0085531

SAF-RC-116
Columbia River Component of the RCBRA – Sediment
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

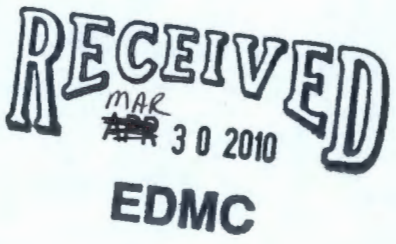
Kathy Wendt H4-21 KW 3/22/10
INITIAL/DATE

COMMENTS:

SDG SEQ021810 SAF-RC-116

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial



Sampling Location:

100D J100D9
100D J100D39
HTS JHTS19
HTS JHTS18
100F T100F2A
100F J100F11

Analytical Chemistry Data Package
Inorganics Analysis

Project: Washington Closures Hanford
AVS/SEM Analysis of Sediment

SDG021010
SDG021810
SDG022510
SDG030310

PNNL Project No. 56166
MSL CF No. 2981

Pacific Northwest
NATIONAL LABORATORY

Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, WA 98382
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SEQ021810

INORGANIC CHEMISTRY ANALYSIS DATA PACKAGE CONTENTS

AVS/SEM Analysis in Sediment

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Sample Custody Information

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BATTELLE MARINE SCIENCES LABORATORY
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Project: Washington Closures Hanford AVS/SEM SDG021010, 021810, 022510, and 030310
File #: 2981

SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	AVS µmole/g	SEM Cd µg/L	SEM Cd µg/g	SEM Cd µmole/g	SEM Cu µg/L	SEM Cu µg/g	SEM Cu µmole/g
J19JB2	2981-351 r1	SDG021010	79.5	021810AVS	0.524	13.3	1.62	0.0144	79.0	9.58	0.151
J19JB2 DUP	2981-351 r2	SDG021010	79.5	021810AVS	0.748	11.0	1.08	0.00961	64.0	6.29	0.0989
J19JB1	2981-352	SDG021010	87.0	021810AVS	0.0103 U	2.00	0.138	0.00122	34.5	2.38	0.0374
J19JP1	2981-353	SDG021810	86.5	021810AVS	0.0294	1.78	0.127	0.00113	46.2	3.30	0.0519
J19JP0	2981-354	SDG021810	81.8	021810AVS	0.0087 U	5.84	0.341	0.00303	34.9	2.04	0.0321
J19K94	2981-355	SDG021810	87.3	021810AVS	0.0119 U	1.78	0.142	0.00126	18.9	1.51	0.0238
J19K93	2981-356	SDG021810	84.2	021810AVS	0.0546	2.59	0.231	0.00206	38.3	3.42	0.0538
J19K25	2981-357	SDG021810	82.9	021810AVS	0.0780	5.47	0.367	0.00327	50.1	3.37	0.0530
J19K24	2981-358	SDG021810	86.8	021810AVS	0.0683	2.94	0.191	0.00170	51.2	3.33	0.0524
J19H40	2981-359 r1	SDG022510	78.1	022610AVS	1.53	9.02	1.42	0.0126	15.7	2.46	0.0388
J19H40 DUP	2981-359 r2	SDG022510	78.1	022610AVS	1.53	9.50	1.47	0.0131	14.1	2.18	0.0344
J19KD7	2981-360	SDG022510	74.9	022610AVS	0.433	2.87	0.580	0.00516	11.9	2.41	0.0379
J19K89	2981-361	SDG022510	74.3	022610AVS	0.157	2.99	0.358	0.00318	24.8	2.96	0.0466
J19K90	2981-362	SDG022510	76.7	022610AVS	0.0561	6.43	0.581	0.00517	98.9	8.93	0.141
J19KF9	2981-363	SDG030310	77.5	031010AVS	3.20	12.4	1.33	0.0118	60.4	6.49	0.102
J19JM0	2981-364	SDG030310	77.4	031010AVS	0.352	1.44	0.362	0.00322	35.9	9.02	0.142
J19L04	2981-365 r1	SDG030310	61.3	031010AVS	26.5	2.36	0.564	0.00502	20.4	4.87	0.0766
J19L04 DUP	2981-365 r2	SDG030310	61.3	031010AVS	29.4	3.42	0.663	0.00590	28.7	5.56	0.0875
		Average:	*78.6*								
Detection Limit (mean used for AVS)					0.0185	0.0530	0.00536	0.0000477	0.364	0.0368	0.000580

[1] Batch ID includes ICP-MS analysis batch 031010-6100

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File #: 2981

SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	SEM Ni µg/L	SEM Ni µg/g	SEM Ni µmole/g	SEM Pb µg/L	SEM Pb µg/g	SEM Pb µmole/g	SEM Zn µg/L	SEM Zn µg/g	SEM Zn µmole/g
J19JB2	2981-351 r1	SDG021010	79.5	021810AVS	15.9	1.89	0.0321	178	21.5	0.104	1091	131	2.00
J19JB2 DUP	2981-351 r2	SDG021010	79.5	021810AVS	14.7	1.41	0.0240	156	15.3	0.0740	1076	105	1.60
J19JB1	2981-352	SDG021010	87.0	021810AVS	14.3	0.958	0.0163	41.5	2.84	0.0137	217	14.3	0.218
J19JP1	2981-353	SDG021810	86.5	021810AVS	16.8	1.18	0.0200	139	9.87	0.0476	360	24.9	0.381
J19JP0	2981-354	SDG021810	81.8	021810AVS	21.2	1.22	0.0207	79.9	4.65	0.0224	598	34.3	0.525
J19K94	2981-355	SDG021810	87.3	021810AVS	9.44	0.730	0.0124	48.1	3.83	0.0185	195	14.8	0.227
J19K93	2981-356	SDG021810	84.2	021810AVS	13.3	1.16	0.0197	102	9.07	0.0438	339	29.4	0.449
J19K25	2981-357	SDG021810	82.9	021810AVS	32.5	2.16	0.0368	110	7.35	0.0355	739	49.0	0.750
J19K24	2981-358	SDG021810	86.8	021810AVS	35.4	2.28	0.0389	80.3	5.21	0.0252	435	27.7	0.423
J19H40	2981-359 r1	SDG022510	78.1	022610AVS	7.77	1.17	0.0199	44.5	6.95	0.0336	645	99.7	1.53
J19H40 DUP	2981-359 r2	SDG022510	78.1	022610AVS	7.97	1.18	0.0201	47.8	7.36	0.0355	692	105	1.61
J19KD7	2981-360	SDG022510	74.9	022610AVS	8.27	1.60	0.0273	27.7	5.56	0.0268	366	71.8	1.10
J19K89	2981-361	SDG022510	74.3	022610AVS	13.1	1.53	0.0260	58.9	7.02	0.0339	354	41.1	0.629
J19K90	2981-362	SDG022510	76.7	022610AVS	36.2	3.24	0.0552	232	20.9	0.101	715	63.7	0.974
J19KF9	2981-363	SDG030310	77.5	031010AVS	17.8	1.87	0.0319	119	12.8	0.0617	1604	171	2.62
J19JM0	2981-364	SDG030310	77.4	031010AVS	3.33	0.754	0.0128	97.2	24.4	0.118	325	79.2	1.21
J19L04	2981-365 r1	SDG030310	61.3	031010AVS	13.5	3.16	0.0538	42.8	10.2	0.0492	301	69.7	1.07
J19L04 DUP	2981-365 r2	SDG030310	61.3	031010AVS	18.7	3.57	0.0608	50.9	9.83	0.0474	385	72.6	1.11
		Average:	*78.6*										
Detection Limit (mean used for AVS)					0.0630	0.0100	0.000170	0.0260	0.00263	0.0000127	0.323	0.0327	0.000500

[1] Batch ID includes ICP-MS analysis batch 031010-6100

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Project: Washington Closures Hanford AVS/SEM SDG021010, 021810, 022510, and 030310
File #: 2981

Molar Ratios of AVS to Total SEM Metals

SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	AVS µmole/g	ΣSEM Metals µmole/g	Excess Metals Present (Y or N)
J19JB2	2981-351 r1	SDG021010	79.5	021810AVS	0.524	2.30	Y
J19JB2 DUP	2981-351 r2	SDG021010	79.5	021810AVS	0.748	1.81	Y
J19JB1	2981-352	SDG021010	87.0	021810AVS	0.0103	0.287	Y
J19JP1	2981-353	SDG021810	86.5	021810AVS	0.0294	0.502	Y
J19JP0	2981-354	SDG021810	81.8	021810AVS	0.00871	0.604	Y
J19K94	2981-355	SDG021810	87.3	021810AVS	0.0119	0.283	Y
J19K93	2981-356	SDG021810	84.2	021810AVS	0.0546	0.569	Y
J19K25	2981-357	SDG021810	82.9	021810AVS	0.0780	0.879	Y
J19K24	2981-358	SDG021810	86.8	021810AVS	0.0683	0.542	Y
J19H40	2981-359 r1	SDG022510	78.1	022610AVS	1.53	1.63	Y
J19H40 DUP	2981-359 r2	SDG022510	78.1	022610AVS	1.53	1.72	Y
J19KD7	2981-360	SDG022510	74.9	022610AVS	0.433	1.20	Y
J19K89	2981-361	SDG022510	74.3	022610AVS	0.157	0.739	Y
J19K90	2981-362	SDG022510	76.7	022610AVS	0.0561	1.28	Y
J19KF9	2981-363	SDG030310	77.5	031010AVS	3.20	2.83	N
J19JM0	2981-364	SDG030310	77.4	031010AVS	0.352	1.49	Y
J19L04	2981-365 r1	SDG030310	61.3	031010AVS	26.5	1.25	N
J19L04 DUP	2981-365 r2	SDG030310	61.3	031010AVS	29.4	1.31	N
		Average:	*78.6*				

Detection Limit (mean used for AVS)

