B	0.10	8740		138	23.1		0.64	8.9	B	1.9	15.1		1.5	17700		6.1

Analysis:

		Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron
TDL		5	1	0.5	0.2	100	0.2	2	1	5
Split Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	5.1%		6.4%		10.1%	0.9%		1.3%	1.1%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	Yes - assess further	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

Sampling Area	HEIS Number	Sample Date	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL
C7855; I-015	B29869	12/21/10	3.89		0.52	6.92		2.58	5040		77.4	286		5.16	18.0		4.13	502		51.6	1270		413	1230		2.07	864		51.6
C7855; I-015 SPLIT	B298F2	12/21/10	3.0		0.36	7.5	B	6.8	5570		17.2	285		0.32	19.0		0.47	428		1.4	760	B	698	531	C	20.7	611		97.5

Analysis:

		Lead	Lithium	Magnesium	Manganese	Nickel	Phosphorus	Potassium	Silicon	Sodium
TDL		0.5	2.5	75	5	4	100	400	2	50
Split Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	25.8%		10.0%	0.4%				79.4%	34.3%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable

Sampling Area	Sample Number	Sample Date	Strontium mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL
C7855; I-015	B29869	12/21/10	38.8		1.03	54.6		2.6	33.5		10.3
C7855; I-015 SPLIT	B298F2	12/21/10	27.0		2.6	47.9		2.6	37.9		4.1

Analysis:

		Strontium	Vanadium	Zinc
TDL		1	2.5	1
Split Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)
	RPD	35.9%	13.1%	12.3%
	Difference > 2 TDL?	Not applicable	Not applicable	Not applicable

Sampling Area	Sample Number	Sample Date	Hexavalent chromium mg/kg	Q	PQL
C7855; I-015	B29869	12/21/10	0.340	B	0.52
C7855; I-015 SPLIT	B298F0	12/21/10	0.662		0.154

Analysis:

		Hexavalent chromium
TDL		0.5
Split Analysis	Both > PQL?	No-Stop (acceptable)
	Both >5xTDL?	
	RPD	
	Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway

Rev. No. 0
Date 9/15/14
Sheet No. 28 of 41

1 **Duplicate Analysis - C7855 Interval 24 Groundwater Samples**

	Sampling Area	Sample Number	Sample Date	Aluminum			Barium			Boron			Calcium			Chromium			Cobalt		
3				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
4	C7855; I-024	B298F5	12/28/10	28.2	B	50	108		2	53.0		10	87900		100	151		2	0.55	B	2
5	C7855; I-024 DUP	B298F6	12/28/10	14.7	B	50	109		2	53.6		10	88200		100	150		2	0.67	B	2

6 **Analysis:**

7	TDL	50	5	20	1000	2	20
8	Duplicate Analysis: Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
9	Duplicate Analysis: Both >5xTDL?		Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	
10	Duplicate Analysis: RPD		0.9%		0.3%	0.7%	
11	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

12

	Sampling Area	HEIS Number	Sample Date	Lithium			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus		
14				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
15	C7855; I-024	B298F5	12/28/10	5.10	B	20	20400		100	133		2	6.84		2	2.59	B	5	10.6	B	50
16	C7855; I-024 DUP	B298F6	12/28/10	8.68	B	20	20500		100	134		2	6.33		2	2.06	B	5	11.5	B	50

17 **Analysis:**

18	TDL	25	750	5	20	40	100
19	Duplicate Analysis: Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)
20	Duplicate Analysis: Both >5xTDL?		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)		
21	Duplicate Analysis: RPD		0.5%	0.7%			
22	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable

23

	Sampling Area	HEIS Number	Sample Date	Potassium			Silicon			Sodium			Strontium			Vanadium			Zinc		
25				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
26	C7855; I-024	B298F5	12/28/10	5380		500	16200		50	15800		100	531		5	16.4		5	17.0	B	20
27	C7855; I-024 DUP	B298F6	12/28/10	5230		500	16300		50	15800		100	535		5	15.7		5	16.3	B	20

28 **Analysis:**

29	TDL	4000	20	500	10	25	10
30	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
31	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	
32	Duplicate Analysis: RPD		0.6%	0.0%	0.8%		
33	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable

34

35	Sampling Area	Sample Number	Sample Date	Hexavalent chromium		
36				mg/L	Q	PQL
37	C7855; I-024	B298F3	12/28/10	0.143		0.0037
38	C7855; I-024 DUP	B298F4	12/28/10	0.144		0.0037

39 **Analysis:**

40	TDL	0.01
41	Duplicate Analysis: Both > PQL?	Yes (continue)
42	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)
43	Duplicate Analysis: RPD	0.7%
44	Duplicate Analysis: Difference > 2 TDL?	Not applicable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 08/12/11
Job No. 14855

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway

Rev. No. 0
Date 9/15/11
Sheet No. 29 of 41

Duplicate Analysis - C7857 Interval 5 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Total beta radiostrontium			Uranium-233/234			Uranium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
C7857; I-005	B29918	1/20/11	10.4		0.649	0.608		0.151	0.869		0.391	1.85		0.255	0.538		0.229	0.369		0.229
C7857; I-005 DUP	B298R9	1/20/11	7.58		0.751	0.462		0.156	0.563		0.219	1.84		0.235	0.519		0.221	0.462		0.221

Analysis:

	TDL	0.5	0.1	0.2	1	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	31.4%					
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Calcium			Chromium			Cobalt			Copper			Iron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7857; I-005	B298Y7	1/20/11	7220		3.83	2.23		0.77	102		0.38	0.213		0.150	6930		76.6	9.53		0.15	5.66		1.53	19.3		0.77	26800		15.3
C7857; I-005 DUP	B298R8	1/20/11	8120		11.4	2.34		2.28	99.4		1.14	0.296	B	0.460	9730		228	11.0		0.46	9.35		4.56	18.4		2.28	34200		45.6

Analysis:

	TDL	5	1	0.5	0.2	100	0.2	2	1	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	11.7%		2.6%		33.6%	14.3%		22.5%	24.3%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

Sampling Area	HEIS Number	Sample Date	Lead			Lithium			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus			Potassium			Silicon		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7857; I-005	B298Y7	1/20/11	1.90		0.38	3.18		1.92	4450		57.5	377		3.83	0.429	B	1.53	7.86		3.06	1100		38.3	583		306	807		1.53
C7857; I-005 DUP	B298R8	1/20/11	2.55		1.14	4.63	B	5.70	5730		171	403		11.4	0.738	B	4.56	8.01	B	9.12	1310		114	578	B	912	1060		4.56

Analysis:

	TDL	0.5	2.5	75	5	2	4	100	400	2
Duplicate Analysis	Both > PQL?	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)		Yes (calc RPD)	Yes (calc RPD)			Yes (calc RPD)		Yes (calc RPD)
	RPD			25.1%	6.7%			17.4%		26.2%
	Difference > 2 TDL?	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable

