

# A

## Summary of Soil Boring Data

Please note: this appendix is not fully accessible. If you need assistance with this appendix, please contact the BLM Alaska Public Information Center 907-271-5960, [BLM\\_AK\\_AKSO\\_Public\\_Room@blm.gov](mailto:BLM_AK_AKSO_Public_Room@blm.gov).



*This page intentionally left blank.*

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious "Slag"	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
MP094	0	1	07/08/2015	20									NR	T/WR	Dry														
MP094	1	2	07/08/2015	20	x						x	Dark Gray	SP-SM	T/WR	Dry					19127	96.97	5416.36	42.49	134.82	9.78				
MP094	2	3	07/08/2015										NR	T/WR															
MP094	3	4	07/08/2015	40	x				x	x		Grayish Brown	SM	T/WR	Damp					24765	118.58	6826.15	50.53	112.23	10.16				
MP094	4	5	07/08/2015	100	x				x	x		Gray	SP-SM	T/WR	Damp					24560	117.25	5520.59	43.65	98.09	9.19				
MP094	5	6	07/08/2015	100								Brown	OL	DN	Moist					557	12.22	352.37	7.82	< LOD	4.52				
MP094	6	7	07/08/2015	70								Very Dark Brown	OL	DN	Damp					241	10.7	424.06	8.73	< LOD	4.71				
MP094	7	8	07/08/2015	70								Very Dark Brown	OL	DN	Moist					38	10.18	111.35	5	< LOD	4.95				
MP094	8	9	07/08/2015	90	x						x	Dark Gray	GM	T/WR	Moist					9836	55.98	2296.34	24.11	39.31	5.67				
MP094	9	10	07/08/2015	90								Yellowish Brown	ML	DN (KG)	Damp					3144	32.46	1010.49	19.54	20.31	6.8				
MP094	10	11	07/08/2015	90								Dark Grayish Brown	ML	DN (KG)	Moist					15MP094SB11	9600	2900	89	2914	28.85	1445.32	19.43	33.3	5.52
MP094	11	12	07/08/2015	90								Gray	ML	N	Moist					30	11.01	81.54	5.01	< LOD	6.01				
MP094	12	13	07/08/2015	90								Gray	GM	N	Wet					15MP094SB13	3300	860	37	2872	27.37	733.53	12.87	25.82	4.69
MP094	13	14	07/08/2015	90								Gray	ML	N	Moist					< LOD	17.45	10.01	2.7	< LOD	5.71				
MP094	14	15	07/08/2015	70								Brown	ML	N	Saturated					229	11.91	98.13	4.88	< LOD	5.19				
MP094	15	16	07/08/2015	70								Brown	ML	N	Wet					< LOD	18.27	273	9.11	< LOD	7.22				
MP094	16	17	07/08/2015	100							x	Grayish Brown	GM	N (KG)	Moist					15MP094SB17	2300	1100 J+	120	3102	28.78	917.94	15.37	51.15	5.81
MP094	17	18	07/08/2015	100								Brown	ML	N (KG)	Wet					< LOD	16.06	43.02	3.79	< LOD	5.53				
MP094	18	19	07/08/2015	90								Grayish Brown	ML	N (KG)	Wet					15MP094SB19	1500	700	76	1403	19.93	546.97	11.49	11.54	4.55
MP094	19	20	07/08/2015	100								Brown	ML	N (KG)	Moist					15MP094SB20	410 J	37	1.8	1028	21.01	52.13	5.04	< LOD	7.71
MP094	20	21	07/08/2015	90								Brown	ML	WB	Moist					271	12.69	168.49	6.34	< LOD	5.37				
MP094	21	22	07/08/2015	90								Grayish Brown		WB	Wet														
MP094	22	24	07/08/2015	30								Dark Grayish Brown		WB	Wet														
MP095	0	1	07/07/2015	60	x				x		x	Dark Gray	GM	T/WR	Damp					13310	142	6284	68	631	18				
MP095	1	2	07/07/2015	60	x						x	Dark Gray	ML	T/WR	Damp					9501	97	3274	35	514	14				
MP095	2	3	07/07/2015	100								Dark Gray	SM	T/WR	Damp					764	21	283	5	29	4				
MP095	3	4	07/07/2015									Dark Gray	SM	T/WR	Damp					15MP095SB04	180	83	2.5	151	19	59	3	<LOD	8
MP095	4	5	07/07/2015	100								Dark Gray	ML	N	Moist					15MP095SB05	630	370	42	1819	28	485	8	59	5
MP095	5	6	07/07/2015	100							x	Dark Gray	ML	N	Moist														
MP095	6	7	07/07/2015	90								Brown	ML	N	Wet														
MP095	7	8	07/07/2015	90								Brown	ML	N	Moist					96	19	58	3	16	3				
MP095	8	9	07/07/2015									Brown	ML	N	Moist														
MP095	9	10	07/07/2015	20								Brown	ML	N	Moist					15MP095SB10	1200	590	45	1268	26	584	9	61	5
MP095	10	11	07/07/2015	100								Olive Brown	MH	N	Moist					15MP095SB11	380	180	18	310	20	108	4	11	3
MP095	11	12	07/07/2015	100								Olive Brown	MH	N	Moist					905	22	430	7	56	4				
MP095	12	13	07/07/2015	100								Olive Brown	MH	N	Moist					15MP095SB13	140 J	80 J	29 J	122	18	59	3	14	3
MP095	13	14	07/07/2015	100								Olive Brown	ML	N	Moist					<LOD	56	17	2	9	3				
MP095	14	15	07/07/2015	80								Olive Brown	MH	N	Moist					<LOD	50	79	3	<LOD	6				
MP095	15	16	07/07/2015	80								Dark Brown	ML	N	Damp					<LOD	52	24	2	<LOD	7				
MP095	16	17	07/07/2015	40										WB	Saturated														
MP095	17	18	07/07/2015	40								Dark Gray		WB	Saturated					<LOD	57	142	4	<LOD	8				
MP095	18	19	07/07/2015	60								Dark Grayish Brown		WB	Wet					<LOD	51	34	2	10	3				
MP095	19	20	07/07/2015	60								Dark Grayish Brown		WB	Wet					<LOD	56	30	2	<LOD	8				
MP095	20	22	07/07/2015	50								Dark Grayish Brown		WB	Wet														
MP096	0	1	07/08/2015	100	x		x				x	Brown	GM	T/WR	Dry					7034	77	3827	42	287	6				
MP096	1	2	07/08/2015	100	x		x				x	Grayish Brown	SM	T/WR	Dry					3036	37	3568	39	325	7				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
MP094	0	1																						
MP094	1	2	179.77	53.89	65.26	13.69	NA	NA	164.3	78.23	97.4	15.17	24400.1	256.82	23.63	5.49	514.63	58.46	109.95	27.72	< LOD	7.75	80.85	10.86
MP094	2	3																						
MP094	3	4	153.57	57.78	61.41	15.34	NA	NA	196.04	95.39	89.18	16.23	32626.45	314.53	26.01	6.11	694.48	70.2	176.06	32.32	< LOD	8.97	105.77	12.6
MP094	4	5	< LOD	83.28	96.24	15.91	NA	NA	140.43	71.19	88.82	15.2	19286.23	232.76	17.72	5.26	387.31	53.56	171.14	29.6	< LOD	8.04	83.41	11.05
MP094	5	6	< LOD	39.05	< LOD	7.02	NA	NA	< LOD	51.88	18.51	6.92	9669.39	114.07	6.68	2.75	125.46	24.84	< LOD	20.73	< LOD	2.74	36.87	5.12
MP094	6	7	< LOD	41.14	< LOD	7.21	NA	NA	< LOD	55.87	11.07	6.9	10660.87	122.15	8.71	2.95	213.88	29.07	< LOD	21.85	< LOD	2.97	44.31	5.6
MP094	7	8	338.61	31.65	< LOD	7.98	NA	NA	< LOD	69.38	21.25	7.78	15478.27	153.42	9.26	3.13	172.06	30.04	< LOD	23.61	< LOD	2.87	52.6	6.18
MP094	8	9	< LOD	61.61	28.07	9.34	NA	NA	122.93	57.03	43.08	10.61	17009.32	186.42	14.74	4.14	324.59	42.21	90.01	21.73	< LOD	5.09	76.64	8.53
MP094	9	10	427.52	43.51	< LOD	12.04	NA	NA	< LOD	123.83	29.87	14.35	24943.73	273.28	11.8	4.72	204.53	47.78	48.98	28.67	< LOD	5.37	54.25	9.55
MP094	10	11	702.75	41.14	< LOD	11.02	NA	NA	186.69	73.71	37.16	10.76	28163.28	242.32	11.96	4	351.27	45.63	53.17	21.97	< LOD	4.6	74.74	8.53
MP094	11	12	502.75	35.29	< LOD	8.7	NA	NA	< LOD	78.36	< LOD	13.87	15563.15	173.49	9.9	3.63	224.78	36.39	< LOD	28.52	< LOD	3.55	55.79	7.28
MP094	12	13	557.9	38.32	< LOD	10.33	NA	NA	144.58	60.31	36.96	9.38	22125.68	198.07	11.68	3.66	278.52	38.02	44.35	18.81	< LOD	3.84	69.24	7.54
MP094	13	14	947.15	39.84	< LOD	9.49	NA	NA	< LOD	86.66	30.51	9.73	19320.02	191.34	6.58	3.38	509.93	46.81	46.61	19.64	< LOD	3.35	76.47	7.92
MP094	14	15	586.06	33.84	< LOD	8.28	NA	NA	< LOD	69.42	37.7	8.78	14744	154.1	8.17	3.19	222.83	32.81	33.55	16.76	< LOD	3.12	69.16	7
MP094	15	16	814.9	41.04	< LOD	9.9	NA	NA	< LOD	130.79	34.46	11.58	37638.73	292.59	8.04	3.81	250.96	45.84	78.91	24.21	< LOD	3.96	85.27	9.23
MP094	16	17	525.84	39.02	< LOD	10.63	NA	NA	< LOD	108.45	30.69	10.34	28458.7	240.42	10.91	3.89	348.32	45.02	79.62	22.02	< LOD	4.37	91.64	9
MP094	17	18	711.76	36	< LOD	8.67	NA	NA	< LOD	100.19	33.72	9.11	29120.69	224.48	10.68	3.44	866.73	55.68	36.87	18.26	< LOD	3.04	72.6	7.44
MP094	18	19	689.07	37.37	< LOD	9.23	NA	NA	130.36	71.02	32.55	9.69	29639.77	235.59	11.41	3.69	360.7	43.74	43.98	19.9	< LOD	3.81	79.36	8.17
MP094	19	20	606.19	43.41	< LOD	11.4	NA	NA	< LOD	126.99	40.32	13.21	30220.13	282.24	10.91	4.39	523.65	58.21	51.41	26.02	< LOD	4.37	89.41	10.08
MP094	20	21	670.16	35.63	< LOD	8.47	NA	NA	141.08	67.25	51.48	9.46	29536.29	222.94	11.44	3.5	725.63	51.6	< LOD	26.6	< LOD	3.28	90.92	7.94
MP094	21	22																						
MP094	22	24																						
MP095	0	1	714	122	< LOD	40	127	37	26	7	70	11	32581	371	< LOD	13	591	44	74	18	12	3	129	8
MP095	1	2	474	102	< LOD	37	95	31	23	6	43	9	25250	274	< LOD	10	531	38	62	15	< LOD	7	88	6
MP095	2	3	269	77	< LOD	31	< LOD	69	< LOD	15	< LOD	18	23445	221	< LOD	7	238	26	< LOD	34	< LOD	3	62	4
MP095	3	4	431	81	< LOD	32	< LOD	69	< LOD	15	< LOD	18	24627	233	< LOD	7	206	26	57	12	< LOD	3	76	4
MP095	4	5	333	86	< LOD	32	126	27	< LOD	17	28	7	29039	276	9	3	594	35	50	13	< LOD	4	140	6
MP095	5	6																						
MP095	6	7																						
MP095	7	8	503	87	< LOD	32	171	28	20	6	38	7	28905	273	16	3	464	32	54	13	< LOD	3	142	6
MP095	8	9																						
MP095	9	10	503	92	< LOD	34	99	28	< LOD	19	31	7	32888	319	13	3	661	38	84	14	< LOD	4	96	5
MP095	10	11	542	91	< LOD	32	132	28	22	6	37	7	34573	320	10	3	740	38	40	13	< LOD	3	97	5
MP095	11	12	628	87	< LOD	31	122	26	23	6	26	6	30386	273	11	3	916	38	57	12	4	1	91	5
MP095	12	13	478	78	< LOD	30	101	23	16	4	42	6	17480	169	15	2	362	26	37	11	< LOD	3	69	4
MP095	13	14	630	84	< LOD	31	128	25	< LOD	13	26	6	19666	189	17	3	412	28	78	12	< LOD	3	107	5
MP095	14	15	276	67	< LOD	29	< LOD	60	11	4	< LOD	16	13990	138	8	2	268	23	< LOD	29	< LOD	3	50	4
MP095	15	16	348	73	< LOD	30	88	22	18	4	19	6	15265	148	14	2	194	22	< LOD	30	< LOD	3	80	4
MP095	16	17																						
MP095	17	18	400	89	< LOD	32	148	28	28	6	36	7	35445	331	12	3	1009	42	54	13	< LOD	3	150	6
MP095	18	19	381	73	< LOD	29	104	22	20	4	37	6	15814	151	19	3	254	23	67	11	13	1	94	4
MP095	19	20	667	99	< LOD	32	< LOD	86	42	7	32	7	47226	433	< LOD	8	1840	55	< LOD	43	7	1	91	5
MP095	20	22																						
MP096	0	1	10	3	< LOD	44	8	2	80	8	18	3	3274	37	11	2	46	3	10	3	< LOD	8	40	3
MP096	1	2	11	3	< LOD	44	< LOD	5	59	7	14	3	2961	34	< LOD	7	34	3	< LOD	7	< LOD	9	28	3
MP096	2	3	12	4	< LOD	45	< LOD	6	80	9	19	3	3843	45	< LOD	8	53	4	< LOD	8	< LOD	10	41	3



Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
MP096	3	4	07/08/2015	100	x	x	x				x	Grayish Brown	SM	T/WR	Damp					4404	57	9157	106	1098	17				
MP096	4	5	07/08/2015	90	x	x	x				x	Dark Brown	SM	T/WR	Damp					5520	63	4396	49	843	13				
MP096	5	6	07/08/2015	90	x	x	x				x	Dark Grayish Brown	SM	T/WR	Damp			15MP096SB06	13000	6800	2100	7976	88	5203	58	580	10		
MP096	6	7	07/08/2015	100								Yellowish Brown	ML	T/WR	Damp					2042	28	2282	26	151	4				
MP096	7	8	07/08/2015	100								Yellowish Brown	ML	DN						<LOD	33	30	2	4	1				
MP096	8	9	07/08/2015	100								Olive Brown	ML	DN	Moist					382	13	203	4	24	1				
MP096	9	10	07/08/2015	100								Olive Brown	ML	DN	Damp					<LOD	32	6	1	<LOD	2				
MP096	10	11	07/08/2015	100								Olive Brown	ML	DN	Moist					341	13	228	5	27	2				
MP096	11	12	07/08/2015	100								Olive Brown	ML	DN	Moist					<LOD	45	7	2	<LOD	3				
MP096	12	13	07/08/2015	100								Olive Brown	ML	DN	Moist			15MP096SB13	650	410	77	453	16	261	6	26	2		
MP096	13	14	07/08/2015	100								Olive Brown	ML	DN	Moist					<LOD	32	10	2	<LOD	2				
MP096	14	15	07/08/2015	100								Grayish Brown	ML	DN	Moist					60	12	20	2	<LOD	2				
MP096	15	16	07/08/2015	100								Olive Brown	ML	DN	Moist					<LOD	34	12	2	<LOD	2				
MP096	16	17	07/08/2015	100							x	Grayish Brown	ML	DN (KG)	Moist			15MP096SB17	1800	1200	320	1407	21	941	12	122	4		
MP096	17	18	07/08/2015	100							x	Grayish Brown	GM	DN (KG)	Moist					61	12	15	2	<LOD	2				
MP096	18	19	07/08/2015	80							x	Olive Brown	GM	DN (KG)	Wet			15MP096SB19	250	740	4.2	140	12	418	6	4	1		
MP096	19	20	07/08/2015	80								Olive Brown	GM	DN (KG)	Wet					<LOD	33	30	2	<LOD	2				
MP096	20	21	07/08/2015	90								Olive Brown	ML	N or DN	Wet					39	11	184	4	13	1				
MP096	21	22	07/08/2015	100								Dark Grayish Brown	ML	N or DN	Moist					<LOD	40	14	2	<LOD	3				
MP096	22	23	07/08/2015	90								Grayish Brown	ML	N	Wet					<LOD	35	11	2	<LOD	2				
MP096	23	24	07/08/2015	90								Olive Brown	ML	N	Moist					<LOD	38	15	2	<LOD	3				
MP096	24	25	07/08/2015	100								Gray	ML	N	Moist					<LOD	39	22	2	<LOD	3				
MP096	25	26	07/08/2015	100								Olive Brown	ML	N	Wet			15MP096SB26	60 J	71 J	19 J	133	13	165	4	7	1		
MP096	26	27	07/08/2015	70								Grayish Brown	GM	N	Moist					<LOD	38	23	2	<LOD	3				
MP096	27	28	07/08/2015	70								Brown	GM	N	Wet					<LOD	42	43	3	<LOD	3				
MP096	28	30	07/08/2015	80								Brown		WB	Wet														
MP096	30	32	07/08/2015	50								Dark Gray		WB	Moist														
MP097	0	1	07/08/2015	30								Dark Grayish Brown	NR	T/WR	Damp														
MP097	1	2	07/08/2015	30	x	x						Dark Grayish Brown	GM	T/WR	Damp			15MP097SB02	4300	1700	390	2799	27.29	1064.39	15.81	59.84	5.85		
MP097	2	3	07/08/2015	30								Dark Grayish Brown	NR	T/WR	Damp														
MP097	3	4	07/08/2015	40							x	Gray	ML	N or DN	Damp					759	16.8	431.74	10.37	14.93	4.48				
MP097	4	5	07/08/2015	100								Gray	ML	N or DN	Damp					1040	19.17	1737.61	20.07	36.48	5.24				
MP097	5	6	07/08/2015	100								Tan	ML	N or DN	Damp			15MP097SB06	710	770	76	45	12.26	51.44	4.6	<LOD	6.76		
MP097	6	7	07/08/2015	90								Gray	ML	N or DN	Wet					1475	20.31	497.23	10.58	21.72	4.48				
MP097	7	8	07/08/2015	90								Gray	MH	N or DN	Moist					<LOD	16.06	23.67	3.36	<LOD	5.66				
MP097	8	9	07/08/2015	60								Brown	ML	N or DN				15MP097SB09	1800	1100	92	1795	21.59	464.11	10.21	20.85	4.48		
MP097	9	10	07/08/2015	60								Grayish Brown	ML	N or DN	Wet					54	11.03	39.45	3.73	<LOD	5.67				
MP097	10	11	07/08/2015	80								Olive Brown	ML	N or DN	Moist			15MP097SB11	650 J+	800 J+	110	856	16.5	719.35	12.53	47.46	5.16		
MP097	11	12	07/08/2015	80								Olive Brown	MH	N or DN	Moist					204	12.06	99.42	5.12	<LOD	5.67				
MP097	12	13	07/08/2015	100								Olive Brown	GM	N (KG)	Saturated			15MP097SB13	160	330	22	1431	19.85	551.97	11.33	26.96	4.86		
MP097	13	14	07/08/2015	100								Olive Brown	ML	N (KG)	Wet					374	13.13	296.42	8.09	17.79	4.14				
MP097	14	15	07/08/2015	100								Olive Brown		WB	Saturated					180	11.8	174.89	6.35	<LOD	5.73				
MP097	15	16	07/08/2015	100								Orange Brown		WB	Damp					63	14.63	42.49	4.88	<LOD	8.62				
MP098	0	1	07/09/2015	80								Brown	SM	T/WR	Moist					1239	18.38	754.63	13.4	85.45	6.25				
MP098	1	2	07/09/2015	80							x	Black	GP	T/WR	Damp					647	17.73	3743.47	35.53	92.45	8.59				
MP098	2	3	07/09/2015	80								Brown	GM	T/WR	Moist					94	12.55	761.18	15.67	24.5	5.73				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
MP096	3	4	<LOD	12	<LOD	47	<LOD	7	120	12	21	3	6554	77	<LOD	9	99	5	<LOD	10	<LOD	12	43	4
MP096	4	5	12	3	<LOD	41	7	2	60	7	20	3	3356	37	49	3	35	3	<LOD	7	<LOD	7	40	3
MP096	5	6	13	4	<LOD	44	<LOD	6	70	8	21	3	3279	38	<LOD	7	50	3	<LOD	8	<LOD	10	46	3
MP096	6	7	10	3	<LOD	41	<LOD	5	63	6	7	2	2572	28	5	2	24	2	<LOD	6	<LOD	6	27	2
MP096	7	8	7	2	<LOD	34	<LOD	3	37	4	7	2	1620	16	5	1	27	2	<LOD	4	<LOD	2	13	1
MP096	8	9	<LOD	6	<LOD	34	<LOD	3	35	4	6	2	1437	15	7	1	21	2	<LOD	4	<LOD	3	13	1
MP096	9	10	8	2	<LOD	33	4	1	40	4	<LOD	4	1308	13	4	1	22	2	<LOD	4	<LOD	2	16	1
MP096	10	11	14	3	<LOD	36	5	1	64	6	7	2	2770	27	7	1	30	2	7	2	<LOD	3	26	2
MP096	11	12	<LOD	8	<LOD	46	5	2	41	5	<LOD	6	1417	20	8	2	13	2	<LOD	6	<LOD	3	16	2
MP096	12	13	<LOD	8	<LOD	41	<LOD	4	45	6	<LOD	6	1896	23	7	2	16	2	<LOD	5	<LOD	3	17	2
MP096	13	14	9	2	<LOD	33	4	1	33	4	5	2	1085	12	6	1	15	2	7	1	3	1	22	1
MP096	14	15	12	2	<LOD	35	<LOD	4	36	4	<LOD	5	1364	15	4	1	16	2	<LOD	4	<LOD	2	19	1
MP096	15	16	7	2	<LOD	35	<LOD	4	26	4	8	2	1538	16	4	1	51	2	<LOD	5	<LOD	2	14	1
MP096	16	17	12	3	<LOD	39	<LOD	4	39	5	6	2	1951	22	<LOD	4	17	2	<LOD	5	<LOD	4	22	2
MP096	17	18	13	2	<LOD	36	<LOD	4	38	5	11	2	1942	20	6	1	11	2	<LOD	5	<LOD	2	19	1
MP096	18	19	11	2	<LOD	34	5	1	45	4	9	2	1669	17	<LOD	3	12	2	<LOD	5	<LOD	3	21	1
MP096	19	20	11	2	<LOD	33	<LOD	4	60	5	7	2	2329	22	5	1	26	2	<LOD	5	<LOD	2	20	1
MP096	20	21	9	2	<LOD	34	<LOD	4	46	5	<LOD	5	2179	21	6	1	21	2	<LOD	5	<LOD	3	21	1
MP096	21	22	<LOD	7	<LOD	40	5	1	49	6	<LOD	6	2052	23	5	1	14	2	<LOD	5	<LOD	3	18	2
MP096	22	23	12	2	<LOD	36	<LOD	4	36	5	<LOD	5	2394	24	6	1	23	2	<LOD	5	<LOD	2	23	2
MP096	23	24	12	3	<LOD	39	<LOD	4	55	7	8	2	3071	32	5	1	28	3	<LOD	6	<LOD	3	26	2
MP096	24	25	14	3	<LOD	39	6	2	60	7	6	2	3134	33	6	1	26	3	<LOD	6	<LOD	3	27	2
MP096	25	26	13	3	<LOD	38	<LOD	4	51	6	7	2	2388	26	4	1	18	2	<LOD	6	<LOD	3	25	2
MP096	26	27	13	3	<LOD	38	<LOD	4	55	6	9	2	2489	26	4	1	13	2	<LOD	6	<LOD	3	23	2
MP096	27	28	18	3	<LOD	42	7	2	83	9	19	2	5114	55	6	2	213	6	<LOD	8	<LOD	3	48	2
MP096	28	30																						
MP096	30	32																						
MP097	0	1																						
MP097	1	2	637.79	39.1	<LOD	10.55	NA	NA	<LOD	90.03	43.25	10	21330.23	199.42	12.55	3.78	355.59	41.96	40.73	19.26	<LOD	4.06	78.31	8.23
MP097	2	3																						
MP097	3	4	654.83	37.93	<LOD	9.76	NA	NA	<LOD	94.47	30.44	9.86	22977.13	209.72	10.62	3.64	273.12	39.54	59.01	20.3	<LOD	3.52	62.97	7.54
MP097	4	5	1084.49	41.71	<LOD	10.1	NA	NA	<LOD	107.62	41.65	9.99	31384.75	242.99	10.11	3.64	3836.74	109.26	63.31	20.14	<LOD	4.33	102.63	8.95
MP097	5	6	1080.4	41.7	<LOD	10.1	NA	NA	<LOD	127.51	34.48	11.42	36064.18	285.43	9.54	3.96	355.62	49.3	55.11	23.28	<LOD	3.99	96	9.52
MP097	6	7	572.16	36.79	<LOD	9.54	NA	NA	108.44	65.46	35.48	9.21	27058.68	217.37	8.88	3.39	273.75	38.78	<LOD	27.23	<LOD	3.54	91.93	8.22
MP097	7	8	480.64	34.99	<LOD	8.9	NA	NA	<LOD	80.97	35.52	10	16874.66	179.91	10.05	3.62	343.8	40.88	<LOD	28.6	<LOD	3.29	81.67	8.11
MP097	8	9	491.13	36.01	<LOD	9.31	NA	NA	92.07	57.79	31.82	9.03	21134.28	191.36	11.32	3.52	347.12	39.98	29.58	17.94	<LOD	3.52	82.44	7.88
MP097	9	10	738.07	35.81	<LOD	8.73	NA	NA	<LOD	88.05	36.72	9.45	21967.4	196.63	10.87	3.5	141.74	32.85	69.5	19.19	<LOD	3.21	89.69	8.07
MP097	10	11	592.38	35.66	<LOD	8.81	NA	NA	139.26	61.25	43.32	9.44	23744.34	201.8	10.1	3.46	347.11	40.2	60.71	18.92	<LOD	3.55	83.27	7.94
MP097	11	12	503.27	34.41	<LOD	8.5	NA	NA	<LOD	76.2	35.04	9.04	16730.93	168.37	13.12	3.55	240.56	34.77	<LOD	25.79	<LOD	3.14	63.41	7.02
MP097	12	13	495.6	35.96	<LOD	9.19	NA	NA	130.22	62.76	28.59	9.18	23936.14	207.13	16.65	3.88	323.5	40.4	36.95	18.82	<LOD	3.59	77.61	7.92
MP097	13	14	609.02	34.61	<LOD	8.46	NA	NA	<LOD	83.75	33.79	8.85	21001.47	186.45	10.93	3.4	315.47	37.96	53.87	17.92	<LOD	3.23	82.68	7.63
MP097	14	15	589.43	34.56	<LOD	8.38	NA	NA	112.11	56.16	36.72	8.96	20661.55	185.19	8.41	3.26	303.95	37.51	32.44	17.56	<LOD	3.24	78.22	7.49
MP097	15	16	853.88	47.87	<LOD	11.52	NA	NA	<LOD	140.06	42.59	14.56	35386.6	322.99	8.67	4.33	4000.94	139.96	87.28	28.69	<LOD	4.17	81.55	10.46
MP098	0	1	303.06	34	<LOD	8.87	NA	NA	<LOD	75.52	31.61	9.6	14831.33	166.1	19.42	4.13	304.37	38.42	<LOD	27.55	<LOD	3.86	77.12	8.14
MP098	1	2	721.26	42.3	<LOD	10.11	NA	NA	<LOD	108.71	35.69	13.58	21240.35	241.03	11.97	4.67	496.18	57.24	60.92	27.02	<LOD	6.57	106.61	11.55
MP098	2	3	302.35	37.47	<LOD	9.15	NA	NA	<LOD	126.63	52.88	13.3	31424.61	282.05	11.94	4.42	808.33	66.3	44.29	25.21	<LOD	4.58	80.39	9.62