[1] Batch ID includes ICP-MS analysis batch 031010-6100

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File #: 2981

SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	AVS µmole/g	SEM Cd µg/L	SEM Cd µg/g	SEM Cd µmole/g	SEM Cu µg/L	SEM Cu µg/g	SEM Cu µmole/g
Detection Limit					**0.0185**	**0.0530**	**0.00536**	**0.0000477**	**0.364**	**0.0368**	**0.000580**
SEM Analytical Blanks											
ICB				031010-6100		0.0530 U			0.364 U		
CCB1				031010-6100		0.0530 U			0.364 U		
CCB2				031010-6100		0.0530 U			0.364 U		
CCB3				031010-6100		0.0530 U			0.364 U		
CCB4				031010-6100		0.0530 U			0.364 U		
CCB5				031010-6100		0.0530 U			0.364 U		
CCB6				031010-6100		0.0530 U			0.364 U		
AVS Blanks											
Blank 021810			*78.6*	021810AVS	0.0114 U	0.0530 U			0.364 U		
Blank 022610			*78.6*	022610AVS	0.0200 U	0.0530 U			0.364 U		
Blank 031010			*78.6*	031010AVS	0.0344 U	0.0530 U			0.364 U		
	Mean Blank					*0.0530 U*			*0.364 U*		
Replicate Analysis Results											
J19JB2	2981-351 r1	SDG021010	79.5	021810AVS	0.524	13.3	1.62	0.0144	79.0	9.58	0.151
J19JB2 DUP	2981-351 r2	SDG021010	79.5	021810AVS	0.748	11.0	1.08	0.00961	64.0	6.29	0.0989
	RPD				**35%** *			**40%** *			**41%** *
J19H40	2981-359 r1	SDG022510	78.1	022610AVS	1.53	9.02	1.42	0.0126	15.7	2.46	0.0388
J19H40 DUP	2981-359 r2	SDG022510	78.1	022610AVS	1.53	9.50	1.47	0.0131	14.1	2.18	0.0344
	RPD				**1%**			**4%**			**12%**
J19L04	2981-365 r1	SDG030310	61.3	031010AVS	26.5	2.36	0.564	0.00502	20.4	4.87	0.0766
J19L04 DUP	2981-365 r2	SDG030310	61.3	031010AVS	29.4	3.42	0.663	0.00590	28.7	5.56	0.0875
	RPD				**10%**			**16%**			**13%**

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File #: 2981

SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	SEM Ni µg/L	SEM Ni µg/g	SEM Ni µmole/g	SEM Pb µg/L	SEM Pb µg/g	SEM Pb µmole/g	SEM Zn µg/L	SEM Zn µg/g	SEM Zn µmole/g
Detection Limit					**0.0630**	**0.0100**	**0.000170**	**0.0260**	**0.00263**	**0.0000127**	**0.323**	**0.0327**	**0.000500**
SEM Analytical Blanks													
ICB				031010-6100	0.0630 U			0.0260 U			0.323 U		
CCB1				031010-6100	0.0630 U			0.0260 U			0.323 U		
CCB2				031010-6100	0.0630 U			0.0260 U			0.323 U		
CCB3				031010-6100	0.0630 U			0.0260 U			0.323 U		
CCB4				031010-6100	0.0630 U			0.0260 U			0.323 U		
CCB5				031010-6100	0.0630 U			0.0260 U			0.323 U		
CCB6				031010-6100	0.0630 U			0.0260 U			0.323 U		
AVS Blanks													
Blank 021810			*78.6*	021810AVS	0.196			0.186			7.51		
Blank 022610			*78.6*	022610AVS	0.654			0.229			19.2		
Blank 031010			*78.6*	031010AVS	0.137			0.247			3.62		
	Mean Blank				*0.329*			*0.221*			*10.1*		
Replicate Analysis Results													
J19JB2	2981-351 r1	SDG021010	79.5	021810AVS	15.9	1.89	0.0321	178	21.5	0.104	1091	131	2.00
J19JB2 DUP	2981-351 r2	SDG021010	79.5	021810AVS	14.7	1.41	0.0240	156	15.3	0.0740	1076	105	1.60
	RPD						**29%** *			**34%** *			**22%**
J19H40	2981-359 r1	SDG022510	78.1	022610AVS	7.77	1.17	0.0199	44.5	6.95	0.0336	645	99.7	1.53
J19H40 DUP	2981-359 r2	SDG022510	78.1	022610AVS	7.97	1.18	0.0201	47.8	7.36	0.0355	692	105.4	1.61
	RPD						**1%**			**6%**			**6%**
J19L04	2981-365 r1	SDG030310	61.3	031010AVS	13.5	3.16	0.0538	42.8	10.2	0.0492	301	69.7	1.07
J19L04 DUP	2981-365 r2	SDG030310	61.3	031010AVS	18.7	3.57	0.0608	50.9	9.83	0.0474	385	72.6	1.11
	RPD						**12%**			**4%**			**4%**

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Project: Washington Closures Hanford AVS/SEM SDG021010, 021610, 022610 and 030310
File #: 2981

SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	AVS µmole g	SEM Cd µg L	SEM Cd µg g	SEM Cd µmole g	SEM Cu µg L	SEM Cu µg g	SEM Cu µmole g
Laboratory Control Sample Results											
LCS r1 021810			78.6	021810AVS	0.487						
LCS r2 021810			78.6	021810AVS	0.447						
Blank 021810			78.6	021810AVS	0.0114 U						
	Spike Concentration				0.508						
	Percent Recovery				**96%**						
	Percent Recovery				**88%**						
LCS r1 022610			78.6	022610AVS	0.553						
LCS r2 022610			78.6	022610AVS	0.474						
Blank 022610			78.6	022610AVS	0.0200 U						
	Spike Concentration				0.521						
	Percent Recovery				**106%**						
	Percent Recovery				**91%**						
Laboratory Control Sample Results											
LCS r1 031010			78.6	031010AVS	0.515						
LCS r2 031010			78.6	031010AVS	0.610						
Blank 031010			78.6	031010AVS	0.0344 U						
	Spike Concentration				0.521						
	Percent Recovery				**99%**						
	Percent Recovery				**117%**						
LCS031010 r1			78.6	031010-6100		11.2			11.5		
LCS031010 r2			78.6	031010-6100		10.6			10.8		
LCS031010 r3			78.6	031010-6100		10.7			10.6		
Mean Blank						0.0530 U			0.364 U		
	Spike Concentration					10			10		
	Percent Recovery					**112%**			**115%**		
	Percent Recovery					**106%**			**108%**		
	Percent Recovery					**107%**			**106%**		
Standard Reference Material Data											
1640 Direct 031010			100	031010-6100		23.5			89.0		
	Certified/Reference Value					22.79			85.2		
	Range					±0.96			±1.2		
	Percent Recovery					**103%**			**104%**		

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SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	SEM Ni µg/L	SEM Ni µg/g	SEM Ni µmole/g	SEM Pb µg/L	SEM Pb µg/g	SEM Pb µmole/g	SEM Zn µg/L	SEM Zn µg/g	SEM Zn µmole/g
Laboratory Control Sample Results													
LCS r1 021810			*78.6*	021810AVS									
LCS r2 021810			*78.6*	021810AVS									
Blank 021810			*78.6*	021810AVS									
	Spike Concentration												
	Percent Recovery												
LCS r1 022610			*78.6*	022610AVS									
LCS r2 022610			*78.6*	022610AVS									
Blank 022610			*78.6*	022610AVS									
	Spike Concentration												
	Percent Recovery												
	Percent Recovery												
Laboratory Control Sample Results													
LCS r1 031010			*78.6*	031010AVS									
LCS r2 031010			*78.6*	031010AVS									
Blank 031010			*78.6*	031010AVS									
	Spike Concentration												
	Percent Recovery												
	Percent Recovery												
LCS031010 r1			*78.6*	031010-6100	10.9			11.5			59.9		
LCS031010 r2			*78.6*	031010-6100	10.1			10.8			69.8		
LCS031010 r3			*78.6*	031010-6100	10.3			11.2			57.0		
Mean Blank					0.329			0.221			10.1		
	Spike Concentration				10			10			50		
	Percent Recovery				**106%**			**113%**			**100%**		
	Percent Recovery				**97%**			**106%**			**119%**		
	Percent Recovery				**99%**			**110%**			**94%**		
Standard Reference Material Data													
1640 Direct 031010			100	031010-6100	27.6			28.2			56.6		
	Certified/Reference Value				27.4			27.89			53.2		
	Range				±0.8			±0.14			±1.1		
	Percent Recovery				**101%**			**101%**			**106%**		

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File #: 2981

SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	AVS µmole/g	SEM Cd µg/L	SEM Cd µg/g	SEM Cd µmole/g	SEM Cu µg/L	SEM Cu µg/g	SEM Cu µmole/g
SEM Matrix Spike Recovery											
J19JB1	2981-352	SDG021010	87.0	031010-6100		2.00			34.5		
J19JB1MS	2981-352 MS		87.0	031010-6100		23.1			441		
J19JB1MSD	2981-352 MSD		87.0	031010-6100		23.7			437		
Amount Spiked						20			400		
% Recovery, MS						**106%**			**102%**		
% Recovery, MSD						**109%**			**101%**		
RPD						**3%**			**1%**		
J19KD7	2981-360	SDG022510	74.9	031010-6100		2.87			11.9		
J19KD7MS	2981-360 MS		74.9	031010-6100		24.2			33.3		
J19KD7MSD	2981-360 MSD		74.9	031010-6100		23.7			33.0		
Amount Spiked						20			20		
% Recovery, MS						**107%**			**107%**		
% Recovery, MSD						**104%**			**105%**		
RPD						**3%**			**2%**		
J19KF9	2981-363	SDG030310	77.5	031010-6100		12.4			60.4		
J19KF9MS	2981-363 MS		77.5	031010-6100		33.2			471		
J19KF9MSD	2981-363 MSD		77.5	031010-6100		32.9			476		
Amount Spiked						20			400		
% Recovery, MS						**104%**			**103%**		
% Recovery, MSD						**103%**			**104%**		
RPD						**1%**			**1%**		

[1] Batch ID includes ICP-MS analysis batch 031010-6100

BATTELLE MARINE SCIENCES LABORATORY
1529 W. Sequim Bay Road
Sequim, WA 98382
(360) 681-4564

Project: Washington Closures Hanford AVS/SEM SDG021010 021810 022510 and 030310
File #: 2981