Sampling Area	Sample Number	Sample Date	Sodium			Strontium			Vanadium			Zinc			Chloride			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7857; I-005	B298Y7	1/20/11	834		38.3	33.0		0.77	94.4		1.92	42.4		7.66	2.2	B	5.2	1.3	B	5.2	0.25	B	0.52	7.7		5.2
C7857; I-005 DUP	B298R8	1/20/11	1010		114	35.1		2.28	96.0		5.70	53.8		22.8	3.1	B	5.2	1.4	B	5.2	0.30	B	0.52	8.4		5.2

Analysis:

	TDL	50	1	2.5	1	2	2.5	0.75	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)				No-Stop (acceptable)
	RPD	19.1%	6.2%	1.7%	23.7%				
	Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Acetone			Methylene chloride		
			ug/kg	Q	PQL	ug/kg	Q	PQL
C7857; I-005	B298T4	1/20/11	6.03	J	15.2	3.79	BJ	7.62
C7857; I-005 DUP	B298R7	1/20/11	3.70	J	10.7	2.73	BJ	5.34

Analysis:

	TDL	20	5
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	No-Stop (acceptable)
	Both >5xTDL?		
	RPD		
	Difference > 2 TDL?	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

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Checked H. M. Sulloway HMS

Rev. No. 0
Date 9/15/11
Sheet No. 30 of 41

Duplicate Analysis - C7857 Interval 23 Groundwater Samples

Sampling Area	Sample Number	Sample Date	Aluminum ug/L	Aluminum Q	Aluminum PQL	Barium ug/L	Barium Q	Barium PQL	Boron ug/L	Boron Q	Boron PQL	Calcium ug/L	Calcium Q	Calcium PQL	Chromium ug/L	Chromium Q	Chromium PQL	Copper ug/L	Copper Q	Copper PQL
C7857; I-023	B29BC2	1/27/11	30.2	B	50	107		2	42.6		10	89100		100	80.0		2	4.08	B	10
C7857; I-023 DUP	B29BC4	1/27/11	31.1	B	50	109		2	43.3		10	91600		100	82.1		2	2.68	B	10

Analysis:

	TDL		50			5			20			1000			2			10		
Duplicate Analysis	Both > PQL?		No-Stop (acceptable)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)		
	Both >5xTDL?					Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)					
	RPD					1.9%						2.8%			2.6%					
	Difference > 2 TDL?		No - acceptable			Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable		

Sampling Area	HEIS Number	Sample Date	Iron ug/L	Iron Q	Iron PQL	Magnesium ug/L	Magnesium Q	Magnesium PQL	Manganese ug/L	Manganese Q	Manganese PQL	Molybdenum ug/L	Molybdenum Q	Molybdenum PQL	Nickel ug/L	Nickel Q	Nickel PQL	Phosphorus ug/L	Phosphorus Q	Phosphorus PQL
C7857; I-023	B29BC2	1/27/11	69.5		50	16200		100	20.0		2	3.77		2	0.931	B	5	21.4	B	50
C7857; I-023 DUP	B29BC4	1/27/11	51.0		50	16700		100	18.6		2	3.48		2	1.08	B	5	22.2	B	50

Analysis:

	TDL		50			750			5			20			40			100		
Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			No-Stop (acceptable)			No-Stop (acceptable)		
	Both >5xTDL?		No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)								
	RPD					3.0%														
	Difference > 2 TDL?		No - acceptable			Not applicable			No - acceptable			No - acceptable			No - acceptable			No - acceptable		

Sampling Area	HEIS Number	Sample Date	Potassium ug/L	Potassium Q	Potassium PQL	Silicon ug/L	Silicon Q	Silicon PQL	Sodium ug/L	Sodium Q	Sodium PQL	Strontium ug/L	Strontium Q	Strontium PQL	Vanadium ug/L	Vanadium Q	Vanadium PQL	Zinc ug/L	Zinc Q	Zinc PQL
C7857; I-023	B29BC2	1/27/11	3480		500	13100		50	14900		100	430		5	14.2		5	26.5		20
C7857; I-023 DUP	B29BC4	1/27/11	3640		500	13400		50	15200		100	435		5	14.3		5	32.5		20

Analysis:

	TDL		4000			20			500			10			25			10		
Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
	Both >5xTDL?		No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)		
	RPD					2.3%			2.0%			1.2%								
	Difference > 2 TDL?		No - acceptable			Not applicable			Not applicable			Not applicable			No - acceptable			No - acceptable		

Sampling Area	Sample Number	Sample Date	Hexavalent chromium mg/L	Q	PQL
C7857; I-023	B29BC3	1/27/11	0.079		0.0037
C7857; I-023 DUP	B29BC5	1/27/11	0.078		0.0037

Analysis:

	TDL	0.01
Duplicate Analysis	Both > PQL?	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)
	RPD	1.3%
	Difference > 2 TDL?	Not applicable

CALCULATION SHEET

Washington Closure Hanford
Originator P. L. Benjamin
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

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Checked H. M. Sullaway

Rev. No. 0
Date 9/15/11
Sheet No. 31 of 41

Duplicate Analysis - C7860 Interval 7 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Technetium-99 pCi/g	Q	MDA	Uranium-233/234 pCi/g	Q	MDA	Uranium-238 pCi/g	Q	MDA
C7860; I-007	B29MK0	2/8/11	13.8		0.405	0.451		0.077	0.535		0.165	0.328		0.094	0.452		0.067	0.424		0.044
C7860; I-007 DUP	B29MK1	2/8/11	14.8		0.222	0.486		0.048	0.548		0.088	0.304		0.090	0.515		0.050	0.482		0.034

Analysis:

		Potassium-40	Radium-226	Radium-228	Technetium-99	Uranium-233/234	Uranium-238
Duplicate Analysis	TDL	0.5	0.1	0.2	15	1	1
	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	7.0%					
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL
C7860; I-007	B29MR3	2/8/11	5180		4.27	1.70		0.85	53.8		0.43	0.171		0.170	0.593	B	1.71	0.065	B	0.17	4920		85.3	10.5		0.17	5.58		1.71	14.0		0.85
C7860; I-007 DUP	B29ML9	2/8/11	5630		3.56	1.96		0.71	61.1		0.36	0.175		0.140	0.606	B	1.42	0.085	B	0.14	5170		71.2	12.3		0.14	6.01		1.42	15.7		0.71

Analysis:

		Aluminum	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper
Duplicate Analysis	TDL	5	1	0.5	0.2	2	0.2	100	0.2	2	1
	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)			Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	8.3%		12.7%				5.0%	15.5%		11.4%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