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations							Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF		
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg							Cinnabar	White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
MP098	3	4	07/09/2015	80								Brown	ML	T/WR	Moist					290	13.93	692.31	13.77	13.72	4.96				
MP098	4	5	07/09/2015	90								Dark Gray	GM	T/WR	Damp					6412	43.97	1775.55	22.1	697.76	15.71				
MP098	5	6	07/09/2015								x	Gray	GM	T/WR	Damp					1393	22.57	1213.89	19.67	229.83	10.68				
MP098	6	7	07/09/2015	50									NR	T/WR															
MP098	7	8	07/09/2015	50								Dark Gray	GM	T/WR	Damp														
MP098	8	9	07/09/2015	70							x	Dark Gray	GP-GM	T/WR	Damp														
MP098	9	10	07/09/2015	70							x	Dark Gray	GP-GM	T/WR	Damp														
MP098	10	11	07/09/2015	90	x							Dark Gray	GP	T/WR	Damp														
MP098	11	12	07/09/2015	80							x	Dark Gray	GP	T/WR	Dry														
MP098	12	13	07/09/2015	30								Dark Gray	NR	T/WR	Damp														
MP098	13	14	07/09/2015	30								Dark Gray	GP	T/WR	Damp														
MP098	14	15	07/09/2015	70								Dark Gray	GM	T/WR	Damp														
MP098	15	16	07/09/2015	70							x	Light Gray	GP-GM	T/WR	Damp					281	14.16	1950.63	23.49	40.71	6.44				
MP098	16	18	07/09/2015	5									NR	T/WR						188	12.14	281.99	8.11	< LOD	5.93				
MP098	18	20	07/09/2015	5								Dark Grayish Brown	SM	T/WR	Moist					339	14.67	1686.29	21.85	90.22	7.29				
MP098	20	21	07/09/2015	50									NR	WR						53	12.61	916.54	16.72	1213.15	21.07				
MP098	21	22	07/09/2015	50	x						x	Dark Grayish Brown	ML	WR	Damp					44	11.21	526.01	11.49	15.42	4.54				
MP098	22	23	07/09/2015	90							x	Brown	GM	WR	Damp					200	15.34	833	17.12	218.99	10.96				
MP098	23	24	07/09/2015	90								Brown	SM	DN (KG, MZ)	Damp					135	15.93	89.75	7.72	755.66	21.09				
MP098	24	25	07/09/2015	80							x	Brown	ML	DN (KG, MZ)	Damp					303	14.84	270	9.7	23.45	6.39				
MP098	25	26	07/09/2015	80							x	Gray	ML	N or DN (KG, MZ)	Moist					413	14.79	1083.46	17.35	241.38	9.99				
MP098	26	27	07/09/2015	100							x	Orange Brown	ML	N or DN (KG, MZ)	Damp					81	10.8	293.4	8.11	20.82	4.21				
MP098	27	28	07/09/2015	100							x	Orange Brown	GM	N or DN (KG, MZ)	Moist					101	10.98	223.27	7.23	16.43	3.99				
MP098	28	29	07/09/2015	50									NR	N (KG, MZ)															
MP098	29	30	07/09/2015	50							x	Orange Brown	ML	N (KG, MZ)	Wet					442	15.76	428.53	11.6	42.22	6.12				
MP098	30	31	07/09/2015	100								Yellowish Brown	GM	N (KG, MZ)	Saturated					264	12.87	286.3	8.29	60.58	5.59				
MP098	31	32	07/09/2015	100								Gray	ML	N (KG, MZ)	Wet					361	15.04	222.86	8.64	11.21	5.45				
MP098	32	33	07/09/2015	70								Brown	ML	N (KG, MZ)	Saturated					418	14.54	433.47	10.51	135.03	7.43				
MP098	33	34	07/09/2015	70							x	Dark Grayish Brown	ML	N (KG, MZ)	Moist					523	15.63	170.01	7.1	12.75	4.82				
MP098	34	35	07/09/2015	60								Gray	GP	N (KG, MZ)	Wet														
MP098	35	36	07/09/2015	60							x	Light Gray	GP-GM	WB	Wet					638	15.23	1729.36	19.5	59.93	5.76				
MP098	36	37	07/09/2015	50									NR	WB															
MP098	37	38	07/09/2015	50								Orange Brown	GM	WB	Saturated					1747	23.75	2781.6	28.21	159.86	9.12				
MP098	38	39	07/09/2015	30									NR	WB															
MP098	39	40	07/09/2015	30								Orange Brown	GW-GM	WB	Saturated					1351	20.55	1857.14	21.79	67.63	6.45				
MP098	40	41	07/09/2015	40									NR	WB															
MP098	41	42	07/09/2015	40							x	Orange Brown	GP-GM	WB	Saturated					1279	20.71	2610.38	27.01	290.49	11.12				
MP098	42	44	07/09/2015	100							x	Light Gray		WB	Wet														
MP098	44	45	07/09/2015	100							x	Light Gray		WB	Wet					1314	26.47	6242.8	53.11	949.49	23.99				
MP099	0	2	07/09/2015	30								Dark Grayish Brown	SM	T/WR	Dry														
MP099	2	4	07/09/2015	80	x						x	Grayish Brown	SM	T/WR	Dry					6587	47	6264.36	44.27	605.8	16.32				
MP099	4	6	07/09/2015	30	x						x	Dark Grayish Brown	SM	T/WR	Damp					3139	31.25	2606.98	27.09	142.16	8.54				
MP099	6	7	07/09/2015		x									T/WR						10017	60.14	4569.06	37.96	132.97	9.37				
MP099	7	8	07/09/2015	100	x						x	Olive Brown	ML	DN	Damp					558	14.81	273.58	8.18	29.91	4.74				
MP099	8	9	07/09/2015		x	x								T/WR						2525	26.36	1600.56	20.73	185.24	8.97				
MP099	9	10	07/09/2015	100	x	x					x	Brown	ML	DN	Moist					63	11.78	75.99	5.08	< LOD	6.26				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
MP098	3	4	936.61	40.09	< LOD	9.57	NA	NA	249.64	88.36	34.68	10.91	39715.36	291.51	12.02	4.04	777.78	61.38	46.08	22.77	< LOD	4.23	111.93	9.89
MP098	4	5	697.93	44.35	< LOD	12.53	NA	NA	99.49	56.31	99.11	13.27	15486.21	184.51	16.91	4.87	579.24	52.86	56.5	22.22	< LOD	6.04	74.19	10.54
MP098	5	6	1238.74	45.66	< LOD	10.77	NA	NA	< LOD	119.33	69.19	13.94	27836.3	265.56	8.68	4.41	657.29	61.35	100.51	26.61	< LOD	5.58	131.23	12.13
MP098	6	7																						
MP098	7	8																						
MP098	8	9																						
MP098	9	10																						
MP098	10	11																						
MP098	11	12																						
MP098	12	13																						
MP098	13	14																						
MP098	14	15																						
MP098	15	16	823	40.39	< LOD	9.65	NA	NA	220.43	91.78	69.22	12.7	40857.94	303.75	17.28	4.53	651.33	59.6	43.13	23.76	< LOD	5.1	148.74	11.61
MP098	16	18	722.59	36	< LOD	8.79	NA	NA	< LOD	80.24	27.17	8.92	18703.06	180.2	12.71	3.6	241.14	35.72	< LOD	26.28	< LOD	3.34	64.78	7.26
MP098	18	20	736.98	40.16	< LOD	9.73	NA	NA	241.33	89.37	65.8	12.61	38427.55	294.8	13.35	4.32	890.76	66.06	72.3	24.52	< LOD	5.03	127.05	10.92
MP098	20	21	1162.49	43.2	< LOD	10.1	NA	NA	< LOD	144.28	53.66	12.81	45156.41	325.78	8.52	4.89	1364.19	81.59	159.48	27.3	< LOD	6.49	91.99	12.68
MP098	21	22	760	36.83	< LOD	8.88	NA	NA	< LOD	99.88	30.83	9.91	25643.76	222.84	13.71	3.89	260.41	39.99	< LOD	29.22	< LOD	3.57	74.89	8.06
MP098	22	23	1333.01	48.58	< LOD	11.59	NA	NA	< LOD	102.83	31.14	13.4	18882.8	228.22	13.45	4.86	230.83	45.83	< LOD	38.54	< LOD	5.38	65.96	10.28
MP098	23	24	532.33	47.77	< LOD	12.02	NA	NA	< LOD	85.47	49.99	17.68	9926.09	189.7	13.09	5.96	87.77	41.7	< LOD	48.24	< LOD	7.49	38.21	12.45
MP098	24	25	481.3	40.05	< LOD	9.86	NA	NA	< LOD	127.89	65.09	14.1	32492.74	290	9.05	4.33	869.37	71.28	101.7	26.95	< LOD	4.96	151.12	12.54
MP098	25	26	780.66	39.26	< LOD	9.39	NA	NA	< LOD	117.1	51.35	11.83	31363.56	262	14.83	4.42	507.2	52.98	69.44	23.14	< LOD	4.97	95.02	10.07
MP098	26	27	512.18	33.39	< LOD	8.27	NA	NA	< LOD	77.63	38.86	9.11	17952.99	172.72	14.76	3.67	230.98	34.61	63.45	18.17	< LOD	3.48	87.98	7.83
MP098	27	28	518.3	33.51	< LOD	8.35	NA	NA	< LOD	73.43	25.21	8.78	15490.58	162.53	12.86	3.58	248.86	35.01	65.55	18.47	< LOD	3.22	64.64	7.05
MP098	28	29																						
MP098	29	30	1027.14	42.54	< LOD	10.08	NA	NA	182.77	83.33	26.36	11.65	31762.37	275.1	15.16	4.47	513.12	55.34	47.22	24.31	< LOD	4.38	97.23	10.01
MP098	30	31	867.79	37.2	< LOD	8.86	NA	NA	126.93	69.7	42.79	9.74	29861.05	231.52	8.76	3.49	710.81	53.07	43.59	19.27	< LOD	3.61	83.1	8.18
MP098	31	32	1062.5	42.45	< LOD	9.73	NA	NA	< LOD	106.43	70.1	13.49	22948.01	235.89	12.54	4.33	289.64	45.82	64.92	24.57	< LOD	4.36	74.55	9.26
MP098	32	33	1146.75	40.18	< LOD	9.35	NA	NA	< LOD	92.37	42.76	10.44	21809.95	206.32	9.99	3.77	410.88	44.9	53.7	20.31	< LOD	3.97	72.37	8.36
MP098	33	34	1232.68	41.68	< LOD	9.74	NA	NA	< LOD	71.41	31.36	10.72	11920.53	159.08	9.36	3.84	466.18	46.8	35.96	20.69	< LOD	3.84	30.15	6.66
MP098	34	35																						
MP098	35	36	714.22	36.27	< LOD	8.7	NA	NA	105.18	55.54	46.98	9.76	18924.49	182.88	9.06	3.57	285.31	38.31	< LOD	27.07	6.44	3.08	41.73	6.74
MP098	36	37																						
MP098	37	38	1494.73	45.52	< LOD	10.16	NA	NA	< LOD	174.07	50.83	12.2	66525.5	390.61	10.35	4.37	726.29	67.79	90.03	25.84	< LOD	6.18	86.51	10.14
MP098	38	39																						
MP098	39	40	932.71	40.3	< LOD	9.81	NA	NA	< LOD	156.64	58.35	11.41	61904.39	355.41	10.9	3.92	490.44	56.48	134.17	24.13	< LOD	4.71	107.72	9.77
MP098	40	41																						
MP098	41	42	1291.93	43.24	< LOD	9.75	NA	NA	209	124.02	58.79	12.22	77217.22	415.48	10.75	4.3	608.91	64.9	104.25	26.28	< LOD	5.87	108.11	10.97
MP098	42	44																						
MP098	44	45	2487.83	62.17	< LOD	13.1	NA	NA	< LOD	252.05	28.53	17.21	88476.57	567.38	< LOD	8.55	996.78	98.19	136.74	39	< LOD	10.57	90.86	15.77
MP099	0	2																						
MP099	2	4	662.23	46.76	15.53	8.92	NA	NA	127.93	82.33	68.53	13.88	29396	272.97	15.86	5.18	538.48	58.32	75.7	26.43	< LOD	8.05	99.97	12.4
MP099	4	6	531.84	42.26	< LOD	11.54	NA	NA	< LOD	109.95	54.24	12.17	26502.86	244.81	21.92	4.9	629.87	56.98	76.82	23.72	< LOD	5.55	86.34	9.79
MP099	6	7	1008.28	51.42	33.02	10.12	NA	NA	146.49	81.13	85.77	14.4	28167.44	268.2	15.73	4.84	624	60.97	98.02	26.76	< LOD	6.98	96.06	11.04
MP099	7	8	627.43	36.01	< LOD	8.94	NA	NA	131.67	57.41	32.57	9.43	19575.85	188.38	12.45	3.7	531.82	46.48	35.97	18.86	< LOD	3.5	76.55	7.85
MP099	8	9	544.44	38.99	< LOD	10.6	NA	NA	< LOD	96.5	38.59	11.1	21342.28	213.88	16.55	4.41	444.86	48.27	47.42	21.81	< LOD	4.96	81.29	9.35
MP099	9	10	479.29	36.73	< LOD	9.24	NA	NA	100.63	60.67	24.97	10.22	19392.5	200.16	11.26	3.86	429.64	46.23	< LOD	30.28	< LOD	3.56	54.44	7.45