SAMPLE ID SPONSOR	SAMPLE ID BATTELLE	SDG	% Dry Weight	Batch ID[1]	SEM Ni µg/L	SEM Ni µg/g	SEM Ni µmole/g	SEM Pb µg/L	SEM Pb µg/g	SEM Pb µmole/g	SEM Zn µg/L	SEM Zn µg/g	SEM Zn µmole/g
SEM Matrix Spike Recovery													
J19JB1	2981-352	SDG021010	87.0	031010-6100	14.3			41.5			217		
J19JB1MS	2981-352 MS		87.0	031010-6100	34.5			452			622		
J19JB1MSD	2981-352 MSD		87.0	031010-6100	35.8			453			626		
Amount Spiked					20			400			400		
% Recovery, MS					**101%**			**103%**			**101%**		
% Recovery, MSD					**108%**			**103%**			**102%**		
RPD					**6%**			**0%**			**1%**		
J19KD7	2981-360	SDG022510	74.9	031010-6100	8.27			27.7			366		
J19KD7MS	2981-360 MS		74.9	031010-6100	28.8			440			774		
J19KD7MSD	2981-360 MSD		74.9	031010-6100	27.5			445			776		
Amount Spiked					20			400			400		
% Recovery, MS					**103%**			**103%**			**102%**		
% Recovery, MSD					**96%**			**104%**			**103%**		
RPD					**7%**			**1%**			**0%**		
J19KF9	2981-363	SDG030310	77.5	031010-6100	17.8			119			1604		
J19KF9MS	2981-363 MS		77.5	031010-6100	38.1			539			2003		
J19KF9MSD	2981-363 MSD		77.5	031010-6100	38.8			534			2035		
Amount Spiked					20			400			400		
% Recovery, MS					**102%**			**105%**			**100%**		
% Recovery, MSD					**105%**			**104%**			**108%**		
RPD					**4%**			**1%**			**8%**		

[1] Batch ID includes ICP-MS analysis batch 031010-6100

BATTELLE MARINE SCIENCES LABORATORY
1529 W. Sequim Bay Road
Sequim, WA 98382
(360) 681-4564

Project: Washington Closures Hanford AVS/SEM SDG021010, 021810, 022510, and 030310
File #: 2981

MSL SOP-C-001-04 Quality Control Criteria

Lab Qualifier	Description	Criterion
N	Spikes (Blank spikes AVS/matrix spikes SEM)	75-125%
*	Duplicates	<25% RPD
NA	Not Applicable/Available (note: precision on SEM data is only calculated after SEM ratio is applied)	
U	Not detected at or above MDL; MDL reported	

BATTELLE MARINE SCIENCES LABORATORY
1529 W. Sequim Bay Road
Sequim, WA 98382
(360) 681-3650

Project: Washington Closures Hanford AVS/SEM SDG021010, 021810, 022510, and 030310
File #: 2981

SPONSOR ID	MSL ID	Batch ID	Receipt Date	Collection Date	Extraction Date	AVS Analysis Date	SEM Analysis Date	Suggested 14 day Holding Time Expired	HT Exceeded by x Days
Blank 021810					2/18/2010	2/18/2010	03/10/2010		
Blank 022610					2/26/2010	3/1/2010	03/10/2010		
Blank 031010					3/10/2010	3/11/2010	03/10/2010		
J19JB2	2981-351 r1	SDG021010	2/10/2010	02/05/2010	2/18/2010	2/18/2010	03/10/2010	02/19/2010	-1
J19JB2 DUP	2981-351 r2	SDG021010	2/10/2010	02/05/2010	2/18/2010	2/18/2010	03/10/2010	02/19/2010	-1
J19JB1	2981-352	SDG021010	2/10/2010	02/05/2010	2/18/2010	2/18/2010	03/10/2010	02/19/2010	-1
J19JP1	2981-353	SDG021810	2/18/2010	2/14/2010	2/18/2010	2/18/2010	03/10/2010	02/28/2010	-10
J19JP0	2981-354	SDG021810	2/18/2010	2/14/2010	2/18/2010	2/18/2010	03/10/2010	02/28/2010	-10
J19K94	2981-355	SDG021810	2/18/2010	2/15/2010	2/18/2010	2/18/2010	03/10/2010	03/01/2010	-11
J19K93	2981-356	SDG021810	2/18/2010	2/15/2010	2/18/2010	2/18/2010	03/10/2010	03/01/2010	-11
J19K25	2981-357	SDG021810	2/18/2010	2/12/2010	2/18/2010	2/18/2010	03/10/2010	02/26/2010	-8
J19K24	2981-358	SDG021810	2/18/2010	2/12/2010	2/18/2010	2/18/2010	03/10/2010	02/26/2010	-8
J19H40	2981-359 r1	SDG022510	2/25/2010	2/19/2010	2/26/2010	3/1/2010	03/10/2010	03/05/2010	-7
J19H40 DUP	2981-359 r2	SDG022510	2/25/2010	2/19/2010	2/26/2010	3/1/2010	03/10/2010	03/05/2010	-7
J19KD7	2981-360	SDG022510	2/25/2010	2/20/2010	2/26/2010	3/1/2010	03/10/2010	03/06/2010	-8
J19K89	2981-361	SDG022510	2/25/2010	2/21/2010	2/26/2010	3/1/2010	03/10/2010	03/07/2010	-9
J19K90	2981-362	SDG022510	2/25/2010	2/21/2010	2/26/2010	3/1/2010	03/10/2010	03/07/2010	-9
J19KF9	2981-363	SDG030310	3/3/2010	2/28/2010	3/10/2010	3/11/2010	03/10/2010	03/14/2010	-4
J19JM0	2981-364	SDG030310	3/3/2010	2/27/2010	3/10/2010	3/11/2010	03/10/2010	03/13/2010	-3
J19L04	2981-365 r1	SDG030310	3/3/2010	2/26/2010	3/10/2010	3/11/2010	03/10/2010	03/12/2010	-2
J19L04 DUP	2981-365 r2	SDG030310	3/3/2010	2/26/2010	3/10/2010	3/11/2010	03/10/2010	03/12/2010	-2

Summary Dates

QA/QC NARRATIVE

PROJECT:	Washington Closures Hanford AVS/SEM SDG021010, SDG021810, SDG022510, and SDG030310
PARAMETER:	Acid Volatile Sulfide (AVS) and Simultaneously Extracted Metals (SEM)
LABORATORY:	Pacific Northwest National Laboratory (PNNL) operated by Battelle, Marine Sciences Laboratory (MSL), Sequim, Washington
MATRIX:	Sediment
SAMPLE CUSTODY AND PROCESSING:	A total of 15 sediment samples were received at MSL between 02/10/10 and 3/3/10. All samples were received in good condition. Samples were assigned a Battelle Central File (CF) identification number (2981) and were entered into the MSL sample tracking and project management system.

SAMPLE PROCESSING INFORMATION:

MSL Code:	**2981* 351-365**
Description:	Sediment
Collection dates	02/5/10 through 02/28/10
Laboratory arrival date	02/10/10 through 03/03/10
Cooler temperature on arrival	2.7 to 5.6°C
AVS Extraction Dates:	02/18/10 to 03/10/10
AVS Analyses Dates:	02/18/10 to 03/11/10
SEM Analyses Dates:	03/10/10

METHODS:

Acid volatile sulfide (AVS) has been used to predict the sediment toxicity of copper (Cu), cadmium (Cd), nickel (Ni), lead (Pb) and zinc (Zn) (Ankley et al. 1996; Berry et al. 1996). This relationship results from the volatilization of AVS present in sediment and simultaneous release of previously sulfide bound metals (SEM). As a metal sulfide complex, early research indicates that metals are not available for uptake by benthic organisms. Under this assumption, the amount of AVS present in sediment limits the metal bioavailability and subsequent toxicity in sediments. Sulfide is an important binding component in modeling metal sorption in sediments (Morse et al. 1987). In the presence of excess sulfide, most of the reactive metal will form insoluble metal sulfides. The AVS becomes an indicator of the ratio of available sulfide to the SEM metals and allows the partitioning of free aqueous phase metal and solid phase metal in sediments. The five divalent metals (Cd, Ni, Cu, Pb and Zn) form metal sulfide complexes. If the molar ratios of the SEMs are greater than that of the AVS, the excess fraction of the metals may be considered to have a high potential for bioavailability. For divalent metals, one mole of SEM will react with one mole of AVS.

Sediment samples were extracted and analyzed for AVS in accordance with Battelle SOP MSL-C-001. This procedure is based on a peer-reviewed, published procedure for the analysis of AVS in sediment and dissolved sulfide in aqueous samples, adopted from a draft USEPA Method (Allen et al. 1991.). In this method, sulfide in the sample is converted to hydrogen sulfide by the addition of hydrochloric acid at room temperature. The hydrogen sulfide (H_2S) is purged from the sample by an inert gas and trapped in a sodium hydroxide (NaOH) solution. With the addition of a mixed-diamine reagent (MDR), the sulfide is converted to methylene blue and measured on a spectrometer. AVS results were reported in units of µmole/g on a dry-weight basis.

The SEM extracts were analyzed for all other metals by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) in accordance with Battelle SOP MSL-I-022, Determination of Elements in Aqueous and Digestate Samples by ICP/MS. The analysis guidelines for this procedure are adapted from USEPA Method 1638 Determination of Trace Elements in Ambient Waters by Inductively Coupled Plasma-Mass Spectrometry. The SEM metal solution concentrations are determined in units of µg/L and then converted to µg SEM/g of sediment extracted for AVS. These data are further converted to µmole/g for each SEM metal.

QA/QC NARRATIVE

HOLDING TIMES: The suggested holding time for AVS in sediment is 14 days per Battelle SOP MSL-C-001. The holding time may be extended if the samples are frozen and the oxidized layer is removed prior to analyses. The suggested holding time is calculated from day of collection to day of extraction (preservation of the sulfide). All samples were analyzed within the suggested holding time. All samples were stored frozen from time of receipt to analysis.

DATA QUALITY CRITERIA (DQC):

Analyte	Analytical Method	Method Range of Spike Recovery	Replicate Precisions (RPD)	Achieved MDL[1]
AVS	Spectrometer	75-125%	≤25%	0.0185 µmole/g
SEM Cd	ICP-MS	75-125%	≤25%	0.0530 µg/L
SEM Cu	ICP-MS	75-125%	≤25%	0.364 µg/L
SEM Ni	ICP-MS	75-125%	≤25%	0.0630 µg/L
SEM Pb	ICP-MS	75-125%	≤25%	0.0260 µg/L
SEM Zn	ICP-MS	75-125%	≤25%	0.323 µg/L

[1] Batch average is reported for AVS

DETECTION LIMITS: Analytical results were reported to the laboratory achieved method detection limits (MDL) as determined from the Annual MDL study. The MDLs were determined according to EPA's "Definition and Procedure for the Determination of the Method Detection Limit - revision 1.11" 40 CFR Part 136, Appendix B. The achieved MDLs for ICP-MS are an order of magnitude lower, however, the matrix of the SEM requires a 10x dilution of the SEM solution and the achieved MDLs are adjusted for this dilution factor. Data were evaluated and flagged in accordance with the following criteria:

U Undetected at the MDL, MDL reported.

* Duplicates outside the QC sample criterion.

N Spikes outside the QC sample criterion.