Sampling Area	HEIS Number	Sample Date	Hexavalent chromium mg/kg	Q	PQL	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Mercury mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL
C7860; I-007	B29MR3	2/8/11	1.07		0.51	16200		17.1	2.05		0.43	6.22		2.13	3880		64.0	252		4.27	0.016	B	0.03	0.456	B	1.71	9.29		3.41	679		42.7
C7860; I-007 DUP	B29ML9	2/8/11	0.51	B	0.51	17400		14.2	2.32		0.36	6.38		1.78	4270		53.4	276		3.56	0.016	B	0.03	0.389	B	1.42	11.4		2.85	723		35.6

Analysis:

		Hexavalent chromium	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus
Duplicate Analysis	TDL	0.5	5	0.5	2.5	75	5	0.2	2	4	100
	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
	Both >5xTDL?		Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)			No-Stop (acceptable)	Yes (calc RPD)
	RPD		7.1%			10.1%	8.7%				6.3%
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable

Sampling Area	Sample Number	Sample Date	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Nitrate mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
C7860; I-007	B29MR3	2/8/11	781		341	459		1.71	680		42.7	25.3		0.85	2.08	B	8.53	48.8		2.13	33.5		8.53	4.3	B	5.1	81.7		5.1	16.9	D	1.02	153	D	25.4
C7860; I-007 DUP	B29ML9	2/8/11	883		285	547		1.42	769		35.6	31.9		0.71	2.11	B	7.12	53.1		1.78	34.1		7.12	4.8	B	5.1	78.6		5.1	16.8	D	1.01	139	D	25.7

Analysis:

		Potassium	Silicon	Sodium	Strontium	Tin	Vanadium	Zinc	Chloride	Nitrate	Nitrogen in Nitrite and Nitrate	Sulfate
Duplicate Analysis	TDL	400	2	50	1	10	2.5	1	2	2.5	0.75	5
	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)
	RPD		17.5%	12.3%	23.1%		8.8%	1.8%		6.4%	5.5%	9.6%
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	Not applicable

Sampling Area	Sample Number	Sample Date	Acetone ug/kg	Q	PQL	Methylene chloride ug/kg	Q	PQL
C7860; I-007	B29MM5	2/8/11	10.6	J	11.4	5.71	B	5.70
C7860; I-007 DUP	B29ML7	2/8/11	5.74	J	9.84	2.24	BJ	4.92

Analysis:

		Acetone	Methylene chloride
Duplicate Analysis	TDL	20	5
	Both > PQL?	No-Stop (acceptable)	No-Stop (acceptable)
	Both >5xTDL?		
	RPD		
	Difference > 2 TDL?	No - acceptable	No - acceptable

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1 **Duplicate Analysis - C7860 Interval 16 Groundwater Samples**

	Sampling Area	Sample Number	Sample Date	Aluminum			Barium			Boron			Calcium			Chromium			Iron		
3				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
4	C7860; I-016	B29MT3	2/9/11	36.5	B	50	23.6		2	14.7		10	40700		100	3.91		2	74.7		50
5	C7860; I-016 DUP	B29MT5	2/9/11	49.5	B	50	24.8		2	16.3		10	40200		100	4.20		2	87.9		50

6 **Analysis:**

7	TDL	50	5	20	1000	2	50
8	Duplicate Analysis: Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Duplicate Analysis: Both >5xTDL?		No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
10	Duplicate Analysis: RPD				1.2%		
11	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable	No - acceptable

12

13	Sampling Area	HEIS Number	Sample Date	Lead			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus		
14				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
15	C7860; I-016	B29MT3	2/9/11	2.77	B	10	7820		100	34.1		2	2.32		2	0.813	B	5	23.1	B	50
16	C7860; I-016 DUP	B29MT5	2/9/11	3.77	B	10	7560		100	34.8		2	3.06		2	1.00	B	5	26.4	B	50

17 **Analysis:**

18	TDL	5	750	5	20	40	100
19	Duplicate Analysis: Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)
20	Duplicate Analysis: Both >5xTDL?		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)		
21	Duplicate Analysis: RPD		3.4%	2.0%			
22	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable

23

24	Sampling Area	HEIS Number	Sample Date	Potassium			Selenium			Silicon			Sodium			Strontium			Vanadium			Zinc		
25				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
26	C7860; I-016	B29MT3	2/9/11	4010		500	3.70	B	10	13400		50	12200		100	194		5	9.07		5	23.7		20
27	C7860; I-016 DUP	B29MT5	2/9/11	4000		500	3.96	B	10	13900		50	11900		100	192		5	9.42		5	22.6		20

28 **Analysis:**

29	TDL	4000	10	20	500	10	25	10
30	Duplicate Analysis: Both > PQL?	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
31	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)		Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
32	Duplicate Analysis: RPD			3.7%	2.5%	1.0%		
33	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable

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1 **Duplicate Analysis - C7861 Interval 6 Soil Samples**

2	Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Total beta radiostrontium			Uranium-233/234			Uranium-238		
3				pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
4	C7861; I-006	B29NC8	1/31/11	10.5		0.621	0.256		0.108	0.350		0.224	0.468		0.214	0.469		0.359	0.422		0.359
5	C7861; I-006 DUP	B29NC5	1/31/11	14.6		1.14	0.287		0.194	0.584		0.373	0.389		0.231	0.272		0.260	0.272		0.260

6 **Analysis:**

7		TDL	0.5	0.1	0.2	1	1	1
8	Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9		Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
10		RPD	32.7%					
11		Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

12

13	Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium			Cobalt			Copper		
14				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	C7861; I-006	B29ND1	1/31/11	6110		3.81	1.49		0.76	58.2		0.38	0.191		0.150	0.680	B	1.52	0.062	B	0.15	4760		76.2	22.1		0.15	6.01		1.52	19.6		0.76
16	C7861; I-006 DUP	B29NC7	1/31/11	7010		5.03	1.62		1.01	95.6		0.50	0.186	B	0.200	0.868	B	2.01	0.073	B	0.20	3780		101	17.2		0.20	4.59		2.01	13.9		1.01

17 **Analysis:**

18		TDL	5	1	0.5	0.2	2	0.2	100	0.2	2	1
19	Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
20		Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)				Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
21		RPD	13.7%		46.6%				23.0%	24.9%		34.0%
22		Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

23

24	Sampling Area	HEIS Number	Sample Date	Iron			Lead			Lithium			Magnesium			Manganese			Mercury			Molybdenum			Nickel			Phosphorus			Potassium		
25				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	C7861; I-006	B29ND1	1/31/11	18600		15.2	2.57		0.38	5.24		1.91	4770		57.2	281		3.81	0.012	B	0.03	0.866	B	1.52	9.82		3.05	925		38.1	758		305
27	C7861; I-006 DUP	B29NC7	1/31/11	15400		20.1	3.33		0.50	6.62		2.51	4380		75.4	283		5.03	0.012	B	0.03	0.214	B	2.01	7.36		4.02	538		50.3	1060		402

28 **Analysis:**

29		TDL	5	0.5	2.5	75	5	0.2	2	4	100	400
30	Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
31		Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)			No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)
32		RPD	18.8%	25.8%		8.5%	0.7%				52.9%	
33		Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable