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations							Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF			
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg							Cinnabar	White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)	
MP099	10	11	07/09/2015			x											15MP099SB11	10000	4000	540	11982	66.69	2449.52	28.47	658.52	16.96				
MP099	11	12	07/09/2015	100								Olive Brown	ML	DN	Damp		15MP099SB12	110	280	35	52	12.07	379.4	10.48	< LOD	7.14				
MP099	12	13	07/09/2015														15MP099SB13	3400	3200	640	5805	41.22	4050.46	35.7	303.89	12.22				
MP099	13	14	07/09/2015	70								Gray	SM	DN	Damp						54	10.92	18.97	3.04	< LOD	5.85				
MP099	14	15	07/09/2015																		< LOD	16.6	20.02	3.22	< LOD	5.77				
MP099	15	16	07/09/2015	100								Gray	SM	DN	Moist						< LOD	15.63	15.59	2.8	< LOD	5.13				
MP099	16	17	07/09/2015														15MP099SB17	380	590	130	828	16.3	431.24	10.26	24.64	4.66				
MP099	17	18	07/09/2015	100	x							Olive Brown	ML	T/WR	Moist						< LOD	16.74	14.04	3.2	< LOD	5.78				
MP099	18	19	07/09/2015														15MP099SB19	25 J	200	16	258	14.13	285.94	9.33	32.92	5.65				
MP099	19	20	07/09/2015	90								Gray	ML	N or DN	Damp						< LOD	20.14	58.83	5.54	< LOD	8.11				
MP099	20	21	07/09/2015																		< LOD	17.22	129.47	6.32	7.9	4.67				
MP099	21	22	07/09/2015	70								Brown	SM	N or DN	Damp						< LOD	16.82	135.61	6.53	8.15	4.57				
MP099	22	23	07/09/2015																		< LOD	15.57	77.39	4.71	< LOD	5.94				
MP099	23	24	07/09/2015	70								Brown	ML	WB	Moist						< LOD	15.85	163.69	6.54	9.11	4.15				
MP099	24	26	07/09/2015	90								Brown	ML	WB	Dry															
MP100	0	1	07/10/2015		x																642	16.04	2049.57	23.37	166	8.71				
MP100	1	2	07/10/2015	80	x							Dark Gray	SM	T/WR	Damp						809	17.74	2163.47	24.27	101.89	7.45				
MP100	2	3	07/10/2015				x	x													126	12.6	2069.94	23.58	7.96	5.12				
MP100	3	4	07/10/2015	60			x	x				Dark Gray	SM	T/WR	Damp						569	15.41	2857.26	25.93	7.38	4.76				
MP100	4	6	07/10/2015	30								Dark Gray	SM	T/WR	Damp						255	13.6	1892.93	22.38	79.12	6.92				
MP100	6	7	07/10/2015																		115	12.66	1050.69	16.96	36.33	5.92				
MP100	7	8	07/10/2015	70								Dark Gray	GM	T/WR	Damp						559	15.98	1775.99	22.24	120.41	8.02				
MP100	8	9	07/10/2015																		241	13.66	1235.96	18.43	56.86	6.64				
MP100	9	10	07/10/2015	100								Brown	SM	DN (loess)	Damp		15MP100SB09	430	2100	160	331	12.45	24.73	3.16	< LOD	5.4				
MP100	10	11	07/10/2015																		730	13.99	128.75	5.67	6.95	3.93				
MP100	11	12	07/10/2015	100								Gray	ML	N	Moist						157	11.63	3.63	2.39	< LOD	5.4				
MP100	12	13	07/10/2015																		126	11.2	< LOD	3.5	< LOD	5.21				
MP100	13	14	07/10/2015	100								Gray	ML	N	Moist						51	11.09	28.96	3.43	< LOD	5.57				
MP100	14	16	07/10/2015	50								Grayish Brown	SM	N	Moist						< LOD	16.01	40.37	3.71	< LOD	5.42				
MP100	16	17	07/10/2015																		15MP100SB17	63	110	8.9	30	10.67	41.2	3.64	< LOD	5.41
MP100	17	18	07/10/2015	100								Brown	SP	N (loess)	Moist						< LOD	15.35	51.49	3.94	< LOD	5.2				
MP100	18	19	07/10/2015																		15MP100SB19	220 J+	110 J+	28	138	12.49	73.17	5.01	< LOD	6.29
MP100	19	20	07/10/2015	90								Gray	SP	N	Moist						< LOD	15.39	30.03	3.18	< LOD	5.06				
MP100	20	21	07/10/2015																		15MP100SB21	63	96	13	27	10.13	56.2	3.88	< LOD	4.88
MP100	21	22	07/10/2015	100								Gray	SM	N	Saturated						< LOD	13.77	20.2	2.63	< LOD	4.57				
MP100	22	23	07/10/2015																		< LOD	16.3	30.12	3.37	< LOD	5.4				
MP100	23	24	07/10/2015	100								Gray	SP-SM	N	Saturated						< LOD	14.66	28.87	3.17	< LOD	5.01				
MP100	24	25	07/10/2015																		< LOD	14.73	35.48	3.24	< LOD	4.92				
MP100	25	26	07/10/2015	80								Gray	ML	N	Moist						< LOD	15.3	22.84	3.16	< LOD	5.44				
MP100	26	27	07/10/2015																		< LOD	14.59	32.67	3.27	< LOD	5.07				
MP100	27	28	07/10/2015	70								Brownish Yellow	ML	N (KG)	Wet						< LOD	17.07	21.44	3.38	< LOD	6.2				
MP100	28	29	07/10/2015																		< LOD	16.55	13.24	3.05	< LOD	6.13				
MP100	29	30	07/10/2015	100								Brown	GM	N (KG)	Wet						< LOD	15.65	22.41	3.16	< LOD	5.46				
MP100	30	31	07/10/2015																		< LOD	14.86	25.31	3.07	< LOD	5.19				
MP100	31	32	07/10/2015	80								Brown	SM	N (KG)	Wet						< LOD	22.98	41.98	5.91	< LOD	11.65				
MP100	32	33	07/10/2015																		< LOD	15.03	26.19	3.38	< LOD	5.49				



Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
MP099	10	11	149.24	46.41	< LOD	15.12	NA	NA	126.12	83.13	84.96	14.76	28763.95	275.73	21.18	5.54	725.42	65.31	119.83	27.9	< LOD	6.79	102.88	12.57
MP099	11	12	976.11	40.48	< LOD	9.41	NA	NA	330.15	109.1	53.12	11.71	60251.64	361.4	16.6	4.34	653.81	61.42	73.55	24.57	< LOD	4.06	112.9	9.99
MP099	12	13	483.74	42.33	< LOD	12.12	NA	NA	< LOD	122.04	63.98	13.67	28725.1	270.02	23.77	5.43	632.11	60.93	59.97	25.76	< LOD	6.87	96.01	11.42
MP099	13	14	604.76	34.82	< LOD	8.54	NA	NA	< LOD	60.55	15.98	8.71	9946.93	133.24	9.35	3.42	216.71	32.88	36.03	18	< LOD	3.13	38.15	6.18
MP099	14	15	627.57	36.44	< LOD	9.18	NA	NA	< LOD	73.33	16.75	8.97	14311.34	162.21	12.06	3.63	219.67	34.8	< LOD	27.17	< LOD	3.09	46.14	6.66
MP099	15	16	656.01	34.77	< LOD	8.43	NA	NA	< LOD	58.37	23.33	8.61	9578.54	127.7	8.15	3.26	204	31.71	29.64	17.17	< LOD	2.96	42.04	6.09
MP099	16	17	521.45	35.29	< LOD	8.84	NA	NA	< LOD	69.53	25.06	9.43	12475.33	152.88	13.99	3.82	179.09	33.31	40.35	18.99	< LOD	3.64	46.31	6.78
MP099	17	18	591.25	36.63	< LOD	9.28	NA	NA	71.14	46.34	42.24	10.33	11865.34	151.61	15.89	3.95	194.23	34.27	33.86	19.35	< LOD	3.26	49.1	6.9
MP099	18	19	680.51	40.05	< LOD	9.86	NA	NA	< LOD	101.6	37.6	11.57	22594.99	226.06	11.94	4.12	334.88	45.72	< LOD	33.4	< LOD	4.23	75.88	8.89
MP099	19	20	895.04	45.94	< LOD	11.31	NA	NA	133.9	84.63	44.88	14.14	27817.18	280.08	14.86	4.78	293.75	50.61	< LOD	39.82	< LOD	4.42	77.11	10.07
MP099	20	21	504.17	37.2	< LOD	9.16	NA	NA	267.39	89.53	41.09	11.06	41156.64	295.05	9.04	3.74	484.17	52.68	35.41	22.41	< LOD	3.68	98.98	9.35
MP099	21	22	408.53	36.66	< LOD	9.08	NA	NA	192.81	95.62	33.32	10.94	46549.13	318.32	8.76	3.76	925.07	66.73	< LOD	33.52	< LOD	3.71	98.46	9.4
MP099	22	23	400.76	33.9	< LOD	8.46	NA	NA	< LOD	85.07	18.95	9.17	19458.96	190.64	< LOD	4.76	230	36.68	30.61	18.79	< LOD	3.21	34.99	6.18
MP099	23	24	729.04	36.06	< LOD	8.71	NA	NA	< LOD	97.28	50.13	10.23	25849.17	218.32	9.91	3.6	345.52	42.39	35.77	19.06	< LOD	3.49	77.75	7.93
MP099	24	26																						
MP100	0	1	739.98	38.32	< LOD	9.49	NA	NA	< LOD	119.24	79.67	12.56	33101.86	265.43	19.88	4.61	700.55	58.22	86.23	23.36	< LOD	5.14	82.76	9.46
MP100	1	2	955.3	40.98	< LOD	9.85	NA	NA	< LOD	128.41	90.78	13.11	37776.8	286.82	19.2	4.65	1011.4	67.89	109.27	24.41	< LOD	5.18	135.55	11.04
MP100	2	3	1251.21	41.54	< LOD	9.3	NA	NA	< LOD	123.49	73.48	12.43	34998.63	274.56	15.74	4.39	952.92	65.66	78.46	23.43	< LOD	5.07	103.27	9.79
MP100	3	4	1024.66	39.25	< LOD	9.35	NA	NA	< LOD	108.69	77.58	11.42	30836.25	241.96	13.04	3.93	808.85	57.48	76.76	21.11	< LOD	4.99	143.34	10.33
MP100	4	6	950.43	39.96	< LOD	9.39	NA	NA	< LOD	119	86.82	12.67	33163.53	264.96	15.02	4.31	799.75	60.94	62.16	22.56	< LOD	5.06	99.56	9.77
MP100	6	7	1011.31	40.86	< LOD	9.34	NA	NA	185.99	89.61	64.65	12.11	41078.22	297.71	16.88	4.41	961.05	66.52	55.52	23.14	< LOD	4.5	125.75	10.55
MP100	7	8	1042.05	41.05	< LOD	9.63	NA	NA	< LOD	125.2	77.21	12.86	34872.88	278.45	15.87	4.49	795.33	62.46	81.73	24.04	< LOD	5.1	123.23	10.88
MP100	8	9	937.21	40.42	< LOD	9.47	NA	NA	200.63	83.6	72.55	12.52	34982.03	276.21	14.47	4.3	717.24	59.65	68.89	23.56	< LOD	4.81	90.94	9.6
MP100	9	10	223.55	31.73	< LOD	8.2	NA	NA	70.62	43.5	33.51	9.07	11775.96	142.3	8.65	3.33	219.04	33.21	< LOD	25.84	< LOD	3	41.2	6.16
MP100	10	11	196.01	31.65	< LOD	8.24	NA	NA	< LOD	67.65	18.05	8.53	13055	149.96	9.36	3.37	226.98	33.57	< LOD	26.03	< LOD	3.33	51.5	6.64
MP100	11	12	550.41	34.35	< LOD	8.52	NA	NA	< LOD	60.65	26.63	8.82	10313.8	133.5	9.21	3.37	190.08	31.38	< LOD	25.59	< LOD	3.16	44.38	6.32
MP100	12	13	506.01	33.52	< LOD	8.43	NA	NA	< LOD	58.12	14.41	8.1	10093.69	129.59	10.78	3.4	187.17	30.77	< LOD	24.7	< LOD	3.08	51.64	6.44
MP100	13	14	509.44	35	< LOD	8.79	NA	NA	< LOD	69.56	19.26	8.79	13449.97	154.36	11.16	3.54	195.19	32.95	28.8	17.84	< LOD	3.24	38.48	6.15
MP100	14	16	686.08	35.63	< LOD	8.69	NA	NA	< LOD	66.81	16.97	8.64	12773.82	149.98	9.37	3.39	197.24	32.66	27.83	17.55	< LOD	3.18	41.85	6.27
MP100	16	17	713.3	35.13	< LOD	8.68	NA	NA	< LOD	66.89	20.16	8.44	13253.78	150.14	8.33	3.27	204.71	32.71	< LOD	24.67	< LOD	3	38.22	6
MP100	17	18	608.89	34.52	< LOD	8.42	NA	NA	< LOD	65.55	16.16	8.22	12743.81	146.16	10.24	3.35	184.16	31.47	< LOD	24.74	< LOD	2.97	49.72	6.4
MP100	18	19	540.67	37.31	< LOD	9.35	NA	NA	< LOD	93.15	19.85	9.95	20753.6	206.53	11.54	3.87	266.68	40.33	< LOD	29.73	< LOD	3.69	49.13	7.17
MP100	19	20	645.24	33.98	< LOD	8.34	NA	NA	< LOD	57.32	17.61	7.88	10721.12	129.99	8.82	3.17	163.01	28.98	30.64	15.98	< LOD	3.01	31.02	5.43
MP100	20	21	493.28	32.48	< LOD	7.93	NA	NA	< LOD	58.15	20.05	7.77	10715.16	128.39	10.41	3.2	163.12	28.67	< LOD	23.4	< LOD	2.76	46.89	5.93
MP100	21	22	166.82	29.52	< LOD	7.63	NA	NA	< LOD	43.15	< LOD	10.53	5937.32	93.13	5.48	2.77	248.45	29.77	< LOD	21.31	< LOD	2.67	26.14	4.9
MP100	22	23	704.99	36.09	< LOD	8.97	NA	NA	< LOD	58.3	< LOD	12.33	9365.05	127.66	9.29	3.38	177.34	30.68	26.84	17.34	< LOD	3.14	36.16	5.93
MP100	23	24	503.18	32.69	< LOD	8.02	NA	NA	< LOD	58.19	12.3	7.58	10652.45	128.69	10.34	3.23	131.39	27.56	< LOD	23.71	< LOD	2.88	35.91	5.6
MP100	24	25	426.34	32.08	< LOD	7.94	NA	NA	< LOD	55.63	13.34	7.49	9815.9	122.28	7.21	2.98	184.87	29.14	25.04	15.61	< LOD	2.7	30.41	5.28
MP100	25	26	637.38	34.33	< LOD	8.36	NA	NA	< LOD	73.12	15.1	8.37	15123.23	160.7	10.78	3.44	135.18	30.14	41.75	17.86	< LOD	3.1	65.4	7.09
MP100	26	27	497.87	32.14	< LOD	7.94	NA	NA	< LOD	65.54	24.67	8.1	13487.38	145.48	9.38	3.18	182.52	30.49	24.51	16.07	< LOD	2.87	54.61	6.36
MP100	27	28	665.26	38.28	< LOD	9.37	NA	NA	< LOD	90.44	30.41	10.56	19325.97	200.77	8.37	3.67	195.8	37.65	35.99	20.84	< LOD	3.58	75	8.32
MP100	28	29	582.44	36.66	< LOD	9.2	NA	NA	< LOD	67.07	38.71	10.43	11019.01	148.39	10.92	3.71	700.08	52.32	40.45	19.76	< LOD	3.4	68.07	7.82
MP100	29	30	507.32	34.63	< LOD	8.67	NA	NA	< LOD	79.38	26.44	9.19	17603.92	178.24	8.56	3.41	916.93	56.38	51.05	18.73	< LOD	3.25	74.98	7.56
MP100	30	31	591.6	33.68	< LOD	8.09	NA	NA	< LOD	80.39	28.97	8.73	19113.27	178.47	7.01	3.11	1235.1	61.32	66.3	18.26	< LOD	2.84	78.92	7.44
MP100	31	32	533.41	51.39	< LOD	12.54	NA	NA	264.92	112.56	35.76	19.07	33165.05	369.17	11.2	5.47	1943.63	120.12	< LOD	55.63	< LOD	6.08	69.47	12.3
MP100	32	33	574.87	33.96	< LOD	8.08	NA	NA	90.33	57.75	29.68	8.99	21364.57	191.57	14.5	3.66	769.43	51.98	58.46	18.65	< LOD	3.13	88.6	7.92