METHOD BLANKS: Three AVS Blanks were prepared with this group of samples. None of the blanks had detectable AVS. The AVS/SEM blank is created during the AVS analysis and the creation of the SEM sample. It consists of deionized water added to the bubblers along with hydrochloric acid used to oxidize the AVS from the sediment matrix. Ni, Pb, and Zn were detected above the ICP-MS MDL due to the presence of metals in the reagents used for the AVS. Therefore, the AVS/SEM blank was subtracted from the SEM concentrations reported in µg/L. In all cases, the blank concentrations were trivial relative to the sample concentrations. The SEM analytical blanks for the ICP-MS indicate there was no laboratory contamination.

LABORATORY CONTROL SAMPLE (LCS) ACCURACY: Duplicate laboratory control samples (LCS) samples are prepared and analyzed with the each analytical batch of AVS samples. All recoveries for the AVS LCS were within the QC criterion of 75-125% recovery. Since only AVS is spiked in the AVS LCS samples, the SEM collected from the AVS blank was post spiked with the SEM metals to generate an LCS for the SEM quantification. The SEM blank spikes or LCSs were within the QC criterion of 75-125% recovery.

A riverine water standard reference material (SRM) identified as SRM 1640 was analyzed with the SEM extract by ICP-MS to provide a measure of instrument accuracy. The percent recoveries between the measured and certified or reference values were within the method QC criterion of ±25% for all metals.

REPLICATE PRECISION: Three laboratory duplicates were analyzed with this sample set. The duplicate analyses for AVS consist of the extraction of two different aliquots of sediment from the same sample container. The SEM precision is calculated once the SEM metal concentrations (µg/L) determined from the ICP-MS are converted to a mass basis (µg/g) to account for

differences in sample mass extracted. Analytical precision was also assessed by the analyses of matrix spikes in duplicate. Precision of duplicate analyses was expressed as the relative percent difference (RPD) of replicate results. The RPD values were within the QC criterion of ≤25% for all parameters except one replicate pair for AVS (RPD=96%) and all SEM metals except Zn. The sample was very gravelly, making it difficult to weigh out a consistent sample between the two replicates. SEM analytical precision between MS/MSDs were all well within the 75% to 125% guidelines.

MATRIX SPIKE ACCURACY:

The analyses of the SEM extracts included the preparation of matrix spike samples in duplicate. An aliquot of the SEM extract was spiked with all SEM metals and analyzed with the batch. The matrix spike recoveries were within the QC acceptance criterion of ±25%.

REFERENCES:

Allen, H.E., F. Gongmin, W. Boothman, D. DiToro, and J. Mahoney. 1991. Determination of Acid Volatile Sulfides (AVS) and Simultaneously Extracted Metals in Sediment. Draft Analytical Method for Determination of Acid Volatile Sulfide in Sediment. USEPA Office of Science and Technology, Washington, DC. April, 1991.

Ankley, G. T., Di Toro, D. M., Hansen, D. J., and Berry W. J. 1996. Technical basis and proposal for deriving sediment quality criteria for metals. Environmental Toxicology and Chemistry. 15:2056-2066.

Berry, W. J., Hansen, D. J., Mahony, J. D., Robson, D. L., Di Toro, D. M., Shipley, B. P., Corbin, J. M. and Boothman, W. S. 1996. Predicting the toxicity of metals-spiked laboratory sediments using acid-volatile sulfide and interstitial water normalization. Environmental Toxicology and Chemistry. 15:2067-2079.

Morse, J. W., Millero, F. J., Cornwell, J. C. and Rickard, D. 1987. The chemistry of the hydrogen sulfide and iron sulfide systems in natural waters. Earth Science Review. 24:1-42.

SAMPLE LOGIN

Pacific Northwest NATIONAL LABORATORY | Battelle The Business of Innovation

Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382
PH: (360) 681-4565

Project Manager: Brandenberger
Date Received: 02/10/10
Batch: 27
Login Designee: McGahan
Project: **Washington Closure Hanford**

Sponsor ID	Site Description	Battelle Code	Matrix	Storage Location	Requested Parameters	Collection Date
J19JB2	na	2981-351	other solid	Hg Lab refrigerator	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/05/10
J19JB1	na	2981-352	other solid	Hg Lab refrigerator	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/05/10

SOP#: MSL-A-001

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-116-2122	Page 1 of 1

Collector	Company Contact / Telephone No.	Project Coordinator	Price Code / Data Turnaround
R. Curet	JOAN KESSNER 375-4688	KESSNER, JH	7C / 15 Days
Project Designation Columbia River Component of the RCBRA - Sediment	**Sampling Location** T100D2A	**SAF No.** RC-116	
Ice Chest No. EAS	**Field Logbook No.** EL-1645-01 / **COA** BESCRC6520	**Method of Shipment** FED EX	
Shipped To Battelle Marine Sciences	**Offsite Property No.** N/A	**Bill of Lading/Air Bill No.** 7983 7547 0090	

POSSIBLE SAMPLE HAZARDS/REMARKS
N/A

Special Handling and/or Storage
N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.								
J19JB1 2981.352	OTHER SOLID	02-05-10	1620	X								

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R.Curet R.C	02-05-10 1721	EAS REF D R.Curet	02-05-10 1721
EAS REF D SJ	2/9/10 0930	SHANNAN JOHNSON	2/9/10 0930
CHANNAN JOHNSON	2/9/10 0930	FDX	
			02/10/09 1230

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23675

J19J93 SAF:RC-116 RDD T100D2A River Sediment 60ml poly jar

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23675
Sample Description	: J19J93 SAF:RC-116 RDD T100D2A River Sediment 60ml poly jar
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 6.100E+01 grams
Facility	: Default
Sample Taken On	: 2/5/2010 4:20:44PM
Acquisition Started	: 2/8/2010 10:05:04AM
Procedure	: Non Standard Geometry
Operator	: eswallac
Detector Name	: PGTWHITE
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.7 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

Energy Calibration Used Done On	: 1/17/2010
Efficiency Calibration Used Done On	: 1/17/2010
Efficiency Calibration Description	: PGTWhite NonSTD Geom EffCal 011310 80398-238

Sample Number : 34468

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	1.000	8.96E+00	2.33E+00	
PB-212	0.709	5.57E-01	1.25E-01	
RA-226d	0.614	3.63E-01	1.39E-01	
TH-232d	0.678	4.39E-01	1.35E-01	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2123	Page 1 of 1
Collector R. Barron	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7C / Data Turnaround 15 Days
Project Designation Columbia River Component of the RCBRA - Sediment	Sampling Location T100D3A		SAF No. RC-116	
Ice Chest No. EAS	Field Logbook No. EL-1645	COA BESCRC6520	Method of Shipment FED EX	
Shipped To Battelle Marine Sciences	Offsite Property No. N/A		Bill of Lading/Air Bill No. 7983 7547 0090	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C											
Type of Container	G											
No. of Container(s)	1											
Volume	125g											
SAMPLE ANALYSIS	See item (1) in Special Instructions											
Sample No.	Matrix *	Sample Date	Sample Time									
J19JB2 298436	OTHER SOLID	2-5-10	1530	X								

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R Barron RB	2-5-10 1700	EAS ref D RB	2-5-10 1700
EAS Ref D	2/9/10 0930	SHANNON JOHNSON	2/9/10 0930
SHANNON JOHNSON	2/9/10 0930	FDX	
		C Hahn	02/10/10 1230

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES, AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23676

J19J94 SAF:RC-116 RDD T100D3A River Sediment 60g poly jar

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23676
Sample Description	: J19J94 SAF:RC-116 RDD T100D3A River Sediment 60g poly jar
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 2.480E+02 grams
Facility	: Default
Sample Taken On	: 2/5/2010 3:30:00PM
Acquisition Started	: 2/8/2010 10:06:48AM
Procedure	: Non Standard Geometry
Operator	: eswaltac
Detector Name	: REGIE02
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.4 seconds
Dead Time	: 0.01 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 11/3/2009
Efficiency Calibration Used Done On	: 11/22/2009
Efficiency Calibration Description	: REGE02 NSTD 11/11/09 EffCalSN 80398-238
Sample Number	: 34479

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40	0.995	5.55E+00	8.89E-01	
	PB-212	0.711	2.85E-01	4.36E-02	
	RA-226d	0.770	2.57E-01	4.06E-02	
	TH-232d	0.998	2.33E-01	4.04E-02	
X	U-235	0.543			

LOG-IN CHECKLIST

Reference SOP# MSL-A-001

Central File #: 2981 Sample No(s): 351-352 Batch: Brandenberger

Project Name: DA Closure Hanford Project Manager: ↔ 27

TO BE COMPLETED BY PROJECT MANAGER (prior to arrival when possible)

Matrix: _____ WP# _____

Yes	No		
☐	☑	Navy-type Project (requires high-level sample tracking procedures)	
☐	☑	USDA Samples (see Compliance Agreement Checklist)	PM Verification:
☐	☑	Filter Samples:	Amount: Entire sample Half of sample
☐	☑	Freeze dry sample(s) - samples will be weighed and placed in ultralow temp freezer (Login Lab)	
☑	☐	Special instructions:	Short HT (14 days)

Sample Preservation Instructions: _____

See LIMS for archive/disposal information

TO BE COMPLETED UPON SAMPLE ARRIVAL/LOG-IN

Yes	No	N/A	Indicate in Appropriate Box	
☐	☑	☐	Custody seal present	Seal intact? (YES) NO
☑	☐	☐	Cooler temperature (acceptable range: 4±2°C or solids:frozen) (if multiple coolers, note temp. of each)	4.0 °C °C
☐	☐	☑	Project Manager notified of any custody/login discrepancies (cooler temp, sponsor codes, etc)	
☑	☐	☐	Were all chain of custody forms signed and dated?	
☐	☑	☐	Were samples filtered at MSL?	