34

35	Sampling Area	Sample Number	Sample Date	Silicon			Sodium			Strontium			Tin			Vanadium			Zinc			Chloride			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
36				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
37	C7861; I-006	B29ND1	1/31/11	629		1.52	375		38.1	25.5		0.76	2.35	B	7.62	51.7		1.91	32.8		7.62	4.3	B	5.3	3.0	B	5.3	0.72		0.53	11.4		5.3
38	C7861; I-006 DUP	B29NC7	1/31/11	950		2.01	311		50.3	21.3		1.01	2.29	B	10.1	42.2		2.51	35.1		10.1	6.0	B	5.5	4.4	B	5.5	0.93		0.56	1.0		5.5

39 **Analysis:**

40		TDL	2	50	1	10	2.5	1	2	2.5	0.75	5
41	Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	No-Stop (acceptable)
42		Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)			No-Stop (acceptable)	
43		RPD	40.7%	18.7%	17.9%		20.2%	6.8%				
44		Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Yes - assess further

45

46	Sampling Area	Sample Number	Sample Date	Acetone			Methylene chloride		
47				ug/kg	Q	PQL	ug/kg	Q	PQL
48	C7861; I-006	B29ND0	1/31/11	5.41	BJ	10.7	2.47	J	5.34
49	C7861; I-006 DUP	B29NC6	1/31/11	6.36	BJ	9.01	2.52	J	4.50

50 **Analysis:**

51		TDL	20	5
52	Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	No-Stop (acceptable)
53		Both >5xTDL?		
54		RPD		
55		Difference > 2 TDL?	No - acceptable	No - acceptable

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1 **Duplicate Analysis - C7861 Interval 13 Groundwater Samples**

Sampling Area	Sample Number	Sample Date	Aluminum ug/L	Q	PQL	Barium ug/L	Q	PQL	Boron ug/L	Q	PQL	Calcium ug/L	Q	PQL	Chromium ug/L	Q	PQL	Iron ug/L	Q	PQL	Magnesium ug/L	Q	PQL
C7861; I-013	B29NJ3	2/1/11	14.1	B	50	35.8		2	21.8		10	64500		100	7.58		2	32.3	B	50	10600		100
C7861; I-013 DUP	B29NJ5	2/1/11	11.2	B	50	35.6		2	21.4		10	64300		100	7.29		2	55.5		50	10700		100

Analysis:

	TDL	50	5	20	1000	2	50	750
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?		Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)		Yes (calc RPD)
	RPD		0.6%		0.3%			0.9%
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable

Sampling Area	HEIS Number	Sample Date	Manganese ug/L	Q	PQL	Molybdenum ug/L	Q	PQL	Nickel ug/L	Q	PQL	Phosphorus ug/L	Q	PQL	Potassium ug/L	Q	PQL	Silicon ug/L	Q	PQL	Sodium ug/L	Q	PQL
C7861; I-013	B29NJ3	2/1/11	12.9		2	2.05		2	0.644	B	5	25.9	B	50	3080		500	11800		50	11200		100
C7861; I-013 DUP	B29NJ5	2/1/11	15.3		2	2.45		2	1.14	B	5	27.7	B	50	3210		500	11500		50	11200		100

Analysis:

	TDL	5	20	40	100	4000	20	500
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)			No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD						2.6%	0.0%
	Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable

Sampling Area	HEIS Number	Sample Date	Strontium ug/L	Q	PQL	Vanadium ug/L	Q	PQL	Zinc ug/L	Q	PQL
C7861; I-013	B29NJ3	2/1/11	292		5	9.96		5	13.7	B	20
C7861; I-013 DUP	B29NJ5	2/1/11	288		5	11.0		5	22.6		20

Analysis:

	TDL	10	25	10
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	
	RPD	1.4%		
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Hexavalent chromium mg/L	Q	PQL
C7861; I-013	B29NJ2	2/1/11	0.004		0.0037
C7861; I-013 DUP	B29NJ4	2/1/11	0.005		0.0037

Analysis:

	TDL	0.01
Duplicate Analysis	Both > PQL?	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)
	RPD	
	Difference > 2 TDL?	No - acceptable

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Duplicate Analysis - C7862 Interval 4 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Uranium-233/234			Uranium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
C7862; I-004	B27672	8/23/10	13.8		0.587	0.453		0.125	0.822		0.254	0.552		0.222	0.522		0.222
C7862; I-004 DUP	B27673	8/23/10	11.7		0.401	0.497		0.090	0.825		0.232	0.602		0.177	0.533		0.177

Analysis:

	TDL	0.5	0.1	0.2	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	16.5%				
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7862; I-004	B276D3	8/23/10	5150		3.88	3.67		0.78	46.0		0.39	0.180		0.16	0.807	B	1.55	0.123	B	0.16	6710		77.6	15.9		0.16
C7862; I-004 DUP	B276D4	8/23/10	6250		3.72	4.35		0.74	60.7		0.37	0.211		0.15	1.28	B	1.49	0.136	B	0.15	8790		74.3	10.1		0.15

Analysis:

	TDL	5	1	0.5	0.2	2	0.2	100	0.2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)			Yes (calc RPD)	Yes (calc RPD)
	RPD	19.3%		27.6%				26.8%	44.6%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable

Sampling Area	HEIS Number	Sample Date	Cobalt			Copper			Iron			Lead			Lithium			Magnesium			Manganese			Molybdenum		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7862; I-004	B276D3	8/23/10	4.77		1.55	12.4		0.78	15000		15.5	8.03		0.39	5.80		1.94	3460		58.2	248		3.88	0.510	B	1.55
C7862; I-004 DUP	B276D4	8/23/10	5.18		1.49	16.0		0.74	16600		14.9	9.06		0.37	6.28		1.86	4090		55.7	271		3.72	0.552	B	1.49

Analysis:

	TDL	2	1	5	0.5	2.5	75	5	2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	
	RPD		25.4%	10.1%	12.3%		16.7%	8.9%	
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

Sampling Area	Sample Number	Sample Date	Nickel			Phosphorus			Potassium			Silicon			Sodium			Strontium			Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7862; I-004	B276D3	8/23/10	11.8		3.11	552		38.8	810		311	695		1.55	194		38.8	24.3		0.78	36.7		1.94	34.0		7.76
C7862; I-004 DUP	B276D4	8/23/10	9.72		2.97	575		37.2	981		297	974		1.49	245		37.2	27.1		0.74	39.7		1.86	42.2		7.43

Analysis:

	TDL	4	100	400	2	50	1	2.5	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)
	RPD		4.1%		33.4%		10.9%	7.9%	21.5%
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	Not applicable