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations							Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF			
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg							Cinnabar	White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)	
																								< LOD	18.4	47.71	4.49	< LOD	7.21	
MP100	33	34	07/10/2015	80								Brown	GM	N (KG)	Moist					< LOD	18.4	47.71	4.49	< LOD	7.21					
MP100	34	35	07/10/2015											WB						< LOD	15.61	46.98	3.77	< LOD	5.45					
MP100	35	36	07/10/2015	90								Brown	GM	WB	Wet					< LOD	18.17	109.71	6.45	< LOD	7.43					
MP100	36	37	07/10/2015	70								Brown		WB	Moist					< LOD	18.52	62.83	5	< LOD	7.03					
MP101	0	1	07/10/2015	20	x							Dark Gray	GP	T/WR	Wet					836	17.44	2177.66	23.59	25.41	5.39					
MP101	1	2	07/10/2015									Dark Gray	GP	T/WR	Wet															
MP101	2	4	07/10/2015	50			x					Dark Gray	GP-GM	T/WR	Wet															
MP101	5	6	07/10/2015	50								Gray	GP	T/WR	Saturated						6696	45.35	3175.49	29.46	1216.37	20.35				
MP101	6	8	07/10/2015	50								Dark Gray	GP	T/WR	Saturated						2097	22.28	1317.1	17.07	526.15	12.24				
MP101	8	10	07/10/2015	50	x							Dark Gray	GP-GM	T/WR	Saturated						2565	25.89	1408.6	17.94	265.11	9.26				
MP101	10	11	07/10/2015		x							Dark Gray	GP-GM	T/WR	Saturated						630	22.28	613.57	18.43	77.22	10.47				
MP101	10	11	07/10/2015		x									T/WR							15MP101SB11	2500	1700	520	2357	24.82	1352.82	17.82	329.38	10.31
MP101	11	12	07/10/2015	70								Dark Gray	CH	N	Moist						80	12.42	98.38	6.2	< LOD	6.97				
MP101	12	13	07/10/2015											N							15MP101SB13	870	840	220	1582	21.41	914.53	15.32	161.79	8.28
MP101	13	14	07/10/2015	100								Dark Gray	CH	N (KG)	Moist						15MP101SB14	200	300	21	201	13.3	267.36	8.75	12.07	4.81
MP101	14	15	07/10/2015											WB							205	12.54	358.54	9.46	25.32	4.93				
MP101	15	16	07/10/2015	100								Dark Gray	GP-GC	WB	Moist						86	13.08	248.28	8.86	< LOD	7.36				
MP101	16	17	07/10/2015											WB							181	13.93	772.06	15.49	12.1	5.27				
MP101	17	18	07/10/2015	60								Brown		WB	Damp						97	12.34	414.7	10.46	< LOD	6.6				
RD21	1	2	07/11/2015	50								Dark Grayish Brown	GP-GM	T/WR	Wet						1260	19	853	10	41	2				
RD21	2	3	07/11/2015											T/WR							1190	21	1105	14	30	2				
RD21	3	4	07/11/2015	90	x							Brown	GP-GC	T/WR	Wet						<LOD	44	16	2	<LOD	3				
RD21	4	5	07/11/2015											T/WR							15RD21SB05	740	1300	200	1356	21	867	11	35	2
RD21	5	6	07/11/2015	100	x							Brown	GP-GC	T/WR	Wet						56	14	19	2	4	1				
RD21	6	7	07/11/2015											WB							1778	25	1774	20	24	2				
RD21	7	8	07/11/2015	100								Gray		WB	Damp						<LOD	42	9	2	3	1				
RD22	0	1	07/11/2015	50								Brown	ML	N	Damp						15RD22SB01	210	270	20	47	10.85	20.55	3.17	< LOD	5.62
RD22	2	3	07/11/2015											N							92	11.07	43.45	4.01	< LOD	5.99				
RD22	3	4	07/11/2015	70								Brown	ML	N	Moist						< LOD	16.27	26.23	3.42	< LOD	5.81				
RD22	4	5	07/11/2015											N							< LOD	14.92	19.09	3	< LOD	5.68				
RD22	5	6	07/11/2015	100								Brown	SM	N	Moist						< LOD	16.99	13.14	3.02	< LOD	6.58				
RD22	6	7	07/11/2015											N							< LOD	15.67	13.94	2.68	< LOD	5.21				
RD22	7	8	07/11/2015	100								Brown	ML	N (KG)	Moist						< LOD	16.19	9.86	2.65	< LOD	5.65				
RD22	8	9	07/11/2015											N (KG)							15RD22SB09	9.9	24 J+	3.5	162	11.91	74.45	4.77	6.39	4.21
RD22	9	10	07/11/2015	90								Grayish Brown	ML	N (KG)	Moist						< LOD	16.77	13.02	3.26	< LOD	6.26				
RD22	10		07/11/2015											N (KG)																
RD22	11	12	07/11/2015	50								Gray	GM	N (KG)	Wet						< LOD	14.79	20.96	2.91	< LOD	5.45				
RD22	12		07/11/2015											N (KG)																
RD22	13	14	07/11/2015	50								Grayish Brown	ML	N (KG)	Moist						< LOD	17.68	20.75	3.66	< LOD	6.95				
RD22	14	15	07/11/2015											N (KG)							< LOD	17.94	6.56	3.08	< LOD	6.65				
RD22	15	16	07/11/2015	100								Gray	GC	N (KG)	Moist						< LOD	16.95	6.48	2.94	< LOD	6.53				
RD22	16	17	07/11/2015											N (KG)							< LOD	14.91	26.92	2.99	< LOD	4.97				
RD22	17	18	07/11/2015	80								Gray	GP-GC	WB	Moist						< LOD	17.64	8.2	3.23	< LOD	6.6				
RD22	18	19	07/11/2015											WB							< LOD	15.52	21	3.25	< LOD	5.55				
RD22	19	20	07/11/2015	80								Gray		WB	Moist						< LOD	16.39	9.9	2.77	< LOD	6.17				
SM67	1	2	07/14/2015	50								Olive Brown	ML	DN (KG and loess)	Damp						<LOD	39	61	3	<LOD	3				
SM67	2	3	07/14/2015											N (loess)							<LOD	95	<LOD	37	<LOD	20				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
MP100	33	34	1109.29	43.27	< LOD	10.02	NA	NA	< LOD	107.97	40.93	12.07	24445.81	238.83	7.62	3.82	132.98	38.35	81.34	24.37	< LOD	3.83	77.77	9.03
MP100	34	35	638.89	34.74	< LOD	8.52	NA	NA	96.78	57.88	35.3	8.99	21920.73	191.82	8.44	3.21	587.33	46.61	39.03	17.85	< LOD	2.98	82.68	7.69
MP100	35	36	514.9	40.64	< LOD	9.95	NA	NA	< LOD	189.3	33.28	12.72	70285.01	427.02	< LOD	5.74	3115.93	121.04	79.44	27.67	< LOD	3.94	75.21	9.4
MP100	36	37	717.76	41.4	< LOD	10.04	NA	NA	136.28	86.43	< LOD	16.86	34298.64	287.35	6.36	3.81	351.34	50.18	< LOD	35.56	< LOD	4.11	54.09	8.13
MP101	0	1	729.93	38.77	< LOD	9.65	NA	NA	< LOD	106.7	42.01	10.98	27370.81	237.85	9.92	3.83	1720.66	80.24	107.22	23.01	< LOD	4.84	111.56	9.75
MP101	1	2																						
MP101	2	4	413.23	42.98	< LOD	12.64	NA	NA	< LOD	106.69	89.22	13	25687.84	236.93	23.54	5.5	512.42	52.63	100.36	23.8	< LOD	7.25	117.77	12.89
MP101	5	6	204.5	33.51	< LOD	9.07	NA	NA	89.27	57.3	41.94	9.54	20538.58	189.74	14.47	4.02	527.54	45.92	39.99	18.51	< LOD	4.59	64.11	8.54
MP101	6	8	511.72	37.71	< LOD	10.12	NA	NA	100.19	58.27	50.57	10.06	20374.49	192.61	15.56	4.04	683.5	51.32	48.31	19.18	< LOD	4.41	76.18	8.47
MP101	8	10	326.26	51.19	< LOD	13.2	NA	NA	207.61	110.46	40.65	20.17	30569.07	362.84	9.25	5.58	370.78	67.96	< LOD	58.41	< LOD	6.58	71.45	12.93
MP101	10	11	459.48	37.13	< LOD	10.01	NA	NA	< LOD	87.49	51.55	10.38	20114.89	193.85	12.26	3.95	428.28	44.34	61.08	19.91	< LOD	4.66	78.9	8.85
MP101	11	12	1343.13	42.6	< LOD	9.67	NA	NA	223.57	95.7	89.94	12.67	47999.63	317.7	35.08	5.48	210.64	44.78	75.61	23.43	19.6	3.46	119.73	10.07
MP101	12	13	685.43	38.49	< LOD	9.72	NA	NA	< LOD	109.81	57.98	11.25	29605.12	243.99	16.8	4.24	398.22	46.74	57.77	21.36	< LOD	4.41	83.62	9.07
MP101	13	14	620.12	38.65	< LOD	9.58	NA	NA	< LOD	142.36	33.91	11.01	47197.67	319.23	< LOD	5.3	699.95	60.54	73.94	23.44	< LOD	4.03	82.14	8.83
MP101	14	15	761.65	37	< LOD	8.92	NA	NA	< LOD	104.31	39.74	10.2	27953.35	231.34	6.46	3.41	409.11	45.52	67.82	20.77	< LOD	3.85	63.26	7.64
MP101	15	16	796.1	41.85	< LOD	10.09	NA	NA	< LOD	179.22	23.59	11.49	69549.63	406.76	5.83	3.71	5203.87	144.93	130.89	26.92	< LOD	3.94	91.9	9.65
MP101	16	17	1100.94	43.57	< LOD	10.09	NA	NA	< LOD	223.62	28.04	11.92	104036.1	507.12	< LOD	5.47	7699.93	179.06	149.5	29.15	< LOD	4.61	89.56	9.8
MP101	17	18	753.58	38.93	< LOD	9.6	NA	NA	< LOD	127.32	24.81	10.17	42671.97	296.48	5.65	3.42	4472.09	123.7	92.97	21.84	< LOD	3.77	79.94	8.46
RD21	1	2	9	2	<LOD	36	6	1	64	6	12	2	2506	24	7	1	87	3	11	2	5	1	33	2
RD21	2	3	12	3	<LOD	40	7	2	60	7	8	2	2672	30	5	2	91	4	<LOD	6	<LOD	4	25	2
RD21	3	4	14	3	<LOD	44	6	2	31	5	30	3	1238	17	6	2	13	2	<LOD	6	4	1	11	2
RD21	4	5	9	3	<LOD	39	5	2	57	6	9	2	2930	30	<LOD	4	72	3	8	2	<LOD	4	23	2
RD21	5	6	13	3	<LOD	41	<LOD	5	55	7	6	2	3174	36	<LOD	4	11	2	<LOD	6	5	1	47	2
RD21	6	7	13	3	<LOD	39	11	2	71	7	10	2	3505	36	<LOD	4	53	3	11	2	<LOD	5	29	2
RD21	7	8	<LOD	9	<LOD	43	6	2	70	8	16	2	3347	38	6	2	57	3	<LOD	7	<LOD	3	31	2
RD22	0	1	453.61	34.1	< LOD	8.55	NA	NA	< LOD	80.59	21.06	9.03	17585.5	178.47	10.3	3.52	245.35	36.39	< LOD	26.94	< LOD	3.08	55.37	6.94
RD22	2	3	309.54	33.01	< LOD	8.32	NA	NA	< LOD	85.31	25.71	9.33	19575.59	189.03	14.48	3.79	243.7	36.89	< LOD	27.93	< LOD	3.29	62.76	7.37
RD22	3	4	506.02	35.28	< LOD	8.77	NA	NA	96.31	52.37	14.1	8.8	16297.96	171.99	12.36	3.63	258.42	36.5	< LOD	27.12	< LOD	3.09	54.33	6.96
RD22	4	5	173.53	31.97	< LOD	8.13	NA	NA	< LOD	74.58	< LOD	13.12	14899.22	164.16	6.98	3.32	226.95	34.92	< LOD	26.92	< LOD	3.25	42.35	6.39
RD22	5	6	803.67	38.67	< LOD	9.21	NA	NA	< LOD	101.16	38.56	10.76	24634.63	225.01	8.57	3.63	371.39	45.19	31.15	20.74	< LOD	3.64	75.07	8.37
RD22	6	7	587	34.65	< LOD	8.61	NA	NA	< LOD	74.08	15.28	8.21	16046.15	163.92	6.93	3.15	241.22	34.34	< LOD	25.06	< LOD	2.99	51.24	6.48
RD22	7	8	745.43	36.32	< LOD	8.98	NA	NA	< LOD	80.61	23.19	9.01	18451.52	180.56	8.07	3.33	192.36	34.2	49.11	18.6	< LOD	3.15	67.75	7.31
RD22	8	9	413.31	34.42	< LOD	8.67	NA	NA	< LOD	77.96	17.17	9.32	15814.88	173.35	8.49	3.5	239.52	36.65	39.32	19.34	< LOD	3.42	52.9	7.08
RD22	9	10	521.64	37.24	< LOD	9.35	NA	NA	101.96	61.96	33.21	10.73	19959.48	204.42	14.18	4.04	237.61	39.53	< LOD	30.94	< LOD	3.42	83.04	8.63
RD22	10																							
RD22	11	12	528.11	33.18	< LOD	8	NA	NA	< LOD	81.15	29.79	8.76	19776.28	181.24	6.4	3.09	463.54	42.35	45.1	17.68	< LOD	2.99	66.17	7.06
RD22	12																							
RD22	13	14	748.68	40.19	< LOD	9.77	NA	NA	< LOD	135.58	65.84	12.56	40849.19	303.17	12.93	4.15	1114.54	71.79	57.48	23.63	< LOD	3.68	102.24	9.75
RD22	14	15	799.29	40.97	< LOD	9.76	NA	NA	248.23	109.01	60.99	12.35	58204.8	362.95	12.62	4.16	1209.18	76.43	< LOD	36.08	< LOD	3.81	115.38	10.22
RD22	15	16	705.75	38.46	< LOD	9.26	NA	NA	< LOD	131.48	52.93	11.42	41380.77	294.2	12.53	3.97	896.81	63.88	48.59	22.1	< LOD	3.69	90.38	9
RD22	16	17	473.91	32.39	< LOD	7.98	NA	NA	101.52	54.73	41.84	8.47	21935.65	181.21	8.02	3.02	482.67	41.08	35.04	16.37	< LOD	2.82	78.2	7.05
RD22	17	18	1135.08	41.86	< LOD	9.63	NA	NA	147.9	83.1	58.27	11.85	35626.94	276.27	17.29	4.32	616.79	56.28	50.77	22.6	< LOD	3.68	106.69	9.7
RD22	18	19	889.11	36.38	< LOD	8.52	NA	NA	117.66	58.85	59.05	9.88	22458.75	194.37	16.45	3.75	487.97	44.01	57.55	18.54	< LOD	2.99	113.36	8.65
RD22	19	20	579.01	36.57	< LOD	8.93	NA	NA	< LOD	103.3	35.22	10.26	26906.52	229.79	7.27	3.46	383.42	44.85	43.24	20.46	< LOD	3.4	82.41	8.35
SM67	1	2	12	3	<LOD	39	<LOD	4	36	5	10	2	1868	21	6	1	29	2	<LOD	5	<LOD	3	17	2
SM67	2	3	<LOD	252	<LOD	100	43458	1166	1265	120	767	44	134610	3586	88	13	3434	127	14133	387	<LOD	20	<LOD	40



Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD					
SM67	3	4	07/14/2015	90								Olive Brown	ML	N (loess)	Damp					<LOD	35	16	2	<LOD	2				
SM67	4	5	07/14/2015	70								Olive Brown	ML	N (loess)	Moist					<LOD	32	5	1	<LOD	2				
SM67	6	7	07/14/2015											N (loess)						<LOD	35	6	2	<LOD	2				
SM67	7	8	07/14/2015	80								Olive Brown	ML	N (loess)	Moist					<LOD	33	8	1	2	1				
SM67	8	9	07/14/2015											N (loess)						<LOD	41	122	4	4	1				
SM67	9	10	07/14/2015	100								Olive Brown	ML	WB	Moist					<LOD	38	111	4	4	1				
SM67	10	11	07/14/2015											WB						<LOD	39	116	4	4	1				
SM67	11	12	07/14/2015	100								Grayish Brown	GP	WB	Dry					<LOD	42	157	4	5	1				
SM67	12	13	07/14/2015											WB						<LOD	40	196	5	5	1				
SM67	13	14	07/14/2015	80								Grayish Brown		WB	Damp					<LOD	38	138	4	3	1				
SM67	14	15	07/14/2015											WB						<LOD	35	90	3	5	1				
SM67	15	16	07/14/2015	100								Gray		WB	Dry					<LOD	44	162	5	<LOD	4				
SM67	16	17	07/14/2015											WB						<LOD	40	103	4	5	1				
SM67	17	18	07/14/2015	100								Gray		WB	Damp					<LOD	33	13	1	3	1				
SM67	18	19	07/14/2015											WB						<LOD	44	119	4	<LOD	4				
SM67	19	20	07/14/2015									Gray		WB	Damp					<LOD	42	98	4	6	1				
SM67	20	21	07/14/2015									Gray		B	Dry					<LOD	38	55	3	4	1				
SM67	21	22	07/14/2015									Gray		B	Damp					<LOD	36	75	3	6	1				
SM67	22	23	07/14/2015									Gray		B	Dry					<LOD	38	78	3	4	1				
SM67	23	24	07/14/2015									Grayish Brown		B	Dry					<LOD	36	75	3	4	1				
SM67	24	25	07/14/2015									Grayish Brown		B	Dry					<LOD	36	44	2	3	1				
SM67	25	26	07/14/2015									Grayish Brown		B	Dry					<LOD	38	106	3	<LOD	3				
SM67	26	27	07/14/2015									Grayish Brown		B	Dry					<LOD	38	73	3	3	1				
SM67	27	28	07/14/2015									Grayish Brown		B	Dry					<LOD	39	93	3	5	1				
SM67	28	29	07/14/2015									Grayish Brown		B	Dry					<LOD	38	85	3	<LOD	3				
SM67	29	30	07/14/2015									Dark Gray		B	Dry					<LOD	39	79	3	4	1				
SM67	30	31	07/14/2015									Grayish Brown		B	Dry					<LOD	39	60	3	<LOD	3				
SM67	31	32	07/14/2015									Gray		B	Dry					<LOD	38	79	3	5	1				
SM67	32	33	07/14/2015									Brown		B	Dry					<LOD	37	89	3	5	1				
SM67	33	34	07/14/2015									Brown		B	Dry					<LOD	37	112	3	3	1				
SM67	34	35	07/14/2015									Grayish Brown		B	Dry					<LOD	37	77	3	4	1				
SM67	35	36	07/14/2015									Grayish Brown		B	Dry					<LOD	37	78	3	4	1				
SM67	36	37	07/14/2015									Grayish Brown		B	Dry					<LOD	36	67	3	<LOD	3				
SM67	37	38	07/14/2015									Dark Gray		B	Dry					<LOD	39	62	3	3	1				
SM67	38	39	07/14/2015									Dark Gray		B	Dry					<LOD	35	74	3	<LOD	3				
SM67	39	40	07/14/2015									Black		B	Dry					<LOD	36	91	3	5	1				
SM67	40	41	07/14/2015									Dark Gray		B	Dry					<LOD	38	92	3	4	1				
SM67	41	42	07/14/2015									Gray		B	Damp					<LOD	40	86	3	<LOD	3				
SM67	42	43	07/14/2015									Gray		B	Damp					<LOD	41	80	3	<LOD	3				
SM67	43	44	07/14/2015									Dark Gray		B	Damp					<LOD	38	95	3	3	1				
SM67	44	45	07/14/2015									Gray		B	Damp					<LOD	39	86	3	<LOD	3				
SM67	45	46	07/14/2015									Grayish Brown		B	Damp					<LOD	41	99	4	<LOD	3				
SM67	46	47	07/14/2015									Brown		B	Damp					<LOD	40	176	5	<LOD	3				
SM67	47	48	07/14/2015									Gray		B	Damp					<LOD	40	67	3	<LOD	3				
SM67	48	49	07/14/2015									Gray		B	Damp					<LOD	41	109	4	<LOD	3				
SM67	49	50	07/14/2015									Gray		B	Dry					<LOD	39	54	3	4	1				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF		
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM67	3	4	8	2	<LOD	36	<LOD	4	58	5	5	2	2133	22	<LOD	4	24	2	<LOD	5	<LOD	2	18	1
SM67	4	5	7	2	<LOD	36	4	1	44	5	7	2	1912	19	5	1	23	2	<LOD	5	<LOD	2	19	1
SM67	6	7	7	2	<LOD	32	<LOD	3	45	4	5	1	1735	17	5	1	25	2	5	2	<LOD	2	18	1
SM67	7	8	10	2	<LOD	33	4	1	47	5	7	2	1840	18	<LOD	3	38	2	6	2	3	1	17	1
SM67	8	9	22	3	<LOD	42	8	2	119	10	20	2	5547	58	8	2	64	4	<LOD	8	<LOD	3	36	2
SM67	9	10	20	3	<LOD	39	<LOD	5	66	7	18	2	3437	36	8	2	78	3	<LOD	7	<LOD	3	43	2
SM67	10	11	33	3	<LOD	40	<LOD	5	106	9	23	2	5077	51	11	2	56	3	<LOD	8	4	1	51	2
SM67	11	12	21	3	<LOD	42	10	2	102	9	16	2	5364	56	10	2	110	4	<LOD	8	<LOD	3	58	3
SM67	12	13	29	3	<LOD	40	9	2	89	9	20	2	5039	50	8	2	162	5	13	3	4	1	50	2
SM67	13	14	14	3	<LOD	39	5	2	49	7	12	2	3472	35	<LOD	4	107	4	11	2	<LOD	3	31	2
SM67	14	15	16	3	<LOD	35	6	1	43	6	6	2	2736	26	<LOD	4	67	3	6	2	<LOD	2	30	2
SM67	15	16	20	4	<LOD	44	8	2	101	11	15	2	7136	77	6	2	359	8	<LOD	9	<LOD	3	57	3
SM67	16	17	22	3	<LOD	40	<LOD	5	102	9	17	2	5599	57	6	2	91	4	<LOD	8	<LOD	3	40	2
SM67	17	18	12	2	<LOD	33	4	1	12	2	6	2	551	7	4	1	8	1	5	1	<LOD	2	9	1
SM67	18	19	23	4	<LOD	44	<LOD	7	193	15	28	3	12316	131	19	2	210	7	<LOD	12	5	1	66	3
SM67	19	20	23	3	<LOD	43	6	2	83	8	16	2	3814	43	8	2	37	3	<LOD	7	<LOD	3	46	2
SM67	20	21	20	3	<LOD	39	9	2	69	7	15	2	2910	30	7	1	41	3	<LOD	6	<LOD	3	35	2
SM67	21	22	20	3	<LOD	36	6	1	66	6	22	2	2714	27	8	1	55	3	9	2	<LOD	3	32	2
SM67	22	23	19	3	<LOD	38	<LOD	5	106	8	23	2	4123	41	9	2	52	3	<LOD	7	<LOD	3	46	2
SM67	23	24	20	3	<LOD	37	7	2	111	7	18	2	3803	37	7	1	50	3	<LOD	7	<LOD	3	42	2
SM67	24	25	15	3	<LOD	37	6	1	52	5	11	2	2154	22	7	1	23	2	8	2	<LOD	2	26	2
SM67	25	26	17	3	<LOD	38	5	2	96	7	18	2	3912	39	6	1	41	3	10	2	<LOD	3	47	2
SM67	26	27	27	3	<LOD	39	6	2	110	9	22	2	5280	53	7	2	140	4	<LOD	8	<LOD	3	47	2
SM67	27	28	18	3	<LOD	39	8	2	87	8	18	2	4054	41	7	2	53	3	7	2	<LOD	3	46	2
SM67	28	29	22	3	<LOD	38	<LOD	5	73	7	16	2	3680	37	6	1	42	3	<LOD	7	<LOD	3	42	2
SM67	29	30	20	3	<LOD	40	10	2	89	8	18	2	3951	40	7	1	53	3	7	2	<LOD	3	50	2
SM67	30	31	26	3	<LOD	40	<LOD	5	78	9	13	2	5539	56	6	2	265	6	<LOD	8	<LOD	3	40	2
SM67	31	32	19	3	<LOD	38	6	2	83	7	16	2	3823	38	6	1	73	3	<LOD	6	3	1	40	2
SM67	32	33	17	3	<LOD	38	6	2	101	8	19	2	4269	42	11	2	52	3	7	2	4	1	47	2
SM67	33	34	10	3	<LOD	38	8	2	76	7	9	2	3951	39	5	1	49	3	<LOD	7	3	1	36	2
SM67	34	35	21	3	<LOD	37	<LOD	5	54	7	12	2	3302	33	<LOD	4	62	3	10	2	<LOD	3	38	2
SM67	35	36	20	3	<LOD	38	6	2	76	7	9	2	3352	34	5	1	43	3	<LOD	6	<LOD	3	35	2
SM67	36	37	24	3	<LOD	36	<LOD	4	74	6	21	2	2940	29	6	1	31	2	8	2	<LOD	3	39	2
SM67	37	38	18	3	<LOD	39	7	2	94	8	17	2	4140	42	<LOD	4	65	3	<LOD	7	<LOD	3	43	2
SM67	38	39	13	3	<LOD	36	<LOD	4	68	6	12	2	2980	29	6	1	31	2	<LOD	6	<LOD	3	32	2
SM67	39	40	24	3	<LOD	37	6	2	75	7	27	2	3358	33	11	2	40	3	12	2	3	1	53	2
SM67	40	41	24	3	<LOD	37	6	2	96	7	16	2	3866	38	7	1	58	3	<LOD	7	<LOD	3	47	2
SM67	41	42	33	3	<LOD	40	8	2	106	8	18	2	4022	42	9	2	96	4	<LOD	7	<LOD	3	46	2
SM67	42	43	22	3	<LOD	41	8	2	64	6	22	2	2517	28	8	2	21	2	8	2	<LOD	3	49	2
SM67	43	44	32	3	<LOD	39	7	2	63	6	24	2	2820	29	7	2	29	2	13	2	<LOD	3	54	2
SM67	44	45	17	3	<LOD	40	<LOD	5	84	8	23	2	3819	41	11	2	50	3	<LOD	7	<LOD	3	49	2
SM67	45	46	18	3	<LOD	41	8	2	136	9	20	2	5323	55	9	2	68	4	<LOD	8	<LOD	3	56	3
SM67	46	47	16	3	<LOD	40	<LOD	5	124	10	12	2	5633	58	7	2	104	4	<LOD	8	<LOD	3	36	2
SM67	47	48	20	3	<LOD	40	6	2	124	10	14	2	6061	61	6	2	60	4	<LOD	8	<LOD	3	34	2
SM67	48	49	19	3	<LOD	41	7	2	107	9	16	2	4616	48	9	2	59	3	<LOD	8	<LOD	3	35	2
SM67	49	50	19	3	<LOD	39	<LOD	5	79	8	15	2	3959	40	6	1	52	3	<LOD	7	<LOD	3	32	2