Comment/Remedy: _____

Sample condition(s): (Acceptable) Other (explain): _____

Container type: Tedlar Poly Glass Cap. Vial Other: _____

Notes: Samples frozen

Completed By: [signature] Date/Time: 02/10/10 1230

SAMPLE PRESERVATION

☑	Sample(s) were preserved prior to arrival at MSL (noted on CoC / Sample / per PM Instruction)		
☐	Random pH checked for ~10% of samples (use dip paper)	Sample IDs:	
☐	Complete pH check required for project (use pH meter and record on pH Record form)		
☐	Sample(s) were preserved at MSL		

Type:				
☐	0.2% HNO3	Notes:		Lot#
☐	0.5% HCl (Hg samples)	Notes:		Lot#
☑	Refrigerate/Freeze	Notes:	deep freeze C-1	
☐	Other	Notes:		

Completed By: [signature] Date/Time: 02/10/10 1230

Storage Shelf: deep freeze C-1

Pacific Northwest NATIONAL LABORATORY | Battelle The Business of Innovation

SAMPLE LOGIN

Project Manager: Brandenberger
Date Received: 02/18/10
Batch: 28
Login Designee: McGahan

Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382
PH: (360) 681-4565

Project: **Washington Closure Hanford**

Sponsor ID	Site Description	Battelle Code	Matrix	Storage Location *	Requested Parameters	Collection Date
J19JP1 ✓	na	2981-353 ✓	other solid	Prep Lab 130	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/14/10
J19JP0	na	2981-354	other solid	Prep Lab 130	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/14/10
J19K94	na	2981-355	other solid	Prep Lab 130	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/15/10
J19K93	na	2981-356	other solid	Prep Lab 130	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/15/10
J19K25	na	2981-357	other solid	Prep Lab 130	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/12/10
J19K24	na	2981-358	other solid	Prep Lab 130	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/12/10

*processed day of delivery 2/18/10

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2155	Page 1 of 1
Collector: Sam Gulbo	Company Contact: JOAN KESSNER	Telephone No.: 375-4683	Project Coordinator: KESSNER, JH	Price Code: 7C
Project Designation: Columbia River Component of the RCBRA - Sediment	Sampling Location: 100 D J100D9		SAF No.: RC-116	Data Turnaround: 15 Days
Ice Chest No.: EAS	Field Logbook No.: EL-1645-61	COA: BESCRC6520	Method of Shipment: FED EX	
Shipped To: Battelle Marine Sciences	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: 798399447 2907	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C											
Type of Container	G											
No. of Container(s)	1											
Volume	125g											
SAMPLE ANALYSIS	See item (1) in Special Instructions.											
Sample No.	Matrix *	Sample Date	Sample Time									
J19JP1 2981 · 353	OTHER SOLID	2-14-10	15:30	X								

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Sam Gulbo	Date/Time: 2-14-10 17:15	Received By/Stored In: EAS Ref D	Date/Time: 2-14-10 17:15
Relinquished By/Removed From: EAS LOCKED STORAGE D	Date/Time: 2/17/10 1245	Received By/Stored In: SHANNAN JOHNSON	Date/Time: 2/17/10 1245
Relinquished By/Removed From: SHANNAN JOHNSON	Date/Time: 2/17/10 1245	Received By/Stored In: FDX	Date/Time:
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time: 03/18/10 1230
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23730

J19JN7 SAF:RC-116 RDD J100D9 River Sediment 60ml poly jar

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23730
Sample Description	: J19JN7 SAF:RC-116 RDD J100D9 River Sediment 60ml poly jar
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 6.200E+01 grams
Facility	: Default
Sample Taken On	: 2/14/2010 3:30:00PM
Acquisition Started	: 2/16/2010 12:40:56PM
Procedure	: Non Standard Geometry
Operator	: KSE
Detector Name	: REGIE02
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.3 seconds
Dead Time	: 0.01 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 11/3/2009
Efficiency Calibration Used Done On	: 11/22/2009
Efficiency Calibration Description	: REGE02 NSTD 11/11/09 EffCalSN 80398-238
Sample Number	: 34711

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

Nuclide Name	*Nuclide Id Confidence*	*Wt mean Activity (pCi/grams)*	*Wt mean Activity Uncertainty*	*Comments*
K-40	0.998	1.06E+01	2.49E+00	
PB-212	0.710	6.44E-01	1.35E-01	
RA-226d	0.714	6.08E-01	1.32E-01	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2154	Page 1 of 1
Collector: Rylie Barron	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 7C — Data Turnaround: 15 Days
Project Designation: Columbia River Component of the RCBRA - Sediment	Sampling Location: 100 D J1CC039		SAF No.: RC-116	
Ice Chest No.: EAS	Field Logbook No.: EL-1645	COA: BESCRC6520	Method of Shipment: FED EX	
Shipped To: Battelle Marine Sciences	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: 7983 9947 2907	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.										
Sample No.	Matrix *	Sample Date	Sample Time								
J19JP02981.354	OTHER SOLID	2-14-10	1710	X							

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From: R. Barron RB — Date/Time: 1830 2-14-10	Received By/Stored In: R. Barron EAS ref D RB — Date/Time: 1830 2-14-10	
Relinquished By/Removed From: EAS LOCKED STORAGE D — Date/Time: 2/17/10 1245	Received By/Stored In: SHANNAN JOHNSON — Date/Time: 2/17/10 1245	
Relinquished By/Removed From: SHANNAN JOHNSON — Date/Time: 2/17/10 1245	Received By/Stored In: FDX — Date/Time:	
Relinquished By/Removed From: — Date/Time:	Received By/Stored In: — Date/Time: 04/18/10 1230	
Relinquished By/Removed From: — Date/Time:	Received By/Stored In: — Date/Time:	
Relinquished By/Removed From: — Date/Time:	Received By/Stored In: — Date/Time:	

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *
A=Air
Sd=Sediment
SO=Solid
Sl=Sludge
W=Water
O=Oil
A=Air
Ds=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23729

J19JN6 SAF:RC-116 RDD J100D39 River Sediment 60ml poly jar

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23729
Sample Description	: J19JN6 SAF:RC-116 RDD J100D39 River Sediment 60ml poly jar
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 5.900E+01 grams
Facility	: Default
Sample Taken On	: 2/14/2010 5:10:00PM
Acquisition Started	: 2/16/2010 12:40:44PM
Procedure	: Non Standard Geometry
Operator	: KSE
Detector Name	: PGTWHITE
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.7 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

Energy Calibration Used Done On	: 1/17/2010
Efficiency Calibration Used Done On	: 1/17/2010
Efficiency Calibration Description	: PGTWhite NonSTD Geom EffCal 011310 80398-238
Sample Number	: 34712

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	1.000	1.29E+01	2.71E+00	
PB-212	0.710	6.99E-01	1.48E-01	
RA-226d	0.616	6.08E-01	1.50E-01	
TH-232d	0.823	5.49E-01	1.51E-01	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2199	Page 1 of 1
Collector: Sam Gilbo	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 7C — Data Turnaround: 15 Days
Project Designation: Columbia River Component of the RCBRA - Sediment	Sampling Location: HTS JHT519		SAF No.: RC-116	
Ice Chest No.: EAS	Field Logbook No.: EL-1645-01	COA: BESCRC6520	Method of Shipment: FED EX	
Shipped To: Battelle Marine Sciences	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: 7983 9947 2907	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										
SAMPLE ANALYSIS	See item (1) in Special Instructions										
Sample No.	Matrix *	Sample Date	Sample Time								
J19K94 2981 · 355	OTHER SOLID	2-15-10	1420	X							

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Sam Gilbo	2-15-10 / 1645	EAS Ret'd	2-15-10 / 1645
EAS REFD	2/17/10 1245	SHANNAN JOHNSON	2/17/10 1245
SHANNAN JOHNSON	2/17/10 1245	FDX	
			02/18/10 1230

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *: S=Soil; SE=Sediment; SO=Solid; SL=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23727

J19K76 SAF:RC-116 RDD JHTS19 River Sediment 1000ml poly jar

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23727
Sample Description	: J19K76 SAF:RC-116 RDD JHTS19 River Sediment 1000ml poly jar
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 2.210E+02 grams
Facility	: Default
Sample Taken On	: 2/15/2010 2:20:00PM
Acquisition Started	: 2/16/2010 11:36:11AM
Procedure	: Non Standard Geometry
Operator	: KSE
Detector Name	: REGIE02
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.3 seconds
Dead Time	: 0.01 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 11/3/2009
Efficiency Calibration Used Done On	: 11/22/2009
Efficiency Calibration Description	: REGE02 NSTD 11/11/09 EffCalSN 80398-238
Sample Number	: 34702

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

Nuclide Name	*Nuclide Id Confidence*	*Wt mean Activity (pCi/grams)*	*Wt mean Activity Uncertainty*	*Comments*
K-40	0.997	2.73E+00	6.79E-01	
PB-212	0.711	1.53E-01	3.34E-02	
RA-226d	0.731	1.13E-01	3.67E-02	
TH-232d	0.853	1.04E-01	3.26E-02	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2198	Page 1 of 1
Collector: Rylie Barron	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 7C	Data Turnaround: 15 Days
Project Designation: Columbia River Component of the RCBRA - Sediment	Sampling Location: HTS 1HTS18		SAF No.: RC-116		
Ice Chest No.: EAS	Field Logbook No.: EL-1645	COA: BESCRC6520	Method of Shipment: FED EX		
Shipped To: Battelle Marine Sciences	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: 7983 9947 2907		

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.										
Sample No.	Matrix *	Sample Date	Sample Time								
J19K93 2981-356	OTHER SOLID	2-15-10	1320	X							

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: R Barron RB	Date/Time: 1830 2-15-10	Received By/Stored In: R. Barron EAS ref D RB	Date/Time: 1830 2-15-10
Relinquished By/Removed From: EAS LOCKED STORAGE D	Date/Time: 2/17/10 1245	Received By/Stored In: SHANNAN JOHNSON	Date/Time: 2/17/10 1245
Relinquished By/Removed From: SHANNAN JOHNSON	Date/Time: 2/17/10 1245	Received By/Stored In: FDX	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In: [signature]	Date/Time: 02/18/10 1230
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *

s=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23726

J19K75 SAF:RC-116 RDD JHTS18 River Sediment 1000ml poly jar

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23726
Sample Description	: J19K75 SAF:RC-116 RDD JHTS18 River Sediment 1000ml poly jar
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 2.070E+02 grams
Facility	: Default
Sample Taken On	: 2/15/2010 1:20:00PM
Acquisition Started	: 2/16/2010 10:33:59AM
Procedure	: Non Standard Geometry
Operator	: KSE
Detector Name	: REGIE02
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.5 seconds
Dead Time	: 0.01 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

Energy Calibration Used Done On	: 11/3/2009
Efficiency Calibration Used Done On	: 11/22/2009
Efficiency Calibration Description	: REGE02 NSTD 11/11/09 EffCalSN 80398-238

Sample Number : 34695

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40	0.999	8.61E+00	1.15E+00	
	CS-137	0.993	3.27E-02 MDA	2.93E-02	
X	EU-155	0.396			
	PB-212	0.999	7.60E-01	7.23E-02	
	RA-226d	0.884	5.43E-01	5.41E-02	
	TH-232d	0.998	7.23E-01	6.57E-02	
	U-235	0.546	6.53E-02	3.96E-02	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-116-2175	Page 1 of 1