Sampling Area	Sample Number	Sample Date	Chloride			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7862; I-004	B276D3	8/23/10	3.6	B	5.2	6.7		5.2	1.77		0.52	24.1		5.2
C7862; I-004 DUP	B276D4	8/23/10	2.8	B	4.8	6.6		4.8	1.68		0.48	20.1		4.8

Analysis:

	TDL	2	2.6	0.75	5
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?		No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD				
	Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway HMS

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Duplicate Analysis - C7862 Interval 18 Groundwater Samples

Sampling Area	Sample Number	Sample Date	Aluminum			Barium			Boron			Calcium			Cobalt			Iron			Lithium		
			ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
C7862; I-018	B276H4	8/26/10	98.3		50	48.5		2	36.1		10	56300		100	0.989	B	2	64.6		50	6.88	B	20
C7862; I-018 DUP	B27633	8/26/10	26.0	B	50	47.3		2	36.2		10	55700		100	0.876	B	2	24.8	B	50	7.69	B	20

Analysis:

	TDL	50	5	20	1000	20	50	25
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	Both >5xTDL?		Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)			
	RPD		2.5%		1.1%			
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Magnesium			Manganese			Molybdenum			Nickel			Potassium			Silicon			Sodium		
			ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
C7862; I-018	B276H4	8/26/10	14300		100	276		2	34.6		2	2.38	B	5	6760		500	11400		50	21700		100
C7862; I-018 DUP	B27633	8/26/10	14000		100	274		2	36.8		2	2.31	B	5	6820		500	11400		50	21800		100

Analysis:

	TDL	750	5	20	40	4000	20	500
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)		No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	2.1%	0.7%				0.0%	0.5%
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable

Sampling Area	HEIS Number	Sample Date	Strontium			Vanadium		
			ug/L	Q	PQL	ug/L	Q	PQL
C7862; I-018	B276H4	8/26/10	363		5	9.74		5
C7862; I-018 DUP	B27633	8/26/10	358		5	9.78		5

Analysis:

	TDL	10	25
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)
	RPD	1.4%	
	Difference > 2 TDL?	Not applicable	No - acceptable

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Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway

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Duplicate Analysis - C7863 Interval 2 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Uranium-233/234			Uranium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
C7863; I-002	B28Y47	1/13/11	14.5		0.275	0.547		0.063	0.875		0.119	0.605		0.243	0.605		0.243
C7863; I-002 DUP	B28Y51	1/13/11	15.8		0.456	0.707		0.095	0.985		0.171	0.711		0.237	0.526		0.237

Analysis:

	TDL	0.5	0.1	0.2	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	6.6%	25.5%			
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7863; I-002	B28Y50	1/13/11	6850		3.75	4.19		0.75	64.9		0.38	0.220		0.15	0.861	B	1.50	0.092	B	0.15	8960		75.0	14.5		0.15
C7863; I-002 DUP	B28Y54	1/13/11	7100		3.71	3.97		0.74	63.4		0.37	0.228		0.15	0.902	B	1.49	0.097	B	0.15	8770		74.3	14.6		0.15

Analysis:

	TDL	5	1	0.5	0.2	2	0.2	100	0.2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)			Yes (calc RPD)	Yes (calc RPD)
	RPD	3.6%		2.3%				2.1%	0.7%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable

Sampling Area	HEIS Number	Sample Date	Cobalt			Copper			Iron			Lead			Lithium			Magnesium			Manganese			Molybdenum		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7863; I-002	B28Y50	1/13/11	5.09		1.50	12.2		0.75	16900		15.0	3.84		0.38	8.62		1.87	4760		56.2	286		3.75	0.440	B	1.50
C7863; I-002 DUP	B28Y54	1/13/11	5.32		1.49	11.2		0.74	17700		14.9	3.75		0.37	8.32		1.86	5010		55.7	284		3.71	0.724	B	1.49

Analysis:

	TDL	2	1	5	0.5	2.5	75	5	2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	
	RPD		8.5%	4.6%	2.4%		5.1%	0.7%	
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

Sampling Area	Sample Number	Sample Date	Nickel			Phosphorus			Potassium			Silicon			Sodium			Strontium			Tin			Vanadium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7863; I-002	B28Y50	1/13/11	11.7		3.00	708		37.5	1280		300	1050		1.50	400		37.5	46.6		0.75	1.64	B	7.50	41.0		1.87
C7863; I-002 DUP	B28Y54	1/13/11	10.9		2.97	770		37.1	1260		297	1070		1.49	403		37.1	44.8		0.74	2.07	B	7.43	42.1		1.86

Analysis:

	TDL	4	100	400	2	50	1	10	2.5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)
	RPD		8.4%		1.9%	0.7%	4.4%		2.6%
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable

Sampling Area	Sample Number	Sample Date	Zinc			Chloride			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
C7863; I-002	B28Y50	1/13/11	33.1		7.50	19.0		5.5	8.5		5.5	1.50		0.55	362	D	27.8
C7863; I-002 DUP	B28Y54	1/13/11	34.7		7.43	18.1		5.4	7.0		5.4	1.68		0.55	317	D	26.8

Analysis:

	TDL	1	2	2.5	0.75	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	4.7%	16.5%			13.3%
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable

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Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway

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1 **Duplicate Analysis - C7863 Interval 15 Groundwater Samples**

	Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Boron			Calcium			Chromium			Iron		
3				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
4	C7863; I-015	B28YF9	1/17/11	22.4	B	50	2.68	B	10	52.9		2	43.8		10	71400		100	25.3		2	79.8		50
5	C7863; I-015 DUP	B28YH1	1/17/11	12.5	B	50	3.48	B	10	53.4		2	43.9		10	72000		100	26.2		2	84.1		50

6 **Analysis:**

7	TDL	50	10	5	20	1000	2	50
8	Duplicate Analysis: Both > PQL?	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Duplicate Analysis: Both >5xTDL?			Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
10	Duplicate Analysis: RPD			0.9%		0.8%	3.5%	
11	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

12

13	Sampling Area	HEIS Number	Sample Date	Lithium			Magnesium			Manganese			Molybdenum			Nickel			Phosphorus			Potassium		
14				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
15	C7863; I-015	B28YF9	1/17/11	10.3	B	20	17900		100	25.2		2	6.26		2	1.41	B	5	23.5	B	50	6180		500
16	C7863; I-015 DUP	B28YH1	1/17/11	6.07	B	20	18100		100	26.5		2	4.80		2	1.57	B	5	25.7	B	50	6220		500

17 **Analysis:**

18	TDL	25	750	5	20	40	100	4000
19	Duplicate Analysis: Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
20	Duplicate Analysis: Both >5xTDL?		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)			No-Stop (acceptable)
21	Duplicate Analysis: RPD		1.1%	5.0%				
22	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

23

24	Sampling Area	HEIS Number	Sample Date	Silicon			Sodium			Strontium			Vanadium			Zinc		
25				ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
26	C7863; I-015	B28YF9	1/17/11	14700		50	18900		100	421		5	16.9		5	10.4	B	20
27	C7863; I-015 DUP	B28YH1	1/17/11	15100		50	19000		100	424		5	16.8		5	12.0	B	20