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD	<LOD	<LOD	<LOD	<LOD	
SM67	50	51	07/14/2015									Dark Gray		B	Dry					<LOD	37	41	2	4	1				
SM67	51	52	07/14/2015									Dark Gray		B	Dry					<LOD	40	68	3	4	1				
SM67	52	53	07/14/2015									Gray		B	Dry					<LOD	38	54	3	<LOD	3				
SM67	53	54	07/14/2015									Gray		B	Dry					<LOD	40	60	3	3	1				
SM67	54	55	07/14/2015									Light Gray		B	Dry					<LOD	42	53	3	<LOD	3				
SM67	55	56	07/14/2015									Gray		B	Damp					<LOD	38	70	3	7	1				
SM67	56	57	07/14/2015									Black		B	Dry					<LOD	39	65	3	4	1				
SM67	57	58	07/14/2015									Gray		B	Damp					<LOD	42	69	3	<LOD	3				
SM67	58	59	07/14/2015									Gray		B	Dry					<LOD	40	64	3	4	1				
SM67	59	60	07/14/2015									Gray		B	Dry					<LOD	40	65	3	<LOD	3				
SM67	60	61	07/14/2015									Gray		B	Dry					<LOD	45	77	3	<LOD	3				
SM67	61	62	07/14/2015									Gray		B	Dry					<LOD	43	369	8	<LOD	4				
SM67	62	63	07/14/2015									Dark Gray		B	Damp					<LOD	42	97	4	<LOD	3				
SM67	63	64	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	39	96	3	4	1				
SM67	64	65	07/14/2015									Gray		B	Damp	MW39	63 - 83			<LOD	41	92	3	<LOD	3				
SM67	65	66	07/14/2015									Gray		B	Dry	MW39	63 - 83			<LOD	38	43	2	3	1				
SM67	66	67	07/14/2015									Gray		B	Dry	MW39	63 - 83			<LOD	39	59	3	<LOD	3				
SM67	67	68	07/14/2015									Gray		B	Dry	MW39	63 - 83			<LOD	40	67	3	<LOD	3				
SM67	68	69	07/14/2015									Gray		B	Damp	MW39	63 - 83			<LOD	40	46	3	<LOD	3				
SM67	69	70	07/14/2015									Light Gray		B	Damp	MW39	63 - 83			<LOD	39	40	2	4	1				
SM67	70	71	07/14/2015									Gray		B	Damp	MW39	63 - 83			<LOD	40	159	4	<LOD	3				
SM67	71	72	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	38	77	3	4	1				
SM67	72	73	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	39	79	3	3	1				
SM67	73	74	07/14/2015									Gray		B	Dry	MW39	63 - 83			<LOD	44	69	3	<LOD	3				
SM67	74	75	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	41	54	3	<LOD	3				
SM67	75	76	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	38	81	3	5	1				
SM67	76	77	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	38	85	3	4	1				
SM67	77	78	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	41	87	3	<LOD	3				
SM67	78	79	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	39	116	4	3	1				
SM67	79	80	07/14/2015									Dark Gray		B	Damp	MW39	63 - 83			<LOD	38	93	3	<LOD	3				
SM67	80	81	07/14/2015									Gray		B	Damp	MW39	63 - 83			<LOD	42	52	3	<LOD	3				
SM67	81	82	07/14/2015									Gray		B	Dry	MW39	63 - 83			<LOD	38	41	2	<LOD	3				
SM67	82	83	07/14/2015									Light Gray		B	Dry	MW39	63 - 83			<LOD	42	44	3	4	1				
SM67	83	84	07/14/2015									Dark Gray		B	Damp					<LOD	39	93	3	4	1				
SM67	84	85	07/14/2015									Gray		B	Damp					<LOD	40	66	3	3	1				
SM67	85	86	07/14/2015									Dark Gray		B	Damp					<LOD	38	83	3	5	1				
SM67	86	87	07/14/2015									Dark Gray		B	Damp					<LOD	40	50	3	<LOD	3				
SM67	87	88	07/14/2015									Gray		B	Dry					<LOD	38	48	2	<LOD	3				
SM67	88	89	07/14/2015									Gray		B	Dry					<LOD	41	43	2	<LOD	3				
SM67	89	90	07/14/2015									Gray		B	Dry					<LOD	42	35	2	4	1				
SM68a	0	2	07/15/2015	0																									
SM68a	3	4	07/15/2015	50								Brown	NR	GP-GM	DN (KG)	Damp				137	18	187	6	7	2				
SM68a	4	5	07/15/2015																	<LOD	68	120	6	<LOD	6				
SM68a	5	6	07/15/2015	60									GP-GM	DN (KG)						<LOD	38	93	3	<LOD	3				
SM68a	6	7	07/15/2015																	<LOD	45	122	4	4	1				
SM68a	7	8	07/15/2015	100								Black		DN (KG)	Moist					<LOD	42	153	4	4	1				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM67	50	51	15	3	<LOD	38	<LOD	4	48	6	12	2	2835	29	<LOD	4	29	2	<LOD	6	<LOD	3	27	2
SM67	51	52	22	3	<LOD	40	6	2	108	9	21	2	4677	48	6	2	54	3	<LOD	7	<LOD	3	47	2
SM67	52	53	16	3	<LOD	39	5	2	72	7	10	2	3013	32	6	1	19	2	<LOD	6	<LOD	3	32	2
SM67	53	54	13	3	<LOD	40	<LOD	5	84	8	8	2	3994	41	5	1	74	3	<LOD	7	<LOD	3	31	2
SM67	54	55	10	3	<LOD	42	8	2	109	10	9	2	5501	59	<LOD	4	187	5	<LOD	8	<LOD	3	29	2
SM67	55	56	21	3	<LOD	38	7	2	54	6	20	2	2635	27	12	2	43	3	7	2	<LOD	3	51	2
SM67	56	57	24	3	<LOD	40	7	2	81	8	22	2	3694	38	11	2	47	3	<LOD	7	4	1	62	3
SM67	57	58	22	3	<LOD	42	8	2	72	8	20	2	3439	38	7	2	30	3	<LOD	7	<LOD	3	49	2
SM67	58	59	22	3	<LOD	40	<LOD	5	92	8	24	2	3649	38	5	1	39	3	<LOD	7	<LOD	3	42	2
SM67	59	60	23	3	<LOD	40	8	2	124	10	15	2	5837	59	7	2	84	4	<LOD	8	<LOD	3	38	2
SM67	60	61	14	4	<LOD	45	<LOD	6	147	11	10	2	6698	75	<LOD	5	73	4	<LOD	9	<LOD	3	38	2
SM67	61	62	<LOD	11	<LOD	44	<LOD	6	186	13	9	2	8238	90	12	2	27	4	<LOD	10	7	1	36	2
SM67	62	63	19	4	<LOD	42	11	2	191	11	19	2	7494	77	<LOD	5	36	4	<LOD	9	7	1	41	2
SM67	63	64	25	3	<LOD	39	7	2	88	8	25	2	3975	41	7	2	45	3	<LOD	7	<LOD	3	58	2
SM67	64	65	16	3	<LOD	42	<LOD	5	97	9	11	2	5075	54	6	2	61	4	<LOD	8	<LOD	3	33	2
SM67	65	66	12	3	<LOD	39	<LOD	4	49	7	7	2	2943	31	5	1	76	3	<LOD	6	<LOD	3	29	2
SM67	66	67	19	3	<LOD	39	<LOD	4	53	6	10	2	2803	30	<LOD	4	100	4	<LOD	6	<LOD	3	28	2
SM67	67	68	16	3	<LOD	40	6	2	113	8	10	2	4628	46	5	1	57	3	<LOD	7	<LOD	3	37	2
SM67	68	69	15	3	<LOD	40	<LOD	5	93	8	8	2	3812	40	5	1	32	3	<LOD	7	<LOD	3	29	2
SM67	69	70	17	3	<LOD	39	6	2	56	7	12	2	3650	37	<LOD	4	29	3	<LOD	6	<LOD	3	54	2
SM67	70	71	10	3	<LOD	40	6	2	85	8	7	2	3546	38	5	1	22	3	<LOD	7	<LOD	3	32	2
SM67	71	72	25	3	<LOD	38	7	2	77	7	32	2	3275	33	17	2	43	3	<LOD	6	<LOD	3	43	2
SM67	72	73	22	3	<LOD	39	7	2	76	7	17	2	3396	35	11	2	34	3	10	2	3	1	40	2
SM67	73	74	16	3	<LOD	44	<LOD	5	94	9	9	2	4372	49	<LOD	5	29	3	<LOD	8	<LOD	3	29	2
SM67	74	75	17	3	<LOD	41	5	2	53	7	20	2	2640	30	<LOD	4	26	3	<LOD	6	<LOD	3	36	2
SM67	75	76	21	3	<LOD	38	6	2	74	7	22	2	3400	35	10	2	29	3	<LOD	7	<LOD	3	44	2
SM67	76	77	23	3	<LOD	38	5	2	84	7	23	2	3142	32	13	2	52	3	<LOD	6	4	1	39	2
SM67	77	78	18	3	<LOD	41	6	2	87	8	16	2	3588	39	9	2	78	4	<LOD	7	<LOD	3	42	2
SM67	78	79	22	3	<LOD	39	<LOD	5	89	7	14	2	3520	37	9	2	41	3	9	2	3	1	38	2
SM67	79	80	19	3	<LOD	39	8	2	84	7	23	2	2843	29	13	2	21	2	<LOD	6	<LOD	3	41	2
SM67	80	81	16	3	<LOD	42	<LOD	5	99	8	9	2	3762	42	<LOD	4	48	3	<LOD	7	<LOD	3	24	2
SM67	81	82	12	3	<LOD	38	<LOD	4	54	6	8	2	2361	25	4	1	98	3	<LOD	5	<LOD	3	23	2
SM67	82	83	<LOD	9	<LOD	42	<LOD	5	84	8	8	2	4087	45	13	2	155	5	<LOD	7	3	1	25	2
SM67	83	84	21	3	<LOD	39	6	2	65	6	22	2	2619	28	8	2	31	3	11	2	4	1	45	2
SM67	84	85	16	3	<LOD	40	5	2	97	8	20	2	3827	40	9	2	57	3	<LOD	7	<LOD	3	43	2
SM67	85	86	16	3	<LOD	38	<LOD	4	79	7	13	2	3013	31	<LOD	4	32	3	<LOD	6	<LOD	3	37	2
SM67	86	87	12	3	<LOD	41	<LOD	4	65	6	<LOD	6	2421	27	<LOD	4	29	3	<LOD	6	<LOD	3	29	2
SM67	87	88	10	3	<LOD	39	<LOD	5	83	7	9	2	3148	32	<LOD	4	35	3	<LOD	6	<LOD	3	24	2
SM67	88	89	11	3	<LOD	41	<LOD	5	79	8	7	2	3616	39	<LOD	4	40	3	<LOD	7	<LOD	3	34	2
SM67	89	90	12	3	<LOD	43	8	2	76	8	<LOD	6	3817	43	<LOD	4	51	3	<LOD	7	<LOD	3	28	2
SM68a	0	2																						
SM68a	3	4	11	3	<LOD	52	<LOD	6	42	7	<LOD	7	2012	31	11	2	45	4	<LOD	7	<LOD	4	28	2
SM68a	4	5	<LOD	17	<LOD	68	12	4	281	24	13	4	12106	209	<LOD	8	41	7	<LOD	15	<LOD	6	26	3
SM68a	5	6	25	3	<LOD	38	6	2	70	8	16	2	4346	43	12	2	125	4	<LOD	7	<LOD	3	39	2
SM68a	6	7	12	4	<LOD	45	<LOD	6	122	11	17	3	5339	63	10	2	211	6	<LOD	9	<LOD	3	44	3
SM68a	7	8	17	3	<LOD	42	7	2	97	9	19	2	5325	56	8	2	124	4	<LOD	8	<LOD	3	43	2

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD	<LOD	<LOD	<LOD	<LOD	
SM68a	8	9	07/15/2015											WB						<LOD	37	176	4	5	1				
SM68a	9	10	07/15/2015	80					x					Dark Brown		WB	Damp			<LOD	41	132	4	<LOD	3				
SM68a	10	11	07/15/2015													WB				15SM68SB11	9.1	260	11	147	13	226	5	<LOD	3
SM68a	11	12	07/15/2015	90										Gray		WB	Damp			<LOD	55	140	6	<LOD	4				
SM68a	12	13	07/15/2015													WB				<LOD	43	94	4	<LOD	3				
SM68a	13	14	07/15/2015	100										Grayish Brown		WB	Damp			<LOD	35	58	2	4	1				
SM68a	14	15	07/15/2015													WB				<LOD	39	111	4	6	1				
SM68a	15	16	07/15/2015	90										Grayish Brown		WB	Dry			<LOD	39	80	3	4	1				
SM68a	16	17	07/15/2015													WB				71	20	104	6	<LOD	5				
SM68a	17	18	07/15/2015	100										Dark Gray		WB	Dry			<LOD	51	34	3	<LOD	3				
SM68a	18	19	07/15/2015													WB				<LOD	38	72	3	3	1				
SM68a	19	20	07/15/2015	80										Gray		WB	Dry			<LOD	35	116	3	3	1				
SM68a	20	21	07/15/2015													WB				<LOD	83	195	10	<LOD	7				
SM68a	21	22	07/15/2015	100										Black		WB	Dry			327	17	735	12	<LOD	5				
SM68a	22	23	07/15/2015													B				1313	29	1882	30	<LOD	7				
SM68a	23	24	07/15/2015	75										Grayish Brown		B	Dry			188	13	715	10	5	1				
SM68a	24	25	07/15/2015											Black		B	Damp			85	13	447	7	7	1				
SM68a	25	26	07/15/2015											Brown		B	Damp			506	16	987	13	6	2				
SM68a	26	27	07/15/2015											Brown		B	Damp			291	15	828	12	<LOD	4				
SM68a	27	28	07/15/2015											Grayish Brown		B	Damp			151	14	472	8	6	1				
SM68a	28	29	07/15/2015											Grayish Brown		B	Damp			78	13	423	7	6	1				
SM68a	29	30	07/15/2015											Grayish Brown		B	Damp			47	13	400	7	<LOD	3				
SM68a	30	31	07/15/2015											Dark Gray		B	Damp			<LOD	38	183	4	7	1				
SM68a	31	32	07/15/2015											Dark Gray		B	Damp			<LOD	37	235	5	6	1				
SM68a	32	33	07/15/2015											Black		B	Damp			<LOD	39	163	4	8	1				
SM68a	33	34	07/15/2015											Brownish Yellow		B	Damp			<LOD	37	271	5	5	1				
SM68a	34	35	07/15/2015											Very Dark Gray		B	Damp			<LOD	38	226	5	7	1				
SM68a	35	36	07/15/2015											Grayish Brown		B	Damp			<LOD	39	386	7	8	1				
SM68a	36	37	07/15/2015											Gray		B	Damp			94	13	620	9	7	1				
See borehole SM68a interval 0-25 ft.																													
SM68b	25	26	07/16/2015											Dark Gray		B	Damp			<LOD	39	82	3	4	1				
SM68b	26	27	07/16/2015											Grayish Brown		B	Moist			<LOD	40	72	3	<LOD	3				
SM68b	27	28	07/16/2015											Brown		B	Damp			<LOD	36	41	2	3	1				
SM68b	28	29	07/16/2015											Brown		B	Damp			<LOD	38	41	2	3	1				
SM68b	29	30	07/16/2015											Gray		B	Dry			<LOD	36	54	3	<LOD	3				
SM68b	30	31	07/16/2015											Gray		B	Dry			<LOD	39	73	3	<LOD	3				
SM68b	31	32	07/16/2015											Gray		B	Damp			<LOD	36	36	2	3	1				
SM68b	32	33	07/16/2015											Gray		B	Damp			<LOD	37	36	2	<LOD	3				
SM68b	33	34	07/16/2015											Gray		B	Damp			<LOD	36	47	2	4	1				
SM68b	34	35	07/16/2015											Dark Gray		B	Damp			<LOD	35	92	3	3	1				
SM68b	35	36	07/16/2015											Black		B	Damp			<LOD	36	57	3	<LOD	3				
SM68b	36	37	07/16/2015											Dark Gray		B	Damp			<LOD	37	67	3	<LOD	3				
SM68b	37	38	07/16/2015											Dark Gray		B	Damp			<LOD	40	33	2	<LOD	3				
SM68b	38	39	07/16/2015											Dark Gray		B	Damp			<LOD	40	69	3	<LOD	3				
SM68b	39	40	07/16/2015											Gray		B	Damp			<LOD	37	54	2	4	1				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM68a	8	9	33	3	<LOD	37	7	2	98	9	25	2	6910	62	14	2	254	5	33	3	3	1	86	3
SM68a	9	10	13	3	<LOD	42	<LOD	5	84	8	<LOD	6	3733	43	7	2	77	4	<LOD	7	<LOD	3	37	2
SM68a	10	11	21	3	<LOD	37	5	2	103	8	16	2	4200	41	7	1	63	3	<LOD	7	<LOD	3	35	2
SM68a	11	12	<LOD	12	<LOD	55	<LOD	7	53	12	<LOD	8	5009	71	7	2	474	11	24	4	<LOD	5	73	4
SM68a	12	13	<LOD	10	<LOD	44	<LOD	6	96	11	<LOD	6	6456	71	<LOD	5	51	4	<LOD	9	<LOD	3	33	2
SM68a	13	14	11	2	<LOD	35	<LOD	4	57	6	6	2	2649	25	4	1	25	2	<LOD	5	<LOD	3	28	2
SM68a	14	15	19	3	<LOD	40	7	2	90	8	11	2	3771	39	9	2	49	3	9	2	<LOD	3	45	2
SM68a	15	16	18	3	<LOD	39	5	2	68	7	<LOD	6	3392	35	5	1	88	3	10	2	<LOD	3	33	2
SM68a	16	17	14	4	<LOD	62	<LOD	7	44	9	10	3	2265	40	11	2	37	4	<LOD	9	<LOD	4	25	3
SM68a	17	18	<LOD	9	<LOD	52	<LOD	5	<LOD	20	<LOD	7	1832	28	6	2	12	3	<LOD	7	<LOD	4	19	2
SM68a	18	19	<LOD	7	<LOD	38	<LOD	4	53	6	<LOD	5	2373	26	<LOD	4	29	2	<LOD	6	<LOD	3	25	2
SM68a	19	20	10	3	<LOD	36	6	1	71	6	<LOD	5	3117	30	4	1	21	2	<LOD	6	<LOD	3	30	2
SM68a	20	21	<LOD	17	<LOD	82	<LOD	11	64	18	<LOD	13	5877	127	<LOD	10	59	7	<LOD	15	<LOD	7	42	4
SM68a	21	22	30	4	<LOD	46	9	2	170	13	22	3	8758	98	11	2	77	5	11	4	<LOD	4	79	3
SM68a	22	23	<LOD	17	<LOD	54	<LOD	10	168	21	<LOD	9	15832	212	<LOD	7	466	12	<LOD	15	<LOD	7	48	3
SM68a	23	24	11	3	<LOD	37	7	2	51	7	5	2	3329	33	<LOD	4	240	5	<LOD	6	<LOD	3	36	2
SM68a	24	25	13	3	<LOD	38	9	2	65	7	<LOD	5	3494	35	<LOD	4	187	5	<LOD	6	<LOD	3	42	2
SM68a	25	26	16	3	<LOD	41	<LOD	5	92	9	<LOD	6	4605	48	<LOD	4	225	6	<LOD	8	<LOD	4	40	2
SM68a	26	27	15	3	<LOD	41	<LOD	6	96	10	<LOD	6	5520	58	<LOD	4	169	5	<LOD	8	<LOD	4	39	2
SM68a	27	28	10	3	<LOD	40	<LOD	5	75	8	8	2	3862	40	<LOD	4	103	4	<LOD	7	<LOD	4	41	2
SM68a	28	29	22	3	<LOD	39	7	2	85	8	6	2	3746	39	11	2	51	3	<LOD	7	<LOD	3	44	2
SM68a	29	30	12	3	<LOD	38	7	2	71	7	7	2	3696	37	5	1	51	3	<LOD	6	<LOD	3	36	2
SM68a	30	31	23	3	<LOD	38	7	2	71	7	21	2	3074	31	8	1	24	2	<LOD	6	4	1	34	2
SM68a	31	32	19	3	<LOD	38	<LOD	4	54	6	13	2	2913	30	5	1	29	2	7	2	<LOD	3	38	2
SM68a	32	33	23	3	<LOD	40	9	2	91	8	27	2	3766	39	13	2	23	3	<LOD	7	<LOD	3	42	2
SM68a	33	34	13	3	<LOD	37	<LOD	4	46	6	9	2	2542	26	<LOD	4	16	2	<LOD	6	<LOD	3	23	2
SM68a	34	35	25	3	<LOD	39	5	2	94	7	18	2	3432	35	11	2	42	3	9	2	<LOD	3	64	3
SM68a	35	36	17	3	<LOD	39	8	2	100	8	17	2	4125	42	5	1	43	3	<LOD	7	<LOD	3	35	2
SM68a	36	37	14	3	<LOD	39	7	2	55	6	9	2	2910	30	<LOD	4	41	3	<LOD	6	<LOD	4	33	2
See borehole SM68a interval 0-25 ft.																								
SM68b	25	26	20	3	<LOD	40	<LOD	5	123	9	20	2	4798	49	6	2	58	3	<LOD	7	3	1	59	3
SM68b	26	27	21	3	<LOD	40	<LOD	5	81	8	9	2	4416	45	<LOD	4	102	4	8	2	<LOD	3	42	2
SM68b	27	28	13	3	<LOD	36	5	1	49	6	<LOD	5	2903	29	5	1	176	4	<LOD	6	<LOD	2	27	2
SM68b	28	29	14	3	<LOD	39	<LOD	5	117	9	8	2	6010	59	<LOD	4	314	6	<LOD	8	<LOD	3	24	2
SM68b	29	30	7	2	<LOD	36	<LOD	4	85	6	7	2	2709	27	7	1	71	3	<LOD	6	<LOD	3	35	2
SM68b	30	31	19	3	<LOD	40	6	2	93	7	12	2	3548	37	4	1	58	3	<LOD	7	<LOD	3	46	2
SM68b	31	32	12	2	<LOD	36	5	1	74	6	7	2	2935	28	<LOD	4	49	3	<LOD	6	<LOD	3	28	2
SM68b	32	33	10	2	<LOD	38	<LOD	4	61	6	<LOD	5	2566	27	<LOD	4	33	2	<LOD	6	<LOD	3	32	2
SM68b	33	34	15	3	<LOD	37	<LOD	4	63	6	<LOD	5	2510	26	<LOD	4	49	3	<LOD	6	<LOD	2	29	2
SM68b	34	35	11	2	<LOD	35	<LOD	4	87	6	17	2	2285	23	13	1	13	2	<LOD	5	3	1	41	2
SM68b	35	36	12	2	<LOD	36	4	1	95	6	19	2	2853	28	8	1	33	2	<LOD	6	4	1	37	2
SM68b	36	37	12	2	<LOD	37	<LOD	4	57	5	9	2	2024	21	6	1	79	3	<LOD	5	<LOD	3	32	2
SM68b	37	38	<LOD	9	<LOD	40	<LOD	6	113	10	7	2	6254	64	<LOD	4	362	7	<LOD	8	<LOD	3	23	2
SM68b	38	39	11	3	<LOD	40	<LOD	5	94	8	8	2	4120	44	7	2	253	6	<LOD	7	<LOD	3	29	2
SM68b	39	40	9	2	<LOD	38	<LOD	4	66	6	6	2	2765	28	<LOD	4	55	3	<LOD	6	<LOD	3	32	2