Collector: Sam Gilboo	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 7C	Data Turnaround: 15 Days
Project Designation: Columbia River Component of the RCBRA - Sediment	Sampling Location: 100 F T100F2A		SAF No.: RC-116		
Ice Chest No.: EAS	Field Logbook No.: EL-1645-01	COA: BESCRC6520	Method of Shipment: FED EX		
Shipped To: Battelle Marine Sciences	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: 7983 9947 2907		

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.										
Sample No.	Matrix *	Sample Date	Sample Time								
J19K25 2981 - 357	OTHER SOLID	2-12-10	14:45	X							

CHAIN OF POSSESSION

Sign/Print Names			
Relinquished By/Removed From: Sam Gilboo	Date/Time: 2-12-10 1920	Received By/Stored In: EAS Locked Storage	Date/Time: 2-12-10 1920
Relinquished By/Removed From: EAS LOCKED STORAGE	Date/Time: 2/17/10 1245	Received By/Stored In: SHANNAN JOHNSON	Date/Time: 2/17/10 1245
Relinquished By/Removed From: SHANNAN JOHNSON	Date/Time: 2/17/10 1245	Received By/Stored In: FEDEX	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time: 02/18/10 1230
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23725

J19K19 SAF:RC-116 RDD T100F2A River Sediment 1000ml poly jar

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23725
Sample Description	: J19K19 SAF:RC-116 RDD T100F2A River Sediment 1000ml poly jar
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 1.270E+02 grams
Facility	: Default
Sample Taken On	: 2/12/2010 2:45:00PM
Acquisition Started	: 2/16/2010 10:21:25AM
Procedure	: Non Standard Geometry
Operator	: KSE
Detector Name	: PGTWHITE
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.7 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 1/17/2010
Efficiency Calibration Used Done On	: 1/17/2010
Efficiency Calibration Description	: PGTWhite NonSTD Geom EffCal 011310 80398-238
Sample Number	: 34694

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	1.000	1.04E+01	1.59E+00	
CS-137	0.994	5.87E-02 LMDA	4.62E-02	
PB-212	0.711	5.75E-01	8.32E-02	
RA-226d	0.846	3.71E-01	6.94E-02	
TH-232d	0.995	4.14E-01	6.22E-02	

Analysis Report for RCF23726

J19K75 SAF:RC-116 RDD JHTS18 River Sediment 1000ml poly jar

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
U-238d	0.323	6.33E-01	1.92E-01	

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity
d = identified by daughter product energy lines assumed to be in secular equilibrium
Errors quoted at 2.000 sigma

UNIDENTIFIED PEAKS

Peak Locate Performed on : 2/16/2010 11:34:03AM
Peak Locate From Channel : 80
Peak Locate To Channel : 4096

	Peak No.	Energy (keV)		Peak Rate (CPS)	Peak Rate (%) Uncertainty
m	4	89.78	Ac-228	2.14E-02	18.74
m	9	300.00	Pb-212	1.65E-02	15.43
	10	328.18	Ac-228	7.76E-03	58.57
	13	463.01	Ac-228	8.61E-03	53.88
	14	510.50	Annihilation	2.25E-02 photon +/or Tl-208	21.69
	18	727.12	Bi-212	1.32E-02	27.46

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
NP = No Peak
UK = Unknown
Errors quoted at 2.000 sigma

NUCLIDE MDA REPORT

Nuclide Library Used : \\GOZER\ApexRoot\Default\Library\RCF UNKNOWN.NLB

	Nuclide Name	Energy (keV)		Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	K-40	1460.83	*	10.67	8.61E+00	7.95E-01	7.95E-01
	CO-60	1173.24		99.90	3.91E-02	6.53E-02	9.01E-02
		1332.50		99.98	-1.14E-02		6.53E-02
	NB-94	702.63		99.81	-1.20E-02	6.36E-02	6.36E-02
		871.10		99.89	-3.46E-02		6.89E-02
	AG-108m	433.94		90.50	-3.18E-02	5.35E-02	5.35E-02
		614.28		89.80	6.81E-03		9.12E-02

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2174	Page 1 of 1
Collector: Rylie Barron	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 7C — Data Turnaround: 15 Days
Project Designation: Columbia River Component of the RCBRA - Sediment	Sampling Location: 100 F J100F11		SAF No.: RC-116	
Ice Chest No.: EAS	Field Logbook No.: EL-1645	COA: BESCRC6520	Method of Shipment: FED EX	
Shipped To: Battelle Marine Sciences	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: 7483 99472907	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C											
Type of Container	G											
No. of Container(s)	1											
Volume	125g											
SAMPLE ANALYSIS	See item (1) in Special Instructions.											
Sample No.	Matrix *	Sample Date	Sample Time									
J19K24 2981.358	OTHER SOLID	2-12-10	1345	X								

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: R. Barron RB	Date/Time: 2010 2-12-10	Received By/Stored In: R Barron EAS Ref D RB	Date/Time: 2010 2-12-10
Relinquished By/Removed From: EAS LOCKED STORAGE	Date/Time: 2/17/10 1245	Received By/Stored In: SHANNAN JOHNSON	Date/Time: 2/17/10 1245
Relinquished By/Removed From: SHANNAN JOHNSON	Date/Time: 2/17/10 1245	Received By/Stored In: FDX	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time: 02/18/10 1230
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23724

J19K18 SAF:RC-116 RDD J100F11 River Sediment 1000ml poly jar

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23724
Sample Description	: J19K18 SAF:RC-116 RDD J100F11 River Sediment 1000ml poly jar
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 3.700E+02 grams
Facility	: Default
Sample Taken On	: 2/12/2010 1:45:00PM
Acquisition Started	: 2/16/2010 9:32:22AM
Procedure	: Non Standard Geometry
Operator	: KSE
Detector Name	: REGIE02
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3649.7 seconds
Dead Time	: 1.38 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 11/3/2009
Efficiency Calibration Used Done On	: 11/22/2009
Efficiency Calibration Description	: REGE02 NSTD 11/11/09 EffCalSN 80398-238
Sample Number	: 34697

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40	0.995	5.56E+00	7.14E-01	
	CS-137	0.962	3.50E-02 LMDA	2.75E-02	
X	EU-155	0.387			
	PB-212	0.999	2.99E-01	3.37E-02	
	RA-226d	0.715	2.45E-01	3.32E-02	
	TH-232d	0.994	2.35E-01	3.19E-02	

LOG-IN CHECKLIST

Reference SOP# MSL-A-001

Central File #: 2981 Sample No(s): 353-358 Batch: 28

Project Name: WA Closure Hanford Project Manager: Braudenberger

TO BE COMPLETED BY PROJECT MANAGER (prior to arrival when possible)

Matrix: _____ WP# _____

Yes	No	
☐	☐	Navy-type Project (requires high-level sample tracking procedures)
☐	☐	USDA Samples (see Compliance Agreement Checklist)

PM Verification:

☐	☐	Filter Samples: Amount: Entire sample Half of sample
☐	☐	Freeze dry sample(s) - samples will be weighed and placed in ultralow temp freezer (Login Lab)
☐	☐	Special instructions:

Sample Preservation Instructions: _____

See LIMS for archive/disposal information

TO BE COMPLETED UPON SAMPLE ARRIVAL/LOG-IN

Yes	No	N/A	Indicate in Appropriate Box	
☐	N/A	☐	Custody seal present	Seal intact? YES NO
N/A	☐	☐	Cooler temperature (acceptable range: 4±2°C or solids:frozen) (if multiple coolers, note temp. of each)	2.7 °C _____ °C
☐	☐	N/A	Project Manager notified of any custody/login discrepancies (cooler temp, sponsor codes, etc) Comment/Remedy:	
N/A	☐	☐	Were all chain of custody forms signed and dated?	
☐	N/A	☐	Were samples filtered at MSL?	

Sample condition(s): (Acceptable) Other (explain):

Container type: Teflon Poly (Glass) Cap. Vial Other:

Notes: _____

Completed By: _____ Date/Time: 02/18/10 1220

SAMPLE PRESERVATION

☐ Sample(s) were preserved prior to arrival at MSL (noted on CoC / Sample / per PM Instruction)

☐ Random pH checked for ~10% of samples (use dip paper) Sample IDs: _____

☐ Complete pH check required for project (use pH meter and record on pH Record form)

☐ Sample(s) were preserved at MSL

Type: ☐	0.2% HNO3	Notes:	Lot#
☐	0.5% HCl (Hg samples)	Notes:	Lot#
☐	Refrigerate/Freeze	Notes:	
N/A	Other	Notes:	Prep lab for processing

Completed By: _____ Date/Time: 02/18/10 1220

Storage Shelf: _____

SAMPLE LOGIN

Pacific Northwest NATIONAL LABORATORY | Battelle The Business of Innovation

Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382
PH: (360) 681-4565

Project Manager: Brandenberger
Date Received: 2/25/2010
Batch: 29
Login Designee: McGahan

Project: **Washington Closure Hanford**

Sponsor ID	Site Description	Battelle Code	Matrix	Storage Location	Requested Parameters	Collection Date
J19H40	na	2981-359	other solid	refrigerator in Hg Lab	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/19/10
J19KD7	na	2981-360	other solid	refrigerator in Hg Lab	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/20/10
J19K89	na	2981-361	other solid	refrigerator in Hg Lab	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/21/10
J19K90	na	2981-362	other solid	refrigerator in Hg Lab	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/21/10

J J 2/25/10

SOP#: MSL-A-001

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2084	Page 1 of 1
Collector Rylie Barron	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7C — Data Turnaround 15 Days
Project Designation Columbia River Component of the RCBRA - Sediment	Sampling Location 100BC T100BC151		SAF No. RC-116	
Ice Chest No. 009-001	Field Logbook No. EL-1645	COA BESCRC6520	Method of Shipment FED EX	
Shipped To Battelle Marine Sciences	Offsite Property No. N/A		Bill of Lading/Air Bill No. 7984 2121 8483	

POSSIBLE SAMPLE HAZARDS/REMARKS
N/A

Special Handling and/or Storage
N/A

Preservation	Cool to 4C
Type of Container	G
No. of Container(s)	1
Volume	125g

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

Sample No.	Matrix *	Sample Date	Sample Time	
J19H40 2981-359	OTHER SOLID	2-19-10	1620	X

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R. Barron RB	2-19-10 1830	R. Barron EAS ICF D RB	2-19-10 1830
EAS LOCKED STORAGE	2/24/10 1340	SHANNAN JOHNSON	2/24/10 1340
SHANNAN JOHNSON	2/24/10 1340	FDX	
		[signature]	02/25/10 1235