28 **Analysis:**

29	TDL	20	500	10	25	10
30	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
31	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	
32	Duplicate Analysis: RPD	2.7%	0.5%	0.7%		
33	Duplicate Analysis: Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable

34

35	Sampling Area	Sample Number	Sample Date	Hexavalent chromium		
36				mg/L	Q	PQL
37	C7863; I-015	B28YF8	1/17/11	0.011		0.0037
38	C7863; I-015 DUP	B28YH0	1/17/11	0.012		0.0037

39 **Analysis:**

40	TDL	0.01
41	Duplicate Analysis: Both > PQL?	Yes (continue)
42	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)
43	Duplicate Analysis: RPD	
44	Duplicate Analysis: Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford
Originator P. L. Benjamin
Project 100-D and 100-H Remedial Investigation
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1 Duplicate Analysis - C7864 Interval 1 Soil Samples

	Sampling Area	Sample Number	Sample Date	Cesium-137			Europium-152			Plutonium-239/240			Potassium-40			Radium-226			Radium-228			Total beta radiostrontium			Tritium			Uranium-233/234			Uranium-238		
3				pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
4	C7864; I-001	B28VB8	2/3/11	12.9		0.159	10.1		0.369	0.206		0.196	11.8		0.845	0.42		0.245	1.1		0.429	0.869		0.214	6.08		3.06	0.465		0.237	0.434		0.237
5	C7864; I-001 DUP	B28VB9	2/3/11	14.9		0.169	11.8		0.511	0.275		0.234	13.6		0.628	0.53		0.268	0.82		0.392	1.17		0.211	6.50		3.27	0.451		0.073	0.391		0.068

6 Analysis:

		Cesium-137	Europium-152	Plutonium-239/240	Potassium-40	Radium-226	Radium-228	Total beta radiostrontium	Tritium	Uranium-233/234	Uranium-238
7	TDL	0.1	0.1	1	0.5	0.1	0.2	1	10	1	1
8	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
9	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
10	Duplicate Analysis: RPD	14.4%	13.8%		6.6%						
11	Duplicate Analysis: Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

12

	Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium			Cobalt			Copper		
13				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
15	C7864; I-001	B28VD4	2/3/11	5940		4.51	5.76		0.90	48.7		0.45	0.214		0.18	0.895	B	1.80	0.174	B	0.18	5230		90.1	15.1		0.18	4.62		1.80	11.8		0.90
16	C7864; I-001 DUP	B28VD7	2/3/11	5730		4.09	7.55		0.82	53.0		0.41	0.204		0.16	0.864	B	1.64	0.205		0.16	4590		81.9	12.7		0.16	5.00		1.64	12.5		0.82

17 Analysis:

		Aluminum	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper
18	TDL	5	1	0.5	0.2	2	0.2	100	0.2	2	1
19	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
20	Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)			Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
21	Duplicate Analysis: RPD	3.6%	26.9%	8.5%				13.0%	17.3%		5.8%
22	Duplicate Analysis: Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

23

	Sampling Area	HEIS Number	Sample Date	Hexavalent chromium			Iron			Lead			Lithium			Magnesium			Manganese			Mercury			Molybdenum			Nickel			Phosphorus		
24				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
26	C7864; I-001	B28VD4	2/3/11	1.30		0.53	16000		18.0	10.4		0.45	7.82		2.26	3960		67.8	239		4.51	0.016	B	0.03	0.898	B	1.80	9.20		3.61	576		45.1
27	C7864; I-001 DUP	B28VD7	2/3/11	1.53		0.54	15700		16.4	16.2		0.41	7.77		2.06	3740		61.4	237		4.09	0.013	B	0.03	0.955	B	1.64	8.91		3.27	551		40.9

28 Analysis:

		Hexavalent chromium	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus
29	TDL	0.5	5	0.5	2.5	75	5	0.2	2	4	100
30	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
31	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)			No-Stop (acceptable)	Yes (calc RPD)
32	Duplicate Analysis: RPD		1.9%	43.6%		6.2%	0.8%				4.4%
33	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable

34

	Sampling Area	Sample Number	Sample Date	Potassium			Silicon			Sodium			Strontium			Tin			Vanadium			Zinc			Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b) fluoranthene		
36				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
37	C7864; I-001	B28VD4	2/3/11	968		361	819		1.80	276		45.1	25.5		0.90	1.90	B	6.01	41.9		2.25	39.4		9.01	5.50		3.50	8.44		3.50	10.4		3.50
38	C7864; I-001 DUP	B28VD7	2/3/11	944		327	665		1.64	251		40.9	24.7		0.82	3.18	B	6.19	42.7		2.05	38.0		6.19	4.46		3.52	6.73		3.52	6.85		3.52

39 Analysis:

		Potassium	Silicon	Sodium	Strontium	Tin	Vanadium	Zinc	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene
40	TDL	400	2	50	1	10	2.5	1	15	15	15
41	Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
42	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
43	Duplicate Analysis: RPD		10.6%	9.5%	3.2%		1.9%	3.6%			
44	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable

45

	Sampling Area	Sample Number	Sample Date	Benzo(ghi) perylene			Benzo(k) fluoranthene			Chrysene			Fluoranthene			Indeno(1,2,3-cd) pyrene			Phenanthrene			Pyrene			Nitrate			Nitrogen in Nitrite and Nitrate			Sulfate		
47				µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
48	C7864; I-001	B28VD4	2/3/11	6.06		3.50	3.98		3.50	2.01	J	3.50	11.7		3.50	5.13		3.50	3.33	J	3.50	15.6		3.50	2.9	B	5.3	0.55		0.47	8.5		5.3
49	C7864; I-001 DUP	B28VD7	2/3/11	5.29		3.52	3.21	J	3.52	3.56		3.52	13.4		3.52	3.21	J	3.52	4.05		3.52	12.7		3.52	2.2	B	5.3	0.48	B	0.54	8.2		5.3

50 Analysis:

		Benzo(ghi) perylene	Benzo(k) fluoranthene	Chrysene	Fluoranthene	Indeno(1,2,3-cd) pyrene	Phenanthrene	Pyrene	Nitrate	Nitrogen in Nitrite and Nitrate	Sulfate
51	TDL	30	15	100	50	30	50	50	2.5	0.75	5
52	Duplicate Analysis: Both > PQL?	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
53	Duplicate Analysis: Both >5xTDL?	No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)
54	Duplicate Analysis: RPD										
55	Duplicate Analysis: Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

56

	Sampling Area	Sample Number	Sample Date	Acetone		
58				µg/kg	Q	PQL
59	C7864; I-001	B28VD2	2/3/11	5.18	J	12.7
60	C7864; I-001	B28VD5	2/3/11	6.15	J	12.9