Appendix A

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD	<LOD	<LOD	<LOD	<LOD	
SM68b	40	41	07/16/2015									Dark Gray		B	Moist					<LOD	39	47	3	4	1				
SM68b	41	42	07/16/2015									Dark Brown		B	Damp					<LOD	35	38	2	<LOD	3				
SM68b	42	43	07/16/2015									Dark Brown		B	Damp					<LOD	37	93	3	4	1				
SM68b	43	44	07/16/2015									Black		B	Damp					<LOD	39	76	3	3	1				
SM68b	44	45	07/16/2015									Black		B	Damp					<LOD	39	83	3	4	1				
SM68b	45	46	07/16/2015									Black		B	Damp					<LOD	40	106	4	<LOD	3				
SM68b	46	47	07/16/2015									Black		B	Damp					<LOD	38	64	3	<LOD	3				
SM68b	47	48	07/16/2015									Black		B	Damp					<LOD	37	91	3	4	1				
SM68b	48	49	07/16/2015									Black		B	Damp					<LOD	40	67	3	<LOD	3				
SM68b	49	50	07/16/2015									Black		B	Moist					<LOD	38	93	3	<LOD	3				
SM68b	50	51	07/16/2015									Dark Gray		B	Damp					<LOD	45	81	4	<LOD	4				
SM68b	51	52	07/16/2015									Very Dark Gray		B	Damp					<LOD	41	85	3	5	1				
SM68b	52	53	07/16/2015									Black		B	Damp					<LOD	38	123	4	5	1				
SM68b	53	54	07/16/2015									Black		B	Moist					<LOD	40	116	4	6	1				
SM68b	54	55	07/16/2015									Black		B	Moist					<LOD	39	135	4	4	1				
SM68b	55	56	07/16/2015									Gray		B	Damp					<LOD	40	56	3	<LOD	3				
SM68b	56	57	07/16/2015									Dark Gray		B	Damp					<LOD	38	110	3	4	1				
SM68b	57	58	07/16/2015									Dark Gray		B	Damp					<LOD	38	86	3	3	1				
SM68b	58	59	07/16/2015									Dark Gray		B	Damp					<LOD	38	80	3	<LOD	3				
SM68b	59	60	07/16/2015									Dark Gray		B	Damp					<LOD	40	289	6	7	1				
SM68b	60	61	07/16/2015									Dark Gray		B	Damp					<LOD	38	164	4	5	1				
SM68b	61	62	07/16/2015									Dark Gray		B	Dry					<LOD	37	287	5	4	1				
SM68b	62	63	07/16/2015									Very Dark Gray		B	Moist					48	13	444	8	13	2				
SM68b	63	64	07/16/2015									Black		B	Moist					402	14	1788	20	19	2				
SM68b	64	65	07/16/2015									Light Gray		B	Moist					5659	63	10672	110	16	4				
SM68b	65	66	07/16/2015									Very Dark Gray		B	Damp					2145	26	2975	29	13	2				
SM68b	66	67	07/16/2015									Black		B	Damp					218	15	12859	141	<LOD	14				
SM68b	67	68	07/16/2015									Very Dark Gray		B	Damp					234	14	3791	40	36	3				
SM68b	68	69	07/16/2015									Dark Gray		B	Damp					51	13	1633	18	60	3				
SM68b	69	70	07/16/2015									Gray		B	Damp					111	13	2013	21	69	3				
SM68b	70	71	07/16/2015									Very Dark Gray		B	Damp					83	12	2017	21	52	3				
SM68b	71	72	07/16/2015									Dark Gray		B	Damp					91	13	2678	28	54	3				
SM68b	72	73	07/16/2015									Dark Gray		B	Damp					203	15	6658	73	85	5				
SM68b	73	74	07/16/2015									Dark Gray		B	Damp					65	13	3662	38	34	3				
SM68b	74	75	07/16/2015											B						42	12	674	9	19	2				
SM68b	75	76	07/16/2015									Black		B	Damp					45	13	920	12	10	2				
SM68b	76	77	07/16/2015									Very Dark Gray		B	Damp					<LOD	37	247	5	4	1				
SM68b	77	78	07/16/2015									Black		B	Moist					<LOD	37	156	4	6	1				
SM68b	78	79	07/16/2015									Very Dark Gray		B	Damp					86	13	213	5	5	1				
SM68b	79	80	07/16/2015									Dark Gray		B	Damp					<LOD	37	242	5	4	1				
SM68b	80	81	07/16/2015									Very Dark Gray		B	Moist					<LOD	36	73	3	3	1				
SM68b	81	82	07/16/2015									Black		B	Damp					<LOD	39	260	6	<LOD	3				
SM68b	82	83	07/16/2015									Black		B	Damp					<LOD	36	117	3	4	1				
SM68b	83	84	07/16/2015									Dark Gray		B	Moist					<LOD	40	190	5	4	1				
SM68b	84	85	07/16/2015									Black		B	Moist					<LOD	39	120	4	<LOD	3				
SM68b	85	86	07/16/2015									Black		B	Moist					<LOD	38	132	4	4	1				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM68b	40	41	14	3	<LOD	40	7	2	170	11	10	2	7563	76	<LOD	4	120	5	<LOD	9	3	1	34	2
SM68b	41	42	13	3	<LOD	36	8	2	77	6	11	2	3125	31	5	1	56	3	<LOD	6	<LOD	2	36	2
SM68b	42	43	22	3	<LOD	37	6	1	56	6	22	2	2297	24	10	1	24	2	7	2	<LOD	3	51	2
SM68b	43	44	19	3	<LOD	39	8	2	57	6	29	2	2333	25	9	1	25	2	9	2	3	1	47	2
SM68b	44	45	20	3	<LOD	39	<LOD	5	96	8	29	2	4047	42	8	2	39	3	<LOD	7	<LOD	3	52	2
SM68b	45	46	22	3	<LOD	40	8	2	126	9	18	2	5316	54	13	2	91	4	<LOD	8	<LOD	3	51	2
SM68b	46	47	14	3	<LOD	39	6	2	72	7	24	2	3483	35	10	2	38	3	8	2	3	1	41	2
SM68b	47	48	20	3	<LOD	38	<LOD	5	82	7	22	2	3763	37	8	1	70	3	8	2	3	1	50	2
SM68b	48	49	23	3	<LOD	40	<LOD	5	102	8	25	2	4215	43	10	2	77	4	<LOD	7	<LOD	3	44	2
SM68b	49	50	19	3	<LOD	38	6	2	90	7	20	2	3780	38	12	2	59	3	<LOD	7	4	1	50	2
SM68b	50	51	18	4	46	15	9	3	204	15	18	3	11710	127	12	2	337	8	<LOD	11	<LOD	4	41	3
SM68b	51	52	11	3	<LOD	41	<LOD	5	87	9	11	2	5213	54	5	2	116	4	<LOD	8	<LOD	3	38	2
SM68b	52	53	17	3	<LOD	38	6	2	105	7	25	2	3680	37	9	2	40	3	8	2	<LOD	3	56	2
SM68b	53	54	20	3	<LOD	40	7	2	116	8	24	2	4140	42	7	2	84	4	<LOD	7	4	1	53	2
SM68b	54	55	20	3	<LOD	39	7	2	108	8	19	2	4753	47	13	2	94	4	9	3	4	1	54	2
SM68b	55	56	9	3	<LOD	40	<LOD	4	68	7	8	2	2683	29	<LOD	4	38	3	<LOD	6	<LOD	3	21	2
SM68b	56	57	14	3	<LOD	38	<LOD	4	75	7	7	2	3546	35	<LOD	4	27	3	<LOD	6	<LOD	3	30	2
SM68b	57	58	<LOD	8	<LOD	38	4	1	73	6	8	2	2807	29	<LOD	4	36	3	<LOD	6	<LOD	3	29	2
SM68b	58	59	11	3	<LOD	38	5	1	63	6	7	2	2517	26	<LOD	4	28	2	<LOD	6	<LOD	3	32	2
SM68b	59	60	17	3	<LOD	40	7	2	176	9	16	2	5052	51	5	1	35	3	<LOD	8	4	1	52	2
SM68b	60	61	<LOD	7	<LOD	38	<LOD	4	57	6	<LOD	5	2497	26	<LOD	4	21	2	<LOD	6	<LOD	3	31	2
SM68b	61	62	11	2	<LOD	38	7	1	68	6	6	2	2731	28	<LOD	4	10	2	<LOD	6	<LOD	3	34	2
SM68b	62	63	26	3	<LOD	39	6	2	96	8	26	2	3971	41	10	2	43	3	10	2	<LOD	3	58	3
SM68b	63	64	12	3	<LOD	37	5	1	77	6	20	2	2927	30	8	2	10	2	<LOD	6	<LOD	5	44	2
SM68b	64	65	<LOD	8	<LOD	43	<LOD	5	41	6	<LOD	7	1805	22	<LOD	6	12	2	<LOD	7	<LOD	11	21	2
SM68b	65	66	<LOD	6	<LOD	37	<LOD	3	20	3	<LOD	5	652	9	<LOD	4	6	1	<LOD	4	<LOD	6	14	1
SM68b	66	67	<LOD	10	<LOD	45	<LOD	6	91	11	<LOD	8	6600	75	<LOD	6	350	8	<LOD	9	<LOD	12	29	3
SM68b	67	68	12	3	<LOD	40	5	2	50	6	<LOD	6	2611	29	<LOD	5	139	4	<LOD	6	<LOD	6	31	2
SM68b	68	69	9	2	<LOD	38	<LOD	4	46	5	<LOD	5	1854	21	<LOD	4	30	2	<LOD	5	<LOD	5	21	2
SM68b	69	70	8	2	<LOD	37	<LOD	4	50	5	<LOD	5	1966	21	5	1	27	2	<LOD	5	<LOD	5	21	2
SM68b	70	71	<LOD	7	<LOD	37	<LOD	4	47	5	<LOD	5	1703	18	<LOD	4	21	2	<LOD	5	<LOD	5	24	2
SM68b	71	72	15	3	<LOD	37	<LOD	4	47	5	<LOD	5	1823	20	<LOD	4	55	3	<LOD	6	<LOD	5	25	2
SM68b	72	73	<LOD	10	<LOD	43	<LOD	6	137	11	<LOD	7	5947	66	<LOD	6	168	5	<LOD	9	<LOD	9	26	2
SM68b	73	74	11	3	<LOD	39	<LOD	5	75	7	<LOD	6	2798	30	<LOD	5	54	3	<LOD	6	<LOD	6	31	2
SM68b	74	75	13	2	<LOD	37	<LOD	4	57	5	<LOD	5	2074	22	<LOD	4	33	2	<LOD	5	<LOD	3	21	2
SM68b	75	76	21	3	<LOD	40	<LOD	5	94	7	11	2	3039	32	11	2	33	3	<LOD	7	<LOD	4	35	2
SM68b	76	77	11	2	<LOD	37	<LOD	4	48	5	6	2	1942	20	6	1	19	2	<LOD	5	<LOD	3	25	2
SM68b	77	78	20	3	<LOD	37	7	1	80	6	22	2	2415	25	11	2	28	2	6	2	6	1	53	2
SM68b	78	79	11	3	<LOD	39	<LOD	5	80	7	9	2	3566	37	<LOD	4	63	3	<LOD	6	<LOD	3	27	2
SM68b	79	80	12	2	<LOD	37	<LOD	4	63	6	6	2	2359	25	5	1	23	2	<LOD	6	<LOD	3	24	2
SM68b	80	81	13	2	<LOD	37	6	1	55	5	15	2	1886	20	5	1	15	2	6	2	<LOD	3	28	2
SM68b	81	82	12	3	<LOD	39	<LOD	5	88	7	21	2	3310	35	8	2	44	3	<LOD	7	<LOD	3	44	2
SM68b	82	83	15	2	<LOD	37	5	1	60	5	23	2	2030	22	9	1	23	2	6	2	<LOD	3	46	2
SM68b	83	84	13	3	<LOD	40	7	2	90	8	20	2	4112	42	8	2	106	4	<LOD	7	<LOD	3	29	2
SM68b	84	85	19	3	<LOD	39	<LOD	5	77	7	25	2	3434	36	7	1	44	3	<LOD	7	<LOD	3	45	2
SM68b	85	86	20	3	<LOD	38	6	2	84	7	18	2	3409	34	<LOD	4	36	3	<LOD	6	<LOD	3	37	2



Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD	<LOD	<LOD	<LOD	<LOD	
SM68b	86	87	07/16/2015									Black		B	Damp					<LOD	37	99	3	4	1				
SM68b	87	88	07/16/2015									Black		B	Damp					<LOD	38	126	4	5	1				
SM68b	88	89	07/16/2015									Black		B	Dry					<LOD	41	106	4	3	1				
SM68b	89	90	07/16/2015									Black		B	Moist					<LOD	46	164	5	<LOD	3				
SM68b	90	91	07/16/2015									Black		B	Damp					<LOD	45	84	3	5	1				
SM68b	91	92	07/16/2015									Black		B	Damp					<LOD	41	265	6	<LOD	3				
SM68b	92	93	07/16/2015									Black		B	Dry					<LOD	39	140	4	4	1				
SM68b	93	94	07/16/2015									Very Dark Gray		B	Dry					<LOD	40	137	4	<LOD	3				
SM68b	94	95	07/16/2015									Very Dark Gray		B	Dry					<LOD	43	89	3	4	1				
SM68b	95	96	07/16/2015								x	Dark Gray		B	Moist					<LOD	48	75	4	<LOD	3				
SM68b	96	97	07/16/2015								x	Dark Gray		B	Moist					<LOD	56	82	4	<LOD	4				
SM68b	97	98	07/16/2015								x	Dark Gray		B	Wet					<LOD	49	99	4	<LOD	4				
SM68b	98	99	07/16/2015								x	Dark Gray		B	Wet					<LOD	45	219	6	<LOD	4				
SM68b	99	100	07/16/2015									Dark Gray		B	Wet					<LOD	46	78	4	4	1				
SM68b	100	101	07/16/2015									Dark Gray		B	Wet					<LOD	47	120	4	6	1				
SM68b	101	102	07/16/2015									Dark Gray		B	Wet					<LOD	46	75	4	<LOD	3				
SM68b	102	103	07/16/2015									Black		B	Wet					<LOD	46	100	4	<LOD	3				
SM68b	103	104	07/16/2015									Gray		B	Wet					<LOD	47	61	3	<LOD	3				
SM68b	104	105	07/16/2015								x	Gray		B	Wet					<LOD	47	61	3	<LOD	3				
SM68b	105	106	07/16/2015								x	Gray		B	Wet					<LOD	45	68	3	4	1				
SM68b	106	107	07/16/2015									Gray		B	Wet					<LOD	47	79	4	<LOD	4				
SM68b	107	108	07/16/2015									Dark Gray		B	Wet					<LOD	48	96	4	6	1				
SM68b	108	109	07/16/2015								x	Gray		B	Wet					<LOD	46	54	3	<LOD	3				
SM68b	109	110	07/16/2015									Dark Gray		B	Wet					<LOD	49	58	3	<LOD	3				
SM68b	110	111	07/16/2015									Dark Gray		B	Wet					<LOD	51	48	3	<LOD	4				
SM68b	111	112	07/16/2015									Dark Gray		B	Wet					<LOD	49	52	3	<LOD	4				
SM68b	112	113	07/16/2015									Dark Gray		B	Wet					<LOD	52	96	4	<LOD	4				
SM68b	113	114	07/16/2015								x	Dark Gray		B	Wet					<LOD	47	78	4	<LOD	3				
SM68b	114	115	07/16/2015								x	Dark Gray		B	Wet					<LOD	42	57	3	<LOD	3				
SM68b	115	116	07/16/2015								x	Dark Gray		B	Wet					<LOD	45	65	3	<LOD	3				
SM68b	116	117	07/16/2015									Black		B	Wet					<LOD	47	133	5	5	1				
SM68b	117	118	07/16/2015								x	Dark Gray		B	Damp					<LOD	52	83	4	6	1				
SM68b	118	119	07/16/2015								x	Gray		B	Damp					<LOD	48	85	4	<LOD	4				
SM68b	119	120	07/16/2015								x	Gray		B	Dry					<LOD	50	95	4	<LOD	4				
SM68b	120	121	07/16/2015								x	Gray		B	Dry					<LOD	48	100	4	4	1				
SM68b	121	122	07/16/2015								x	Gray		B	Dry					<LOD	51	96	4	4	1				
SM68b	122	123	07/16/2015								x	Gray		B	Dry					<LOD	53	136	5	<LOD	4				
SM68b	123	124	07/16/2015									Gray		B	Dry					NA	NA	NA	NA	NA	NA				
SM68b	124	125	07/16/2015								x	Gray		B	Damp					NA	NA	NA	NA	NA	NA				
SM68b	125	126	07/16/2015									Dark Gray		B	Damp					NA	NA	NA	NA	NA	NA				
SM68b	126	127	07/16/2015									Dark Gray		B	Dry					NA	NA	NA	NA	NA	NA				
SM68b	127	128	07/16/2015									Gray		B	Dry					NA	NA	NA	NA	NA	NA				
SM68b	128	129	07/16/2015									Gray		B	Dry					NA	NA	NA	NA	NA	NA				
SM68b	129	130	07/16/2015									Gray		B	Dry					NA	NA	NA	NA	NA	NA				
SM68b	130	131	07/16/2015									Gray		B	Dry					NA	NA	NA	NA	NA	NA				
SM68b	131	132	07/16/2015									Gray		B	Dry					NA	NA	NA	NA	NA	NA				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM68b	86	87	21	3	<LOD	37	<LOD	4	37	5	21	2	2231	23	5	1	30	2	6	2	<LOD	3	44	2
SM68b	87	88	24	3	<LOD	38	8	2	80	7	29	2	3357	34	10	2	38	3	9	2	<LOD	3	46	2
SM68b	88	89	14	3	<LOD	41	9	2	91	8	22	2	4073	43	7	2	67	3	<LOD	7	<LOD	3	43	2
SM68b	89	90	18	4	<LOD	45	<LOD	6	121	11	12	2	6663	74	<LOD	5	163	5	<LOD	9	<LOD	3	36	2
SM68b	90	91	21	3	<LOD	44	<LOD	5	75	8	23	2	3102	36	6	2	37	3	<LOD	7	<LOD	3	46	2
SM68b	91	92	22	3	<LOD	41	7	2	81	8	16	2	3862	41	8	2	49	3	<LOD	7	4	1	37	2
SM68b	92	93	19	3	<LOD	40	8	2	81	7	21	2	3712	38	12	2	43	3	<LOD	7	<LOD	3	39	2
SM68b	93	94	19	3	<LOD	39	5	2	68	7	9	2	3376	36	<LOD	4	59	3	<LOD	7	<LOD	3	42	2
SM68b	94	95	17	3	<LOD	43	<LOD	5	62	8	13	2	3306	38	<LOD	4	89	4	<LOD	7	<LOD	3	26	2
SM68b	95	96	<LOD	10	<LOD	49	<LOD	5	47	8	17	3	2795	37	<LOD	5	116	5	<LOD	8	<LOD	4	21	2
SM68b	96	97	16	4	<LOD	56	8	2	38	9	14	3	2811	44	<LOD	6	63	4	<LOD	8	<LOD	4	25	3
SM68b	97	98	12	3	<LOD	49	6	2	82	8	41	3	2580	34	8	2	39	3	<LOD	7	<LOD	3	35	2
SM68b	98	99	11	3	<LOD	45	<LOD	5	43	6	28	3	1689	22	13	2	22	2	22	3	<LOD	4	49	3
SM68b	99	100	14	3	<LOD	46	<LOD	5	69	8	18	2	2964	37	8	2	30	3	<LOD	7	4	1	33	2
SM68b	100	101	11	3	<LOD	47	<LOD	5	98	8	24	3	3100	39	8	2	39	3	<LOD	8	<LOD	4	50	3
SM68b	101	102	<LOD	9	<LOD	47	<LOD	5	75	8	14	2	3111	38	6	2	43	3	8	3	<LOD	3	33	2
SM68b	102	103	25	4	<LOD	47	<LOD	6	81	8	26	3	3179	40	9	2	43	3	<LOD	8	<LOD	3	43	3
SM68b	103	104	17	3	<LOD	47	<LOD	5	84	8	13	2	2821	35	<LOD	5	43	3	<LOD	7	<LOD	3	25	2
SM68b	104	105	<LOD	9	<LOD	48	<LOD	5	32	6	10	2	1878	26	<LOD	5	68	4	<LOD	7	<LOD	3	29	2
SM68b	105	106	12	3	<LOD	45	<LOD	5	56	7	<LOD	6	2299	29	5	2	59	3	<LOD	7	<LOD	3	25	2
SM68b	106	107	11	3	<LOD	48	<LOD	5	66	7	10	2	2208	29	<LOD	5	28	3	<LOD	7	<LOD	4	30	2
SM68b	107	108	16	3	<LOD	48	<LOD	5	63	7	12	2	2442	32	<LOD	5	17	3	<LOD	7	<LOD	3	36	2
SM68b	108	109	10	3	<LOD	46	<LOD	5	68	7	7	2	2362	30	<LOD	5	46	3	<LOD	7	<LOD	3	27	2
SM68b	109	110	13	3	<LOD	48	<LOD	5	67	8	<LOD	7	2703	36	<LOD	5	28	3	<LOD	7	<LOD	3	31	2
SM68b	110	111	<LOD	11	<LOD	52	<LOD	6	92	10	10	3	3844	52	<LOD	5	61	4	<LOD	8	<LOD	4	22	2
SM68b	111	112	<LOD	9	<LOD	49	8	2	44	8	<LOD	7	2634	35	<LOD	5	34	3	<LOD	7	<LOD	4	33	2
SM68b	112	113	<LOD	11	<LOD	52	7	2	94	10	12	3	3707	50	7	2	37	4	<LOD	9	<LOD	4	26	2
SM68b	113	114	11	3	<LOD	47	6	2	88	9	9	2	3401	43	<LOD	5	37	3	<LOD	8	<LOD	3	28	2
SM68b	114	115	11	3	<LOD	42	10	2	45	5	20	2	1597	20	7	2	18	2	<LOD	6	<LOD	3	30	2
SM68b	115	116	10	3	<LOD	45	<LOD	5	89	8	11	2	2912	36	6	2	32	3	<LOD	7	<LOD	3	26	2
SM68b	116	117	15	3	<LOD	47	5	2	63	7	17	3	2460	32	<LOD	5	20	3	<LOD	7	<LOD	4	42	3
SM68b	117	118	24	4	<LOD	52	<LOD	6	72	9	18	3	2730	39	11	2	36	4	<LOD	8	<LOD	4	34	3
SM68b	118	119	13	3	<LOD	49	6	2	67	8	12	2	3014	39	<LOD	5	33	3	<LOD	8	<LOD	3	29	2
SM68b	119	120	15	3	<LOD	49	<LOD	6	64	8	8	2	2639	35	<LOD	5	40	3	<LOD	8	<LOD	3	20	2
SM68b	120	121	20	4	<LOD	48	7	2	69	9	27	3	3568	45	8	2	35	3	<LOD	8	<LOD	4	32	2
SM68b	121	122	15	4	<LOD	51	<LOD	7	107	11	13	3	4553	59	<LOD	5	100	5	<LOD	9	<LOD	3	27	2
SM68b	122	123	13	4	<LOD	54	<LOD	7	80	12	<LOD	8	5357	73	<LOD	6	252	8	<LOD	10	<LOD	4	15	2
SM68b	123	124																						
SM68b	124	125																						
SM68b	125	126																						
SM68b	126	127																						
SM68b	127	128																						
SM68b	128	129																						
SM68b	129	130																						
SM68b	130	131																						
SM68b	131	132																						