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS {Cadmium, Copper, Lead, Nickel, Zinc}

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23751

J19KC9 SAF:RC-116 RDD/100BC 2A-A 120 POLY BOTTLE

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23751
Sample Description	: J19KC9 SAF:RC-116 RDD/100BC 2A-A 120 POLY BOTTLE
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 2.530E+02 grams
Facility	: Default
Sample Taken On	: 2/20/2010 3:15:00PM
Acquisition Started	: 2/22/2010 9:15:35AM
Procedure	: Non Standard Geometry
Operator	: RCT
Detector Name	: PGTWHITE
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.8 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 1/17/2010
Efficiency Calibration Used Done On	: 1/17/2010
Efficiency Calibration Description	: PGTWhite NonSTD Geom EffCal 011310 80398-238
Sample Number	: 34819

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40	1.000	7.15E+00	9.63E-01	
X	EU-155	0.367			
	PB-212	0.998	4.63E-01	5.05E-02	
	RA-226d	0.943	3.36E-01	4.29E-02	
	TH-232d	0.996	4.50E-01	4.38E-02	
	U-238d	0.322	3.22E-01 LMDA	1.48E-01	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2213	Page 1 of 1
Collector: Sam Gilbo	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 7C — Data Turnaround: 15 Days
Project Designation: Columbia River Component of the RCBRA - Sediment	Sampling Location: 100 BC ZA-A		SAF No.: RC-116	
Ice Chest No.: 009-001	Field Logbook No.: EL-1645-01	COA: BESCRC6520	Method of Shipment: FED EX	
Shipped To: Battelle Marine Sciences	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: 7984 2121 8483	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.										
Sample No.	Matrix *	Sample Date	Sample Time								
J19KD7 2981.360	OTHER SOLID	2-20-10	15:15	X							

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Sam Gilbo	2-20-10 17:00	EAS Ref D	2-20-10 17:00
EAS LOCKED STORAGE D	2/24/10 1340	SHANNAN JOHNSON	2/24/10 1340
SHANNAN JOHNSON	2/24/10 1340	FOX	
			04/25/10 1235

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *: S=Soil; SE=Sediment; SO=Solid; SL=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23753

J19K71 SAF:RC-116 RDD/HTS JHTS33 1000ml POLY

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23753
Sample Description	: J19K71 SAF:RC-116 RDD/HTS JHTS33 1000ml POLY
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 2.200E+02 grams
Facility	: Default
Sample Taken On	: 2/21/2010 12:55:00PM
Acquisition Started	: 2/22/2010 10:20:38AM
Procedure	: Non Standard Geometry
Operator	: RCT
Detector Name	: PGTWHITE
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.7 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 1/17/2010
Efficiency Calibration Used Done On	: 1/17/2010
Efficiency Calibration Description	: PGTWhite NonSTD Geom EffCal 011310 80398-238
Sample Number	: 34822

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40	1.000	8.04E+00	1.09E+00	
	CS-137	0.999	3.34E-02	3.58E-02	< MDA
	PB-212	0.711	4.75E-01	5.91E-02	
	RA-226d	0.885	2.97E-01	4.81E-02	
	TH-232d	0.850	3.56E-01	5.68E-02	
X	U-235	0.544			
	U-238d	0.318	5.32E-01	1.75E-01	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2194	Page 1 of 1
Collector Rylie Barron	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7C — Data Turnaround 15 Days
Project Designation Columbia River Component of the RCBRA - Sediment	Sampling Location HTS JHTS 33		SAF No. RC-116	
Ice Chest No. 009-001	Field Logbook No. EL-1645	COA BESCRC6520	Method of Shipment FED EX	
Shipped To Battelle Marine Sciences	Offsite Property No. N/A		Bill of Lading/Air Bill No. 7984 2121 8483	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.										

Sample No.	Matrix *	Sample Date	Sample Time									
J19K89 2981.361	OTHER SOLID	2-21-10	1255	X								

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From R Barron R.B.	Date/Time 1900 2-21-10	Received By/Stored In R Barron EAS Rot D R.B.	Date/Time 1900 2-21-10
Relinquished By/Removed From EAS LOCKED STORAGE	Date/Time 2/24/10 1340	Received By/Stored In SHANNAN JOHNSON	Date/Time 2/24/10 1340
Relinquished By/Removed From SHANNAN JOHNSON	Date/Time 2/24/10 1340	Received By/Stored In FOX	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In [signature]	Date/Time 02/25/10 1255
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS {Cadmium, Copper, Lead, Nickel, Zinc}

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23754

J19K72 SAF:RC-116 RDD/HTS JHTS9 1000ml POLY

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23754
Sample Description	: J19K72 SAF:RC-116 RDD/HTS JHTS9 1000ml POLY
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 6.780E+02 grams
Facility	: Default
Sample Taken On	: 2/21/2010 4:45:00PM
Acquisition Started	: 2/22/2010 10:20:53AM
Procedure	: Non Standard Geometry
Operator	: RCT
Detector Name	: REGIE02
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.8 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 11/3/2009
Efficiency Calibration Used Done On	: 11/22/2009
Efficiency Calibration Description	: REGE02 NSTD 11/11/09 EffCalSN 80398-238
Sample Number	: 34828

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometrics. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40	0.987	5.23E+00	5.19E-01	
	CS-137	0.998	2.40E-02	1.44E-02	
X	EU-155	0.373			
	PB-212	1.000	3.60E-01	2.96E-02	
	RA-226d	0.995	2.91E-01	2.16E-02	
	TH-232d	0.997	4.44E-01	2.69E-02	
	U-235	0.543	1.84E-02	2.01E-02	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2195	Page 1 of 1
Collector Sam Gilbo	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7C / Data Turnaround 15 Days
Project Designation Columbia River Component of the RCBRA - Sediment	Sampling Location HTS JHT59		SAF No. RC-116	
Ice Chest No. 009-001	Field Logbook No. EL-1645-01	COA BESCRC6520	Method of Shipment FED EX	
Shipped To Battelle Marine Sciences	Offsite Property No. N/A		Bill of Lading/Air Bill No. 7984 2121 8483	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.										

Sample No.	Matrix *	Sample Date	Sample Time									
J19K90 2981-361	OTHER SOLID	2-21-10	16:45	X								
		SA 2-21-10										

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Sam Gilbo	2-21-10 18:40	EAS Ref D	2-21-10 18:40
	2/24/10		2/24/10
EAS LOCKED STORAGE D	1340	SHANNAN JOHNSON	1340
SHANNAN JOHNSON	2/24/10 1340	FOX	
			2/25/10 1225

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS {Cadmium, Copper, Lead, Nickel, Zinc}

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23752

J19H36 SAF:RC-116 RDD/100BC T100BC1J1 60g aG

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23752
Sample Description	: J19H36 SAF:RC-116 RDD/100BC T100BC1J1 60g aG
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 1.140E+02 grams
Facility	: Default
Sample Taken On	: 2/19/2010 4:20:00PM
Acquisition Started	: 2/22/2010 9:15:43AM
Procedure	: Non Standard Geometry
Operator	: RCT
Detector Name	: REGIE02
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3629.6 seconds
Dead Time	: 0.82 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV
Energy Calibration Used Done On	: 11/3/2009
Efficiency Calibration Used Done On	: 11/22/2009
Efficiency Calibration Description	: REGE02 NSTD 11/11/09 EffCalSN 80398-238
Sample Number	: 34820

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

INTERFERENCE CORRECTED REPORT

Nuclide Name	*Nuclide Id Confidence*	*Wt mean Activity (pCi/grams)*	*Wt mean Activity Uncertainty*	*Comments*
K-40	0.974	1.07E+01	1.77E+00	
PB-212	0.711	4.43E-01	8.45E-02	
RA-226d	0.612	3.89E-01	8.58E-02	
TH-232d	0.847	4.16E-01	8.05E-02	

LOG-IN CHECKLIST

Reference SOP# MSL-A-001

Central File #: 2981 Sample No(s): 359 - 362 Batch: 29

Project Name: WA Closure Hanford Project Manager: Brandenberger

TO BE COMPLETED BY PROJECT MANAGER (prior to arrival when possible)

Matrix: _____ WP# _____

Yes	No	
☐	☐	Navy-type Project (requires high-level sample tracking procedures)
☐	☐	USDA Samples (see Compliance Agreement Checklist)

PM Verification: _____

☐	☐	Filter Samples: Amount: Entire sample Half of sample
☐	☐	Freeze dry sample(s) - samples will be weighed and placed in ultralow temp freezer (Login Lab)
☐	☐	Special Instructions: _____

Sample Preservation Instructions: _____

See LIMS for archive/disposal information

TO BE COMPLETED UPON SAMPLE ARRIVAL/LOG-IN

Yes	No	N/A	Indicate in Appropriate Box	
☐	☒	☐	Custody seal present	Seal intact? YES NO
☒	☐	☐	Cooler temperature (acceptable range: 4±2°C or solids:frozen) (if multiple coolers, note temp. of each)	4.1 °C _____ °C
☐	☐	☒	Project Manager notified of any custody/login discrepancies (cooler temp, sponsor codes, etc) Comment/Remedy: _____	
☒	☐	☐	Were all chain of custody forms signed and dated?	
☐	☒	☐	Were samples filtered at MSL?	