61 Analysis:

		Acetone
62	TDL	20
63	Duplicate Analysis: Both > PQL?	No-Stop (acceptable)
64	Duplicate Analysis: Both >5xTDL?	
65	Duplicate Analysis: RPD	
66	Duplicate Analysis: Difference > 2 TDL?	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin PB
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway 9/15/11

Rev. No. 0
Date 9/15/11
Sheet No. 40 of 41

1 **Duplicate Analysis - C7864 Interval 15 Groundwater Samples**

Sampling Area	Sample Number	Sample Date	Aluminum			Barium			Boron			Calcium			Chromium			Iron		
			ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
C7864; I-015	B28VL1	2/4/11	32.5	B	50	31.4		2	28.8		10.0	61100		100	6.84		2	93.6		50
C7864; I-015 DUP	B28VL3	2/4/11	41.6	B	50	32.6		2	29.4		10.0	65000		100	7.54		2	91.2		50

6 **Analysis:**

	TDL	50	5	20	1000	2	50
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?		Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD		3.8%		6.2%		
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Magnesium			Manganese			Molybdenum			Nickel			Phosphorus			Potassium		
			ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
C7864; I-015	B28VL1	2/4/11	9940		100	46.4		2	3.21		2	0.732	B	5	15.1	B	50	4000		500
C7864; I-015 DUP	B28VL3	2/4/11	10400		100	49.1		2	2.85		2	0.625	B	5	16.4	B	50	4140		500

17 **Analysis:**

	TDL	750	5	20	40	100	4000
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)			No-Stop (acceptable)
	RPD	4.5%	5.7%				
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Selenium			Silicon			Sodium			Strontium			Tin			Vanadium		
			ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL	ug/L	Q	PQL
C7864; I-015	B28VL1	2/4/11	5.09	B	10	10300		50	10600		100	296		5	1.33	B	5	7.70		5
C7864; I-015 DUP	B28VL3	2/4/11	5.44	B	10	11000		50	11000		100	314		5	1.64	B	5	8.14		5

28 **Analysis:**

	TDL	10	20	500	10	100	25
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?		Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)
	RPD		6.6%	3.7%	5.9%		
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator P. L. Benjamin
Project 100-D and 100-H Remedial Investigation
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculations

Date 09/12/11
Job No. 14655

Calc. No. 0100X-CA-V0056
Checked H. M. Sulloway

Rev. No. 0
Date 9/15/11
Sheet No. 41 of 41

Duplicate Analysis - C7866 Interval 14 Soil Samples

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Total Uranium (chemical) µg/g	Q	MDA
C7866; I-014	B29CR7	12/14/10	11.6		0.496	0.429		0.122	0.481		0.247	0.97		0.088
C7866; I-014 DUP	B29CP3	12/14/10	10.0		0.178	0.324		0.041	0.496		0.081	1.08		0.088

Analysis:

	TDL	0.5	0.1	0.2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	14.8%			
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL
C7866; I-014	B29CT0	12/14/10	6280		3.70	1.54		0.74	111		0.37	0.125	B	0.15	0.696	B	1.48	0.127	B	0.15	8860		74.1	20.1		0.15	3.86		1.48	11.2		0.74
C7866; I-014 DUP	B29CP5	12/14/10	6200		3.87	1.51		0.77	88.8		0.39	0.146	B	0.16	0.676	B	1.55	0.156		0.16	10200		77.4	24.7		0.16	4.17		1.55	11.2		0.77

Analysis:

	TDL	5	1	0.5	0.2	2	0.2	100	0.2	2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)				Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	1.3%		22.2%				13.8%	20.5%		0.0%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

Sampling Area	HEIS Number	Sample Date	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL
C7866; I-014	B29CT0	12/14/10	12500		14.8	2.40		0.37	11.5		1.85	3980		56.6	441		3.70	0.375	B	1.48	14.5		2.96	398		37.0	1140		296	409		1.48
C7866; I-014 DUP	B29CP5	12/14/10	13600		15.5	2.77		0.39	10.4		1.94	3830		56.1	474		3.87	0.474	B	1.55	17.5		3.10	437		38.7	1050		310	539		1.55

Analysis:

	TDL	5	0.5	2.5	75	5	2	4	100	400	2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	7.7%			3.8%	7.2%					27.4%
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable

Sampling Area	Sample Number	Sample Date	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Fluoride mg/kg	Q	PQL	Nitrate mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
C7866; I-014	B29CT0	12/14/10	329		37.0	21.3		0.74	1.68	B	7.41	30.5		1.85	30.5		7.41	2.6	B	4.9	4.2	B	4.9	1.22		0.49	8.7		4.9
C7866; I-014 DUP	B29CP5	12/14/10	348		38.7	23.0		0.77	2.83	B	7.74	33.2		1.94	31.2		7.74	2.6	B	4.9	3.7		4.9	1.07		0.49	7.2		4.9

Analysis:

	TDL	50	1	10	2.5	1	5	2.5	0.75	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)			No-Stop (acceptable)	No-Stop (acceptable)
	RPD	5.6%	7.7%		8.5%	2.3%				
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Methylene chloride ug/kg	Q	PQL
C7866; I-014	B29CR8	12/14/10	3.01	BJ	5.84
C7866; I-014 DUP	B29CP4	12/14/10	3.18	BJ	5.27

Analysis:

	TDL	5
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)
	Both >5xTDL?	
	RPD	
	Difference > 2 TDL?	No - acceptable

Acrobat 8.0

CALCULATION COVER SHEET

Project Title: 100-D and 100-H Remedial Investigation **Job No. 14655**

Area: 100-D and 100-H

Discipline: Environmental *Calculation No: 0100X-CA-V0071

Subject: 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculation for 100-D-12 Well C8668

Computer Program: Excel Program No: Excel 2003

The attached calculations have been generated for a specific purpose and task. Use of the calculations by persons who do not have access to all pertinent facts may lead to incorrect conclusions and/or results. Before applying these calculations to your work, the underlying basis, rationale, and other pertinent information relevant to these calculations must be thoroughly reviewed with appropriate Washington Closure Hanford LLC (WCH) officials or other authorized personnel. WCH is not responsible for the use of a calculation not under its direct control.

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Sheets = 3 Total = 4	H. M. Sulloway	P. L. Benjamin		J. M. Capron	11/30/11

SUMMARY OF REVISION

WCH-DE-019 (05/08/2007) *Obtain Calc. No. from Document Control and Form from Intranet

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway **Date** 11/28/2011 **Calc. No.** 0100X-CA-V0071 **Rev. No.** 0
Project 100-D and 100-H Remedial Investigation **Job No.** 14655 **Checked** P. L. Benjamin PB **Date** 11/28/201
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculation for 100-D-12 Well C8668 **Sheet No.** 1 of 3

Summary

PURPOSE:

Provide documentation to support the calculation of the relative percent difference (RPD) for primary-duplicate and primary-split sample pairs from 100-D and 100-H Area remedial investigation sample results, as necessary.