Sample condition(s): ~~Acceptable~~ ~~Other (explain):~~

Container type: ~~Teflon~~ ~~Poly~~ (Glass) Cap. Vial Other: _____

Notes: _____

Completed By: _____ Date/Time: 04/25/10 1235

SAMPLE PRESERVATION

☐	Sample(s) were preserved prior to arrival at MSL (noted on CoC / Sample / per PM Instruction)
☐	Random pH checked for ~10% of samples (use dip paper) Sample IDs: _____
☐	Complete pH check required for project (use pH meter and record on pH Record form)
☒	Sample(s) were preserved at MSL

Type: ☐	0.2% HNO3	Notes: _____	Lot# _____
☐	0.5% HCl (Hg samples)	Notes: _____	Lot# _____
☑	Refrigerate/Freeze	Notes: ref in Hg Lab	
☐	Other:	Notes: _____	

Completed By: _____ Date/Time: 04/26/10 1235

Storage Shelf: _____

SAMPLE LOGIN

Pacific Northwest NATIONAL LABORATORY | Battelle The Business of Innovation

Project Manager: Brandenberger
Date Received: 03/03/10
Batch: 30
Login Designee: McGahan
Project: **Washington Closure Hanford**

Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382
PH: (360) 681-4565

Sponsor ID	Site Description	Battelle Code	Matrix	Storage Location	Requested Parameters	Collection Date
J19KF9 ✓	na	2981-363 ✓	other solid	refrigerator in Hg Lab	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/28/10 ✓
J19JM0 ✓	na	2981-364 ✓	other solid	refrigerator in Hg Lab	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/27/10 ✓
J19L04 ✓	na	2981-365 ✓	other solid	refrigerator in Hg Lab	AVS-SEM-SULFIDES; AVS-SEM-METALS (Cadmium, Copper, Lead, Nickel, Zinc)	02/26/10 ✓

✓ 3/3/10

SOP#: MSL-A-001

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2219	Page 1 of 1
Collector Rylie Barron	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7C — Data Turnaround 15 Days
Project Designation Columbia River Component of the RCBRA - Sediment	Sampling Location 100 K K intake test 3A		SAF No. RC-116	
Ice Chest No. WCH-10-003	Field Logbook No. EL-1645	COA BESCRC6520	Method of Shipment FED EX	
Shipped To Battelle Marine Sciences	Offsite Property No. N/A		Bill of Lading/Air Bill No. 7933 1544 8757	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C
Type of Container	G
No. of Container(s)	1
Volume	125g

SAMPLE ANALYSIS

See item (1) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time	
J19KF9 2981-363	OTHER SOLID	2-28-10	1600	X

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R. Barron RB	1740 2-28-10	R. Barron EAS Ref D RB	1740 2-28-10
EAS LOCKED STORAGE D	3/2/10 1030		3/2/10 1030
	3/2/10 1030	FDX	
		[signature]	03/03/10 1330

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23805

J19KY8 SAF-RC-116 300A J3002

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23805
Sample Description	: J19KY8 SAF-RC-116 300A J3002
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 8.800E+01 grams
Facility	: Default
Sample Taken On	: 2/26/2010 3:00:00PM
Acquisition Started	: 3/1/2010 8:56:05AM
Procedure	: Non Standard Geometry
Operator	: RCT
Detector Name	: REGIE02
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.3 seconds
Dead Time	: 0.01 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

Energy Calibration Used Done On	: 11/3/2009
Efficiency Calibration Used Done On	: 11/22/2009
Efficiency Calibration Description	: REGE02 NSTD 11/11/09 EffCalSN 80398-238

Sample Number : 34984

INTERFERENCE CORRECTED REPORT

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40		0.962	8.54E+00	1.84E+00	
X	EU-155		0.380			
	PB-212		0.999	5.15E-01	8.95E-02	
	RA-226d		0.833	5.77E-01	1.01E-01	
	TH-232d		0.849	3.65E-01	6.81E-02	
	U-238d	@	1.000	7.44E-01	8.38E-01	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2147	Page 1 of 1
Collector: Rylie Barron	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 7C — Data Turnaround: 15 Days
Project Designation: Columbia River Component of the RCBRA - Sediment	Sampling Location: 100 H T100H6A		SAF No.: RC-116	
Ice Chest No.: WCH-10-003	Field Logbook No.: EL-1645	COA: BESCRC6520	Method of Shipment: FED EX	
Shipped To: Battelle Marine Sciences	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: 7933 1544 8757	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C											
Type of Container	G											
No. of Container(s)	1											
Volume	125g											
SAMPLE ANALYSIS	See item (1) in Special Instructions											
Sample No.	Matrix *	Sample Date	Sample Time									
J19JM0 2981.364	OTHER SOLID	2-27-10	1700	X								

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R. Barron RB	2-27-10 1800	R Damon EAS ref D RR	2-27-10 1800
EAS LOCKED STORAGE D	3/2/10 1030		3/2/10 1030
	3/2/10 1032	FDK	
			04/03/10 1330

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

of samples for shipment to lab.
Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23808 V SJ 3/2/10
J19KF7 SAF-RC-116 RDD/100K R INTAKE TEST 3A

GAMMA SPECTRUM ANALYSIS

Sample Identification : RCF23808 V SJ 3/2/10
Sample Description : J19KF7 SAF-RC-116 RDD/100K R INTAKE TEST 3A
Sample Type : Non Standard Geo
Unit :
Sample Point

Sample Size : 1.370E+02 grams
Facility : Default

Sample Taken On : 2/28/2010 4:00:00PM
Acquisition Started : 3/1/2010 11:02:21AM

Procedure : Non Standard Geometry
Operator : RCT
Detector Name : PGTWHITE
Geometry : Non Standard Geo
Live Time : 3600.0 seconds
Real Time : 3600.7 seconds

Dead Time : 0.02 %

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 80 - 4096
Peak Area Range (in channels) : 80 - 4096
Identification Energy Tolerance : 1.300 keV

Qualitative Only
Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

Energy Calibration Used Done On : 1/17/2010
Efficiency Calibration Used Done On : 1/17/2010
Efficiency Calibration Description : PGTWhite NonSTD Geom EffCal 011310 80398-238

Sample Number : 34988

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.999	9.35E+00	1.47E+00	
PB-212	0.710	7.89E-01	9.39E-02	
RA-226d	0.716	4.61E-01	8.33E-02	
TH-232d	0.997	6.02E-01	8.21E-02	

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-116-2241	Page 1 of 1
Collector Rylie Barron	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7C / Data Turnaround 15 Days
Project Designation Columbia River Component of the RCBRA - Sediment	Sampling Location 300A-- J3002		SAF No. RC-116	
Ice Chest No. WCH-10-003	Field Logbook No. EL-1645	COA BESCRC6520	Method of Shipment FED EX	
Shipped To Battelle Marine Sciences	Offsite Property No. N/A		Bill of Lading/Air Bill No. 7933 1544 8757	

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

N/A

Preservation	Cool to 4C										
Type of Container	G										
No. of Container(s)	1										
Volume	125g										
SAMPLE ANALYSIS	See item (1) in Special Instructions										
Sample No.	Matrix *	Sample Date	Sample Time								
J19L04 2981.365	OTHER SOLID	2-26-10	1500	X							

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R Barron R B	2-26-10 1600	EAS ref D R B	2-26-10 1600
EAS LOCKED STORAGE D	3/2/10 1030		3/2/10 1030
	3/2/10 1030	FED X	
			03/03/10 1330

SPECIAL INSTRUCTIONS

(1) AVS - SEM - SULFIDES; AVS - SEM - METALS (Cadmium, Copper, Lead, Nickel, Zinc)

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

WCH-EE-011

Radiological Counting Facility

Analysis Report for RCF23804

J19JK8 SAF-RC-116 RDD/100H-T100MGA H 3/2/10 SJ

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF23804
Sample Description	: J19JK8 SAF-RC-116 RDD/100H-T100MGA H SJ 3/2/10
Sample Type	: Non Standard Geo
Unit	:
Sample Point	
Sample Size	: 5.350E+02 grams
Facility	: Default
Sample Taken On	: 2/27/2010 5:00:00PM
Acquisition Started	: 3/1/2010 8:49:13AM
Procedure	: Non Standard Geometry
Operator	: RCT
Detector Name	: PGTWHITE
Geometry	: Non Standard Geo
Live Time	: 3600.0 seconds
Real Time	: 3600.8 seconds
Dead Time	: 0.02 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 80 - 4096
Peak Area Range (in channels)	: 80 - 4096
Identification Energy Tolerance	: 1.300 keV

Qualitative Only

Non-Standard Geometry

Calibrations for determining sample activity are geometry-specific. This sample does not conform to one of the currently calibrated geometries. Reported activities may differ from the acutal sample activity for this reason.

Energy Calibration Used Done On	: 1/17/2010
Efficiency Calibration Used Done On	: 1/17/2010
Efficiency Calibration Description	: PGTWhite NonSTD Geom EffCal 011310 80398-238

Sample Number : 34983

INTERFERENCE CORRECTED REPORT

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40		0.998	7.53E+00	6.99E-01	
X	EU-155		0.366			
	PB-212		0.999	2.58E-01	2.74E-02	
	RA-226d		0.885	2.18E-01	2.62E-02	
	TH-232d		0.998	2.32E-01	2.61E-02	
X	U-235		0.548			
	U-238d	@	0.993	2.37E-01	2.86E-02	

LOG-IN CHECKLIST

Reference SOP# MSL-A-001

Central File #: 2981 Sample No(s): 363-365 Batch: 30

Project Name: WA Closure Hanford Project Manager: Brandenberger

TO BE COMPLETED BY PROJECT MANAGER (prior to arrival when possible)

Matrix: _____ WP# _____

Yes	No		
☐	☐	Navy-type Project (requires high-level sample tracking procedures)	
☐	☐	USDA Samples (see Compliance Agreement Checklist)	PM Verification:
☐	☐	Filter Samples:	Amount: Entire sample Half of sample
☐	☐	Freeze dry sample(s) - samples will be weighed and placed in ultralow temp freezer (Login Lab)	
☐	☐	Special instructions:	

Sample Preservation Instructions: _____

See LIMS for archive/disposal information

TO BE COMPLETED UPON SAMPLE ARRIVAL/LOG-IN

Yes	No	N/A	Indicate in Appropriate Box	
☐	☑	☐	Custody seal present	Seal intact? YES NO
☑	☐	☐	Cooler temperature (acceptable range: 4±2°C or solids:frozen) (if multiple coolers, note temp. of each)	5.6 °C ____ °C
☐	☐	☑	Project Manager notified of any custody/login discrepancies (cooler temp, sponsor codes, etc) Comment/Remedy:	
☑	☐	☐	Were all chain of custody forms signed and dated?	
☐	☑	☐	Were samples filtered at MSL?	

Sample condition(s): ~~Acceptable~~ ~~Other (explain):~~

Container type: ~~Teflon~~ ~~Poly~~ ~~Glass~~ ~~Cap. Vial~~ Other: _____

Notes: _____

Completed By: [signature] Date/Time: 03/03/10 1325

SAMPLE PRESERVATION

☐ Sample(s) were preserved prior to arrival at MSL (noted on CoC / Sample / per PM Instruction)

☐ Random pH checked for ~10% of samples (use dip paper) Sample IDs: _____

☐ Complete pH check required for project (use pH meter and record on pH Record form)

☑ Sample(s) were preserved at MSL

Type:			
☐	0.2% HNO3	Notes:	Lot#
☐	0.5% HCl (Hg samples)	Notes:	Lot#
☑	Refrigerate/Freeze	Notes:	fridge in Hg lab
☐	Other	Notes:	

Completed By: [signature] Date/Time: 03/03/10 1325

Storage Shelf: _____