TABLE OF CONTENTS:

Sheets 1 to 2 - Summary
Sheet 3 - C8668 Interval 2 Soil Samples

GIVEN/REFERENCES:

1) DOE-RL, 2010, *Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units Remedial Investigation/Feasibility Study*, DOE/RL-2009-40, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Solution:

1) Use data obtained from remedial investigation soil, aquifer sediment, and groundwater samples to perform the RPD calculations for primary-duplicate and primary-split sample pairs, as required.

METHODOLOGY:

The RPD is calculated when both the primary sample value and either the duplicate or split sample value for a given analyte are above detection limits and are greater than 5 times the target detection limit (TDL). The TDL is a laboratory detection limit pre-determined for each analytical method. The 100-D and 100-H remedial investigation SAP lists laboratory performance standards as estimated quantitation limits (EQLs) for soil/aquifer sediment samples from sampling targets in Table 2-3 of the SAP (DOE-RL 2010) for selected constituents. Where TDL values lower than those listed in the SAP were available, the lower values were used.

Where direct evaluation of the attached sample data showed that a given analyte was not detected in the primary, duplicate, and/or split sample, further evaluation of the RPD value was not performed.

The RPD calculations use the following formula:

$$RPD = [\,|M-D|/((M+D)/2)]*100$$

where, M = main sample value D = duplicate (or split) sample value

When an analyte is detected in the primary or duplicate/split sample, but is quantified at less than 5 times the TDL in one or both samples, an additional parameter is evaluated. In this case, if the difference between the primary and duplicate/split results exceeds a control limit of 2 times the TDL, further assessment regarding the usability of the data is performed as part of the overall quality assessment.

For quality assurance/quality control (QA/QC) duplicate RPD calculations, a value less than 30% indicates the data compare favorably. If the RPD is greater than 30%, further investigation regarding the usability of the data is performed. Additional discussion is provided in the data quality assessment.

RESULTS:

The results presented in the tables that follow include the summary of the results of the RPD calculations and are for use in data quality assessment of the remedial investigation sampling.

Washington Closure Hanford **CALCULATION SHEET**

Originator H. M. Sulloway **Date** 11/28/11 **Calc. No.** 0100X-CA-V0071 **Rev. No.** 0
Project 100-D and 100-H Remedial Investigation **Job No.** 14655 **Checked** P. L. Benjamin PB **Date** 11/28/2011
Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculation for 100-D-12 Well C8668 **Sheet No.** 2 of 3

Summary (continued)

Relative Percent Difference Results and QA/QC Analysis[a]	
Analyte	**Duplicate Analysis**
	C8668, Soil Interval 2
Potassium-40	21.8%
Aluminum	5.7%
Barium	25.8%
Calcium	6.3%
Chromium	4.9%
Copper	15.8%
Iron	25.9%
Magnesium	9.7%
Manganese	22.0%
Phosphorus	36.7%
Silicon	22.9%
Sodium	0.4%
Strontium	3.0%
Vanadium	17.7%
Zinc	16.2%

[a]RPD listed where result produced, based on criteria. If RPD not required, no value is listed.

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway — Date 11/29/11 — Calc. No. 0100X-CA-V0071 — Rev. No. 0

Project 100-D and 100-H Remedial Investigation — Job No. 14658 — Checked P. L. Benjamin — Date 11/29/11

Subject 100-D and 100-H Remedial Investigation Relative Percent Difference (RPD) Calculation for 100-D-12 Well C8668 — Sheet No. 3 of 3

1 Duplicate Analysis - 100-D-12 Interval 2 Soil Sample

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Thorium-228 pCi/g	Q	MDA	Thorium-232 pCi/g	Q	MDA	Uranium (total) ug/kg	Q	MDA
C8668, I-002	B2H4J3	10/11/11	9.68		0.348	0.316		0.095	0.331		0.183	0.457		0.093	0.331		0.183	1.28		0.108
C8668, I-002 DUP	B2H4J4	10/11/11	7.78		0.567	0.325		0.092	0.545		0.183	0.453		0.089	0.546		0.183	1.39		0.108

6 Analysis:

TDL	0.5	0.1	0.2	1	1	1
Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
Duplicate Analysis: RPD	21.8%					
Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Sampling Area	Sample Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Bismuth mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL
C8668, I-002	B2H4L5	10/11/11	4840		4.03	1.36		0.61	48.0		0.40	0.152	B	0.16	0.61	B	8.06	0.626	B	1.61	0.06	B	0.16	5200		80.6	9.82		0.16	6.00		1.61
C8668, I-002 DUP	B2H4L7	10/11/11	4570		4.97	1.57		1.00	62.2		0.50	0.180	B	0.20	0.797	B	9.95	0.549	B	1.99	0.051	B	0.20	5640		99.5	10.1		0.20	7.09		1.99

17 Analysis:

TDL	5	1	0.5	0.2	19	2	0.2	100	0.2	2
Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)					Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
Duplicate Analysis: RPD	5.7%		26.8%					6.3%	4.9%	
Duplicate Analysis: Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable

Sampling Area	Sample Number	Sample Date	Copper mg/kg	Q	PQL	Iron mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Lithium mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Phosphorus mg/kg	Q	PQL	Potassium mg/kg	Q	PQL
C8668, I-002	B2H4L6	10/11/11	12.2		0.81	17900		16.1	2.16		0.40	4.30		2.02	3350		50.5	247		4.03	1.06	B	1.61	6.45		3.22	759		40.3	504		322
C8668, I-002 DUP	B2H4L7	10/11/11	14.3		1.00	23100		19.9	2.32		0.50	5.85		2.49	3690		74.6	308		4.97	1.26	B	1.99	7.55		3.98	1100		49.7	598		398

28 Analysis:

TDL	1	5	0.5	2.6	75	5	2	4	100	400
Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)
Duplicate Analysis: RPD	15.8%	25.8%			9.7%	22.0%			36.7%	
Duplicate Analysis: Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable

Sampling Area	Sample Number	Sample Date	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Strontium mg/kg	Q	PQL	Tin mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
C8668, I-002	B2H4L6	10/11/11	244		1.61	468		40.3	19.8		0.81	0.858	B	8.06	51.4		2.02	47.3		8.06	1.7	B	5.2	26.6		5.2
C8668, I-002 DUP	B2H4L7	10/11/11	307		1.99	458		49.7	20.4		1.00	1.27	B	9.95	61.4		2.49	40.2		9.95	1.4	B	5.1	23.0		5.1

39 Analysis:

TDL	2	50	1	10	2.6	1	2	5
Duplicate Analysis: Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
Duplicate Analysis: Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)		Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)
Duplicate Analysis: RPD	22.0%	0.4%	3.0%		17.7%	16.2%		
Duplicate Analysis: Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

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