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
SM68b	132	133	07/16/2015											B						NA	NA	NA	NA	NA	NA				
SM68b	133	134	07/16/2015									Gray		B	Dry					NA	NA	NA	NA	NA	NA				
SM68b	134	135	07/16/2015									Gray		B	Dry					NA	NA	NA	NA	NA	NA				
See borehole SM68a interval 0-25 ft and borehole SM68b interval 25-50 ft.																													
SM68c	50	51	08/08/2015									x	Dark Brown		B	Damp								ND		116		4	
SM68c	51	53.5	08/08/2015										Dark Reddish Brown		B	Moist									ND		254		
SM68c	53.5	55	08/08/2015										Dark Gray		B	Dry									ND		136		5
SM68c	55	57.5	08/08/2015									x	Gray		B	Dry									ND		166		5
SM68c	57.5	60	08/08/2015										Dark Gray		B	Dry									ND		106		ND
SM68c	60	62.5	08/08/2015										Dark Reddish Gray		B	Dry									ND		207		5
SM68c	62.5	65	08/08/2015										Gray		B	Dry									ND		98		ND
SM68c	65	67.5	08/08/2015										Gray		B	Dry									ND		78		ND
SM68c	67.5	70	08/08/2015										Gray		B	Dry									ND		85		ND
SM68c	70	72.5	08/08/2015										Gray		B	Dry									ND		92		5
SM68c	72.5	75	08/08/2015										Gray		B	Dry									ND		89		ND
SM68c	75	77.5	08/08/2015										Dark Gray		B	Dry									ND		75		ND
SM68c	77.5	80	08/08/2015									x	Gray		B	Dry									ND		69		ND
SM68c	80	82.5	08/08/2015									x	Gray		B	Dry									ND		81		6
SM68c	82.5	85	08/08/2015										Gray		B	Dry									ND		121		ND
SM68c	85	87.5	08/08/2015									x	Gray		B	Dry									ND		123		6
SM68c	87.5	90	08/08/2015									x	Gray		B	Dry									ND		101		5
SM68c	90	92.5	08/08/2015									x	Gray		B	Dry									ND		103		5
SM68c	92.5	95	08/08/2015									x	Gray		B	Dry									ND		74		6
SM68c	95	97.5	08/08/2015									x	Gray		B	Dry									ND		93		4
SM68c	97.5	100	08/08/2015									x	Gray		B	Dry									ND		253		10
SM68c	100	102.5	08/08/2015										Gray		B	Dry									ND		447		5
SM68c	102.5	105	08/08/2015										Gray		B	Dry									ND		4608		33
SM68c	105	107.5	08/08/2015										Gray		B	Dry									ND		359		7
SM68c	107.5	110	08/08/2015										Gray		B	Dry									ND		128		6
SM68c	110	112.5	08/08/2015										Dark Gray		B	Dry									ND		84		10
SM68c	112.5	115	08/08/2015										Gray		B	Dry									ND		221		5
SM68c	115	117.5	08/08/2015									x	Gray		B	Dry									ND		88		ND
SM68c	117.5	120	08/08/2015									x	Gray		B	Dry	MW40	119 - 139							ND		166		5
SM68c	120	122	08/08/2015										Gray		B	Dry	MW40	119 - 139							ND		79		ND
SM68c	122	125	08/08/2015									x	Gray		B	Dry	MW40	119 - 139							ND		71		5
SM68c	125	127.5	08/08/2015										Gray		B	Dry	MW40	119 - 139							ND		68		4
SM68c	127.5	130	08/08/2015									x	Gray		B	Dry	MW40	119 - 139							ND		84		4
SM68c	130	132.5	08/08/2015									x	Gray		B	Dry	MW40	119 - 139							ND		118		ND
SM68c	132.5	135	08/08/2015									x	Gray		B	Damp	MW40	119 - 139							ND		94		6
SM68c	135	136	08/08/2015									x	Dark Gray		B	Wet	MW40	119 - 139							ND		71		ND
SM68c	136	137	08/08/2015									x	Dark Gray		B	Wet	MW40	119 - 139							ND		110		5
SM68c	137	138	08/08/2015									x	Dark Gray		B	Wet	MW40	119 - 139							ND		74		ND
SM68c	138	139	08/08/2015										Dark Gray		B	Wet	MW40	119 - 139							ND		79		4
SM68c	139	140	08/08/2015									x	Dark Gray		B	Wet									ND		81		4

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF		
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM68b	132	133																						
SM68b	133	134																						
SM68b	134	135																						
See borehole SM68a interval 0-25 ft and borehole SM68b interval 25-50 ft.																								
SM68c	50	51																						
SM68c	51	53.5																						
SM68c	53.5	55																						
SM68c	55	57.5																						
SM68c	57.5	60																						
SM68c	60	62.5																						
SM68c	62.5	65																						
SM68c	65	67.5																						
SM68c	67.5	70																						
SM68c	70	72.5																						
SM68c	72.5	75																						
SM68c	75	77.5																						
SM68c	77.5	80																						
SM68c	80	82.5																						
SM68c	82.5	85																						
SM68c	85	87.5																						
SM68c	87.5	90																						
SM68c	90	92.5																						
SM68c	92.5	95																						
SM68c	95	97.5																						
SM68c	97.5	100																						
SM68c	100	102.5																						
SM68c	102.5	105																						
SM68c	105	107.5																						
SM68c	107.5	110																						
SM68c	110	112.5																						
SM68c	112.5	115																						
SM68c	115	117.5																						
SM68c	117.5	120																						
SM68c	120	122																						
SM68c	122	125																						
SM68c	125	127.5																						
SM68c	127.5	130																						
SM68c	130	132.5																						
SM68c	132.5	135																						
SM68c	135	136																						
SM68c	136	137																						
SM68c	137	138																						
SM68c	138	139																						
SM68c	139	140																						

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
SM68c	140	141	08/08/2015									Dark Gray		B	Wet					ND		75		ND					
SM68c	141	142	08/08/2015									Dark Gray		B	Wet					ND		87		ND					
SM68c	142	143	08/08/2015									Dark Gray		B	Wet					ND		95		ND					
SM68c	143	144	08/08/2015									Dark Gray		B	Wet					ND		126		4					
SM68c	144	145	08/08/2015									Black		B	Wet					ND		179		5					
SM68c	145	146	08/08/2015									Black		B	Wet					ND		122		ND					
SM68c	146	147	08/08/2015								x	Black		B	Wet					ND		99		ND					
SM68c	147	148	08/08/2015									Dark Gray		B	Wet					ND		184		ND					
SM68c	148	149	08/08/2015									Dark Gray		B	Wet					ND		112		5					
SM68c	149	150	08/08/2015									Dark Gray		B	Wet					ND		83		4					
SM68c	150	151	08/08/2015								x	Dark Gray		B	Wet					ND		81		ND					
SM68c	151	152	08/08/2015								x	Dark Gray		B	Wet					ND		80		ND					
SM68c	152	153	08/08/2015									Dark Gray		B	Wet					ND		79		ND					
SM68c	153	154	08/08/2015									Dark Gray		B	Wet					ND		42		ND					
SM68c	154	155	08/08/2015									Dark Gray		B	Wet					ND		58		ND					
SM70a	0	1	07/18/2015											DN (KG, MZ)						50	13	334	6	10	1				
SM70a	1	2	07/18/2015	70								Brown	GM	DN (KG, MZ)	Moist			15SM70SB02	35	850	29	<LOD	40	467	8	13	2		
SM70a	2	3	07/18/2015											DN (KG, MZ)						<LOD	41	15	2	<LOD	3				
SM70a	3	4	07/18/2015	80								Grayish Brown	ML	N (loess)	Damp					<LOD	35	14	2	<LOD	2				
SM70a	4	5	07/18/2015											N (loess)						<LOD	36	35	2	<LOD	2				
SM70a	5	6	07/18/2015	70								Yellowish Brown	SM	N	Dry					<LOD	38	7	2	<LOD	2				
SM70a	6	7	07/18/2015											N (loess)						<LOD	59	<LOD	9	<LOD	5				
SM70a	7	8	07/18/2015	100								Grayish Brown	ML	N (loess)	Damp					<LOD	36	8	2	<LOD	2				
SM70a	8	9	07/18/2015											N (loess)						<LOD	36	7	2	<LOD	3				
SM70a	9	10	07/18/2015	100								Grayish Brown	ML	N (loess)	Damp					<LOD	42	11	2	<LOD	3				
SM70a	10	11	07/18/2015											N (loess)						<LOD	50	<LOD	7	<LOD	3				
SM70a	11	12	07/18/2015	100								Gray	SM	N (loess)	Moist					<LOD	47	<LOD	7	<LOD	3				
SM70a	12	13	07/18/2015											N (KG)						<LOD	36	21	2	3	1				
SM70a	13	14	07/18/2015	70								Brown	GC	N (KG)	Damp					<LOD	38	155	4	4	1				
SM70a	14	15	07/18/2015											WB						<LOD	55	313	8	<LOD	5				
SM70a	15	16	07/18/2015	100								Grayish Brown		WB	Dry					<LOD	44	437	8	<LOD	4				
SM70a	16	17	07/18/2015											WB						<LOD	40	1074	14	<LOD	5				
SM70a	17	18	07/18/2015	60								Brown		WB	Dry					<LOD	42	234	5	4	1				
SM70a	18	20	07/18/2015	60								Dark Gray		WB	Dry					missing	missing	missing	missing	missing	missing	missing			
SM70a	20	22	07/18/2015	100								Dark Gray		WB	Dry					missing	missing	missing	missing	missing	missing	missing			
SM70a	22	24	07/18/2015	90								Dark Grayish Brown		WB	Dry					missing	missing	missing	missing	missing	missing	missing			
SM70a	24	26	07/18/2015	100								Grayish Brown		WB	Dry					missing	missing	missing	missing	missing	missing	missing			
SM70a	26	27	07/18/2015									Brown		B	Dry					40		397		ND					
SM70a	27	28	07/18/2015									Brown		B	Dry					48		427		ND					
SM70a	28	29	07/18/2015									Brown		B	Dry					37		529		ND					
SM70a	29	30	07/18/2015									Brown		B	Dry					44		1027		ND					
SM70a	30	31	07/18/2015									Brown		B	Dry					ND		473		ND					
SM70a	31	32	07/18/2015									Brown		B	Dry					ND		510		ND					
SM70a	32	33	07/18/2015									Brown		B	Damp					<LOD	38	235	5	5	1				
SM70a	33	34	07/18/2015									Grayish Brown		B	Damp					<LOD	36	186	4	4	1				
SM70a	34	35	07/18/2015									Grayish Brown		B	Dry					<LOD	36	105	3	4	1				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM68c	140	141																						
SM68c	141	142																						
SM68c	142	143																						
SM68c	143	144																						
SM68c	144	145																						
SM68c	145	146																						
SM68c	146	147																						
SM68c	147	148																						
SM68c	148	149																						
SM68c	149	150																						
SM68c	150	151																						
SM68c	151	152																						
SM68c	152	153																						
SM68c	153	154																						
SM68c	154	155																						
SM70a	0	1	10	3	<LOD	39	6	2	63	6	16	2	2537	27	5	1	37	3	<LOD	6	<LOD	3	27	2
SM70a	1	2	15	3	<LOD	40	<LOD	5	72	7	10	2	3315	35	5	1	49	3	<LOD	7	<LOD	3	31	2
SM70a	2	3	9	3	<LOD	41	<LOD	4	30	5	<LOD	5	1565	19	8	2	13	2	<LOD	5	<LOD	3	21	2
SM70a	3	4	10	2	<LOD	35	<LOD	4	33	5	6	2	1814	19	5	1	15	2	<LOD	5	<LOD	2	16	1
SM70a	4	5	<LOD	7	<LOD	37	<LOD	3	31	5	<LOD	5	1558	18	<LOD	4	7	2	<LOD	5	<LOD	2	10	1
SM70a	5	6	8	2	<LOD	39	<LOD	4	43	5	6	2	1686	19	<LOD	4	19	2	<LOD	5	<LOD	3	16	1
SM70a	6	7	<LOD	11	<LOD	61	<LOD	6	36	7	<LOD	9	1177	23	9	2	10	3	<LOD	7	<LOD	5	12	2
SM70a	7	8	10	2	<LOD	36	<LOD	4	39	5	<LOD	5	1767	19	5	1	17	2	<LOD	5	<LOD	2	14	1
SM70a	8	9	9	2	<LOD	37	<LOD	4	31	4	<LOD	5	1482	16	5	1	12	2	<LOD	5	<LOD	2	13	1
SM70a	9	10	12	3	<LOD	43	<LOD	5	42	5	<LOD	6	1627	21	6	2	13	2	<LOD	5	<LOD	3	14	2
SM70a	10	11	<LOD	9	<LOD	51	<LOD	5	28	5	<LOD	7	1027	18	7	2	9	2	<LOD	6	<LOD	4	14	2
SM70a	11	12	<LOD	8	<LOD	48	<LOD	4	16	5	9	2	878	15	9	2	8	2	<LOD	6	<LOD	4	14	2
SM70a	12	13	10	2	<LOD	37	<LOD	4	36	5	<LOD	5	1719	18	<LOD	4	17	2	6	2	<LOD	2	18	1
SM70a	13	14	17	3	<LOD	38	7	2	46	7	11	2	3201	32	7	1	100	4	13	2	<LOD	3	35	2
SM70a	14	15	20	5	<LOD	55	<LOD	9	157	17	14	3	10392	141	<LOD	7	253	9	<LOD	13	<LOD	5	52	3
SM70a	15	16	19	3	<LOD	44	<LOD	6	24	8	13	2	3833	44	7	2	465	9	19	3	<LOD	4	60	3
SM70a	16	17	12	3	<LOD	40	<LOD	5	73	7	11	2	3223	35	12	2	69	3	<LOD	6	<LOD	4	28	2
SM70a	17	18	19	3	<LOD	42	7	2	82	9	22	2	4473	49	<LOD	5	114	4	<LOD	8	<LOD	4	51	3
SM70a	18	20																						
SM70a	20	22																						
SM70a	22	24																						
SM70a	24	26																						
SM70a	26	27																						
SM70a	27	28																						
SM70a	28	29																						
SM70a	29	30																						
SM70a	30	31																						
SM70a	31	32																						
SM70a	32	33	14	3	<LOD	38	6	2	115	8	20	2	4051	40	11	2	48	3	<LOD	7	<LOD	3	44	2
SM70a	33	34	13	3	<LOD	36	5	1	83	7	17	2	3194	31	9	1	22	2	9	2	3	1	41	2
SM70a	34	35	16	3	<LOD	36	<LOD	4	93	7	20	2	3460	33	9	1	13	2	<LOD	6	<LOD	3	40	2

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations							Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF		
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg							Cinnabar	White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD					
SM70a	35	36	07/18/2015				x					Reddish Brown		B	Damp					<LOD	37	199	4	<LOD	3				
SM70a	36	37	07/18/2015				x					Brown		B	Dry					<LOD	39	126	4	5	1				
SM70a	37	38	07/18/2015								x	Dark Gray		B	Damp					<LOD	38	151	4	5	1				
SM70a	38	39	07/18/2015				x					Gray		B	Damp					51	14	636	10	<LOD	4				
SM70a	39	40	07/18/2015				x					Dark Reddish Brown		B	Damp					108	15	967	14	<LOD	5				
SM70a	40	41	07/18/2015				x					Dark Reddish Brown		B	Damp					41	12	444	7	6	1				
SM70a	41	42	07/18/2015									Dark Brown		B	Damp					<LOD	38	247	5	5	1				
SM70a	42	43	07/18/2015				x					Brown		B	Damp					41	13	314	6	4	1				
SM70a	43	44	07/18/2015				x					Brown		B	Damp					<LOD	37	249	5	4	1				
SM70a	44	45	07/18/2015				x					Brown		B	Damp					<LOD	38	299	6	5	1				
SM70a	45	46	07/18/2015									Dark Gray		B	Damp					<LOD	37	168	4	5	1				
SM70a	46	47	07/18/2015				x					Dark Gray		B	Damp					<LOD	38	197	5	5	1				
SM70a	47	48	07/18/2015				x					Dark Grayish Brown		B	Damp					38	12	291	5	<LOD	3				
SM70a	48	49	07/18/2015									Grayish Brown		B	Damp					41	12	222	5	5	1				
SM70a	49	50	07/18/2015									Dark Grayish Brown		B	Damp					<LOD	37	225	5	5	1				
SM70a	50	51	07/18/2015									Dark Grayish Brown		B	Damp					<LOD	37	206	5	5	1				
SM70a	51	52	07/18/2015									Dark Grayish Brown		B	Damp					<LOD	38	123	4	4	1				
SM70a	52	53	07/18/2015									Dark Grayish Brown		B	Damp					<LOD	39	145	4	4	1				
SM70a	53	54	07/18/2015											B						<LOD	40	188	5	4	1				
SM70a	54	55	07/18/2015									Grayish Brown		B	Damp					<LOD	36	164	4	4	1				
SM70a	55	56	07/18/2015									Black		B	Damp					<LOD	42	82	3	<LOD	3				
SM70a	56	57	07/18/2015									Black		B	Damp					<LOD	38	113	4	4	1				
SM70a	57	58	07/18/2015									Black		B	Damp					<LOD	39	129	4	3	1				
SM70a	58	59	07/18/2015									Dark Gray		B	Damp					<LOD	37	113	3	4	1				
SM70a	59	60	07/18/2015									Black		B	Damp					<LOD	38	145	4	4	1				
SM70a	60	61	07/18/2015									Very Dark Gray		B	Damp					<LOD	42	118	4	<LOD	3				
SM70a	61	62	07/18/2015									Black		B	Damp					<LOD	39	108	4	4	1				
SM70a	62	63	07/18/2015									Very Dark Gray		B	Damp					<LOD	36	100	3	4	1				
SM70a	63	64	07/18/2015									Black		B	Damp					<LOD	39	77	3	5	1				
SM70a	64	65	07/18/2015									Dark Gray		B	Damp					<LOD	39	79	3	4	1				
SM70a	65	66	07/18/2015									Gray		B	Damp					<LOD	38	109	3	5	1				
SM70a	66	67	07/18/2015									Gray		B	Dry					<LOD	37	69	3	<LOD	3				
SM70a	67	68	07/18/2015									Gray		B	Damp					<LOD	37	70	3	4	1				
SM70a	68	69	07/18/2015									Dark Gray		B	Damp					<LOD	37	58	3	<LOD	3				
SM70a	69	70	07/18/2015									Dark Gray		B	Dry					<LOD	39	45	2	4	1				
SM70a	70	71	07/18/2015									Gray		B	Damp					<LOD	40	67	3	<LOD	3				
SM70a	71	72	07/18/2015									Gray		B	Damp					<LOD	37	106	3	5	1				
SM70a	72	73	07/18/2015									Black		B	Damp					65	13	91	3	7	1				
SM70a	73	74	07/18/2015									Black		B	Damp					<LOD	39	99	3	4	1				
SM70a	74	75	07/18/2015									Very Dark Gray		B	Damp					<LOD	38	72	3	5	1				
SM70a	75	76	07/18/2015									Very Dark Gray		B	Damp					<LOD	39	110	4	4	1				
SM70a	76	77	07/18/2015									Gray		B	Damp					<LOD	38	190	4	4	1				
SM70a	77	78	07/18/2015									Gray		B	Dry					<LOD	38	108	3	3	1				
SM70a	78	79	07/18/2015									Gray		B	Dry					<LOD	37	76	3	3	1				
SM70a	79	80	07/18/2015									Gray		B	Dry					<LOD	38	73	3	3	1				
SM70a	80	81	07/18/2015									Gray		B	Dry					<LOD	39	80	3	5	1				



Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF		
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM70a	35	36	9	3	<LOD	38	<LOD	5	100	8	10	2	4518	44	<LOD	4	30	3	<LOD	7	<LOD	3	37	2
SM70a	36	37	15	3	<LOD	39	<LOD	5	82	7	24	2	3698	38	6	1	11	2	<LOD	7	<LOD	3	46	2
SM70a	37	38	17	3	<LOD	39	5	2	110	8	25	2	3996	40	10	2	52	3	<LOD	7	<LOD	3	48	2
SM70a	38	39	22	4	<LOD	41	<LOD	6	123	10	13	2	6253	65	<LOD	5	243	6	<LOD	9	<LOD	4	46	2
SM70a	39	40	17	4	<LOD	43	<LOD	7	147	13	8	2	10531	111	<LOD	5	585	10	<LOD	10	<LOD	4	54	3
SM70a	40	41	11	3	<LOD	37	<LOD	4	85	7	14	2	3652	36	4	1	180	4	8	2	<LOD	3	39	2
SM70a	41	42	20	3	<LOD	38	6	2	73	7	13	2	3068	31	6	1	38	3	6	2	<LOD	3	42	2
SM70a	42	43	16	3	<LOD	39	<LOD	5	101	8	9	2	4734	47	<LOD	4	74	3	<LOD	7	<LOD	3	33	2
SM70a	43	44	15	3	<LOD	37	<LOD	4	81	7	<LOD	5	3551	35	6	1	46	3	<LOD	6	<LOD	3	32	2
SM70a	44	45	12	3	<LOD	39	7	2	115	9	6	2	4974	49	<LOD	4	90	4	<LOD	7	<LOD	3	34	2
SM70a	45	46	14	3	<LOD	37	<LOD	4	84	7	13	2	3503	35	7	1	17	2	<LOD	6	<LOD	3	36	2
SM70a	46	47	17	3	<LOD	38	<LOD	5	113	8	19	2	4701	46	5	1	25	3	<LOD	7	<LOD	3	37	2
SM70a	47	48	16	3	<LOD	37	<LOD	5	64	7	8	2	3877	38	<LOD	4	269	5	8	2	<LOD	3	39	2
SM70a	48	49	13	3	<LOD	36	<LOD	4	47	6	<LOD	5	2887	28	<LOD	4	236	5	7	2	<LOD	3	34	2
SM70a	49	50	14	3	<LOD	38	6	2	71	7	15	2	3260	33	7	1	64	3	<LOD	6	<LOD	3	36	2
SM70a	50	51	20	3	<LOD	38	5	2	93	7	19	2	3199	32	8	1	27	2	<LOD	6	<LOD	3	32	2
SM70a	51	52	15	3	<LOD	38	<LOD	5	94	8	19	2	4000	40	7	1	30	3	<LOD	7	<LOD	3	38	2
SM70a	52	53	14	3	<LOD	39	9	2	106	8	9	2	4613	47	<LOD	4	66	3	<LOD	7	<LOD	3	34	2
SM70a	53	54	15	3	<LOD	40	<LOD	5	74	8	6	2	3864	40	<LOD	4	87	4	<LOD	7	<LOD	3	28	2
SM70a	54	55	13	3	<LOD	36	<LOD	4	72	6	8	2	2980	29	<LOD	4	23	2	<LOD	6	<LOD	3	27	2
SM70a	55	56	18	3	<LOD	43	<LOD	5	93	8	14	2	3572	41	6	2	31	3	<LOD	7	<LOD	3	31	2
SM70a	56	57	19	3	<LOD	39	6	2	65	7	19	2	3412	35	8	2	49	3	<LOD	7	<LOD	3	52	2
SM70a	57	58	21	3	<LOD	39	6	2	111	9	21	2	4953	50	8	2	38	3	<LOD	7	<LOD	3	49	2
SM70a	58	59	18	3	<LOD	37	6	2	110	8	22	2	3945	39	7	1	24	3	<LOD	7	<LOD	3	40	2
SM70a	59	60	20	3	<LOD	38	<LOD	5	108	8	22	2	4388	44	7	1	39	3	<LOD	7	<LOD	3	47	2
SM70a	60	61	17	3	<LOD	42	<LOD	6	119	10	17	2	6073	64	9	2	120	5	<LOD	8	<LOD	3	52	3
SM70a	61	62	16	3	<LOD	39	7	2	72	7	13	2	3722	38	9	2	30	3	<LOD	7	<LOD	3	38	2
SM70a	62	63	12	3	<LOD	37	4	1	98	7	9	2	3163	31	6	1	12	2	<LOD	6	<LOD	3	35	2
SM70a	63	64	25	3	<LOD	39	8	2	100	8	20	2	3820	38	7	1	26	3	8	2	<LOD	3	53	2
SM70a	64	65	14	3	<LOD	39	6	2	104	8	8	2	4202	42	6	1	43	3	<LOD	7	<LOD	3	38	2
SM70a	65	66	14	3	<LOD	38	6	2	92	7	9	2	3577	36	4	1	27	3	<LOD	6	<LOD	3	25	2
SM70a	66	67	8	3	<LOD	37	7	1	69	6	7	2	3061	30	5	1	25	2	<LOD	6	<LOD	3	25	2
SM70a	67	68	17	3	<LOD	37	5	1	62	6	9	2	2815	29	4	1	16	2	<LOD	6	<LOD	3	35	2
SM70a	68	69	15	3	<LOD	37	7	2	63	6	9	2	2877	29	5	1	25	2	<LOD	6	<LOD	3	40	2
SM70a	69	70	10	3	<LOD	39	6	2	62	7	<LOD	5	3173	33	<LOD	4	31	3	<LOD	6	<LOD	3	24	2
SM70a	70	71	14	3	<LOD	40	5	2	86	8	7	2	3750	39	5	1	37	3	<LOD	7	<LOD	3	25	2
SM70a	71	72	18	3	<LOD	38	6	2	90	7	22	2	3605	36	7	1	36	3	<LOD	6	<LOD	3	38	2
SM70a	72	73	24	3	<LOD	38	8	2	94	7	24	2	3809	38	10	2	18	3	8	2	4	1	54	2
SM70a	73	74	22	3	<LOD	39	<LOD	5	79	8	24	2	3886	40	7	2	17	3	8	2	4	1	44	2
SM70a	74	75	15	3	<LOD	38	9	2	75	7	13	2	3709	37	5	1	39	3	7	2	<LOD	3	35	2
SM70a	75	76	18	3	<LOD	39	<LOD	5	57	7	16	2	2815	30	10	2	126	4	<LOD	6	<LOD	3	37	2
SM70a	76	77	15	3	<LOD	38	7	2	54	7	7	2	3190	32	4	1	71	3	<LOD	6	<LOD	3	31	2
SM70a	77	78	10	3	<LOD	38	6	2	66	7	<LOD	5	3256	33	<LOD	4	36	3	<LOD	6	<LOD	3	27	2
SM70a	78	79	16	3	<LOD	37	6	1	47	6	6	2	2427	25	<LOD	4	35	2	7	2	<LOD	3	23	2
SM70a	79	80	13	3	<LOD	38	<LOD	4	35	5	5	2	2142	23	<LOD	4	29	2	7	2	<LOD	3	18	2
SM70a	80	81	9	3	<LOD	39	5	1	47	6	6	2	2267	24	<LOD	4	26	2	<LOD	6	<LOD	3	29	2



Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations							Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF		
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg							Cinnabar	White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
	SM70a	81			82	07/18/2015															Gray		B	Dry					<LOD
SM70a	82	83	07/18/2015									Gray		B	Dry					63	13	372	6	4	1				
SM70a	83	84	07/18/2015									Gray		B	Dry					<LOD	36	117	3	<LOD	3				
SM70a	84	85	07/18/2015									Gray		B	Dry					82	13	385	7	4	1				
SM70a	85	86	07/18/2015					x				Very Dark Gray		B	Damp					66	12	399	7	9	1				
SM70a	86	87	07/18/2015					x						B						<LOD	38	475	8	8	1				
SM70a	87	88	07/18/2015									Black		B	Damp					<LOD	39	419	7	14	2				
SM70a	88	89	07/18/2015					x	x			Dark Gray		B	Dry					<LOD	40	2170	25	57	3				
SM70a	89	90	07/18/2015					x	x		x	Dark Gray		B	Damp					51	14	3831	41	1531	19				
SM70a	90	91	07/18/2015					x	x		x	Black		B	Damp					67	13	2351	24	300	6				
SM70a	91	92	07/18/2015					x	x			Black		B	Damp					42	13	645	10	231	5				
SM70a	92	93	07/18/2015					x	x			Black		B	Damp					70	13	279	6	33	2				
SM70a	93	94	07/18/2015					x				Very Dark Gray		B	Damp					<LOD	43	162	5	12	2				
SM70a	94	95	07/18/2015					x				Dark Gray		B	Damp					52	14	195	5	12	1				
SM70a	95	96	07/18/2015					x				Black		B	Damp					<LOD	40	416	7	12	1				

See borehole SM70a interval 0-30 ft.

SM70b	30	31	07/24/2015					x				Brown		B	Damp					<LOD	41	350	7	4	1
SM70b	31	32	07/24/2015					x				Brown		B	Damp					<LOD	38	421	7	5	1
SM70b	32	33	07/24/2015									Black		B	Damp					<LOD	36	132	4	9	1
SM70b	33	34	07/24/2015									Very Dark Gray		B	Damp					<LOD	37	179	4	6	1
SM70b	34	35	07/24/2015					x				Very Dark Gray		B	Damp					<LOD	40	90	3	4	1
SM70b	35	36	07/24/2015									Very Dark Gray		B	Damp					<LOD	37	151	4	5	1
SM70b	36	37	07/24/2015					x				Very Dark Gray		B	Damp					<LOD	39	132	4	4	1
SM70b	37	38	07/24/2015									Very Dark Gray		B	Damp					<LOD	38	208	5	4	1
SM70b	38	39	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	37	59	3	6	1
SM70b	39	40	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	38	66	3	7	1
SM70b	40	41	07/24/2015									Dark Brown		B	Damp					<LOD	37	140	4	5	1
SM70b	41	42	07/24/2015									Dark Brown		B	Damp					<LOD	39	162	4	5	1
SM70b	42	43	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	35	76	3	4	1
SM70b	43	44	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	38	69	3	5	1
SM70b	44	45	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	37	138	4	5	1
SM70b	45	46	07/24/2015									Grayish Brown		B	Damp					<LOD	39	72	3	<LOD	3
SM70b	46	47	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	37	80	3	5	1
SM70b	47	48	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	38	71	3	5	1
SM70b	48	49	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	35	102	3	3	1
SM70b	49	50	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	36	297	5	4	1
SM70b	50	51	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	38	149	4	8	1
SM70b	51	52	07/24/2015									Dark Grayish Brown		B	Moist					<LOD	36	72	3	5	1
SM70b	52	53	07/24/2015									Black		B	Damp					<LOD	38	81	3	5	1
SM70b	53	54	07/24/2015									Black		B	Damp					<LOD	37	81	3	4	1
SM70b	54	55	07/24/2015									Black		B	Damp					<LOD	41	92	3	5	1
SM70b	55	56	07/24/2015									Dark Grayish Brown		B	Damp					<LOD	40	84	3	4	1
SM70b	56	57	07/24/2015								x	Very Dark Gray		B	Damp					<LOD	36	139	4	6	1
SM70b	57	58	07/24/2015									Gray		B	Damp					<LOD	39	121	4	6	1
SM70b	58	59	07/24/2015									Grayish Brown		B	Damp					<LOD	41	414	7	4	1

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM70a	81	82	9	3	<LOD	38	5	1	55	6	9	2	2435	25	<LOD	4	23	2	<LOD	6	<LOD	3	26	2
SM70a	82	83	12	3	<LOD	37	4	1	53	6	8	2	2735	28	<LOD	4	38	3	<LOD	6	<LOD	3	28	2
SM70a	83	84	10	2	<LOD	36	5	1	42	5	6	2	2038	21	<LOD	3	22	2	6	2	<LOD	2	22	2
SM70a	84	85	10	3	<LOD	39	8	2	64	7	7	2	3165	33	<LOD	4	32	3	<LOD	6	<LOD	3	30	2
SM70a	85	86	20	3	<LOD	37	<LOD	4	52	6	9	2	2382	24	<LOD	4	33	2	7	2	<LOD	3	31	2
SM70a	86	87	22	3	<LOD	38	6	2	80	7	21	2	3661	37	8	2	48	3	10	2	<LOD	3	52	2
SM70a	87	88	24	3	<LOD	39	5	2	78	7	27	2	3326	34	10	2	36	3	10	2	<LOD	4	46	2
SM70a	88	89	20	3	<LOD	40	7	2	82	8	14	2	3954	42	<LOD	5	51	3	<LOD	7	<LOD	6	45	2
SM70a	89	90	<LOD	9	<LOD	41	<LOD	5	61	7	<LOD	7	3420	37	<LOD	6	28	3	<LOD	7	<LOD	9	24	3
SM70a	90	91	19	3	<LOD	37	5	1	35	5	18	2	1774	19	8	2	18	2	9	2	<LOD	6	27	2
SM70a	91	92	19	3	<LOD	40	7	2	74	8	24	2	3717	39	9	2	64	3	<LOD	7	6	2	51	3
SM70a	92	93	18	3	<LOD	39	9	2	95	7	25	2	3639	37	7	2	33	3	<LOD	7	<LOD	3	44	2
SM70a	93	94	22	3	<LOD	43	7	2	91	8	20	2	3690	42	7	2	49	3	<LOD	7	<LOD	4	48	3
SM70a	94	95	15	3	<LOD	40	7	2	62	7	19	2	3400	36	5	1	46	3	<LOD	7	<LOD	3	36	2
SM70a	95	96	12	3	<LOD	40	5	2	62	7	7	2	3046	32	<LOD	4	50	3	<LOD	6	<LOD	3	30	2
See borehole SM70a interval 0-30 ft.																								
SM70b	30	31	18	3	<LOD	41	<LOD	5	150	9	57	3	5221	54	<LOD	4	119	4	<LOD	8	<LOD	4	29	2
SM70b	31	32	12	3	<LOD	38	8	2	78	7	8	2	3562	36	<LOD	4	47	3	<LOD	6	<LOD	3	29	2
SM70b	32	33	23	3	<LOD	36	4	1	66	6	19	2	3133	30	12	1	36	3	12	2	<LOD	3	48	2
SM70b	33	34	16	3	<LOD	38	<LOD	4	83	7	6	2	3254	33	9	1	64	3	<LOD	6	<LOD	3	37	2
SM70b	34	35	20	3	<LOD	41	<LOD	5	68	7	10	2	3064	34	8	2	57	3	<LOD	7	<LOD	3	40	2
SM70b	35	36	22	3	<LOD	38	5	2	94	8	13	2	4221	41	7	1	207	5	<LOD	7	3	1	57	2
SM70b	36	37	25	3	<LOD	39	<LOD	5	128	9	24	2	5356	54	5	1	111	4	<LOD	8	<LOD	3	47	2
SM70b	37	38	20	3	<LOD	39	<LOD	5	132	9	14	2	5474	54	7	2	159	5	<LOD	8	<LOD	3	45	2
SM70b	38	39	22	3	<LOD	37	8	2	74	7	14	2	3907	38	9	1	141	4	9	2	<LOD	3	44	2
SM70b	39	40	13	3	<LOD	38	5	2	76	8	14	2	4218	41	7	1	158	4	10	2	<LOD	3	46	2
SM70b	40	41	18	3	<LOD	37	<LOD	5	98	7	10	2	3959	39	8	1	112	4	<LOD	7	<LOD	3	38	2
SM70b	41	42	29	3	<LOD	40	<LOD	5	115	9	14	2	4956	50	9	2	123	4	9	3	<LOD	3	59	3
SM70b	42	43	13	3	<LOD	36	<LOD	4	75	6	15	2	2826	28	8	1	41	3	7	2	3	1	38	2
SM70b	43	44	18	3	<LOD	38	5	2	102	8	17	2	4328	43	9	2	60	3	<LOD	7	3	1	53	2
SM70b	44	45	8	3	<LOD	38	<LOD	4	70	7	7	2	3490	34	<LOD	3	33	3	<LOD	6	<LOD	3	22	2
SM70b	45	46	13	3	<LOD	40	<LOD	5	72	7	<LOD	6	2732	30	7	2	65	3	<LOD	6	<LOD	3	28	2
SM70b	46	47	17	3	<LOD	37	8	2	93	7	16	2	3598	35	9	1	24	2	<LOD	6	<LOD	3	39	2
SM70b	47	48	20	3	<LOD	38	6	2	87	7	18	2	3499	35	10	2	48	3	<LOD	6	<LOD	3	38	2
SM70b	48	49	12	3	<LOD	35	6	1	79	6	10	2	2853	28	6	1	66	3	<LOD	6	<LOD	2	35	2
SM70b	49	50	12	3	<LOD	36	5	1	87	7	10	2	3594	35	5	1	19	2	<LOD	6	<LOD	3	24	2
SM70b	50	51	14	3	<LOD	38	<LOD	5	130	9	13	2	5509	53	5	1	36	3	<LOD	8	<LOD	3	34	2
SM70b	51	52	24	3	<LOD	36	5	1	62	6	13	2	2682	27	9	1	11	2	6	2	<LOD	2	21	2
SM70b	52	53	20	3	<LOD	38	6	2	82	7	18	2	3473	35	9	2	31	3	<LOD	7	<LOD	3	54	2
SM70b	53	54	24	3	<LOD	37	7	2	84	7	19	2	3761	37	6	1	22	3	7	2	<LOD	3	43	2
SM70b	54	55	14	3	<LOD	41	6	2	75	8	15	2	3496	38	5	2	15	3	<LOD	7	<LOD	3	40	2
SM70b	55	56	22	3	<LOD	40	7	2	74	8	16	2	4053	42	6	2	17	3	<LOD	7	<LOD	3	42	2
SM70b	56	57	17	3	<LOD	37	5	1	69	7	10	2	3375	33	5	1	21	2	7	2	<LOD	3	38	2
SM70b	57	58	14	3	<LOD	39	8	2	53	8	9	2	5002	50	<LOD	4	298	6	8	2	<LOD	3	29	2
SM70b	58	59	16	3	<LOD	41	<LOD	5	107	9	9	2	4517	48	<LOD	4	67	4	<LOD	7	<LOD	4	26	2

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD					
SM70b	59	60	07/24/2015									Gray		B	Dry					<LOD	41	266	6	<LOD	4				
SM70b	60	61	07/24/2015								x	Light Brownish Gray		B	Dry					<LOD	42	120	4	4	1				
SM70b	61	62	07/24/2015									Gray		B	Dry					<LOD	41	128	4	5	1				
SM70b	62	63	07/24/2015									Grayish Brown		B	Damp					<LOD	39	123	4	5	1				
SM70b	63	64	07/24/2015									Gray		B	Dry					<LOD	39	43	3	5	1				
SM70b	64	65	07/24/2015									Gray		B	Dry					<LOD	42	39	2	6	1				
SM70b	65	66	07/24/2015								x	Gray		B	Dry					<LOD	40	95	3	<LOD	3				
SM70b	66	67	07/24/2015									Dark Gray		B	Damp					<LOD	37	93	3	5	1				
SM70b	67	68	07/24/2015									Black		B	Damp					<LOD	45	68	3	4	1				
SM70b	68	69	07/24/2015									Black		B	Damp					<LOD	38	76	3	4	1				
SM70b	69	70	07/24/2015									Black		B	Dry					<LOD	40	77	3	5	1				
SM70b	70	71	07/24/2015									Black		B	Moist					<LOD	42	112	4	4	1				
SM70b	71	72	07/24/2015									Black		B	Moist					<LOD	39	77	3	5	1				
SM70b	72	73	07/24/2015									Black		B	Moist					<LOD	38	91	3	<LOD	3				
SM70b	73	74	07/24/2015									Black		B	Damp					<LOD	40	74	3	3	1				
SM70b	74	75	07/24/2015									Black		B	Moist					<LOD	41	98	4	5	1				
SM70b	75	76	07/24/2015									Black		B	Moist					<LOD	41	247	6	4	1				
SM70b	76	77	07/24/2015									Black		B	Moist					<LOD	43	82	4	<LOD	3				
SM70b	77	78	07/24/2015									Black		B	Moist					<LOD	40	96	3	4	1				
SM70b	78	79	07/24/2015									Black		B	Damp					<LOD	39	109	4	5	1				
SM70b	79	80	07/24/2015									Dark Gray		B	Damp					<LOD	39	153	4	<LOD	3				
SM70b	80	81	07/24/2015								x	Dark Gray		B	Wet					<LOD	48	117	4	5	1				
SM70b	81	82	07/24/2015									Black		B	Saturated					<LOD	44	85	4	<LOD	3				
SM70b	82	83	07/24/2015								x	Black		B	Saturated					<LOD	47	102	4	5	1				
SM70b	83	84	07/24/2015								x	Black		B	Saturated					<LOD	45	87	4	6	1				
SM70b	84	85	07/24/2015									Gray		B	Damp					<LOD	50	131	5	<LOD	4				
SM70b	85	86	07/24/2015									Gray		B	Damp					<LOD	49	134	5	6	1				
SM70b	86	87	07/24/2015									Gray		B	Damp					<LOD	52	160	5	<LOD	4				
SM70b	87	88	07/24/2015									Light Gray		B	Dry					<LOD	48	167	5	<LOD	4				
SM70b	88	89	07/24/2015									Light Gray		B	Dry					<LOD	48	96	4	<LOD	4				
SM70b	89	90	07/24/2015									Light Gray		B	Dry					<LOD	47	105	4	5	1				
SM70b	90	91	07/24/2015									Yellowish Brown		B	Dry					<LOD	47	163	5	6	1				
SM70b	91	92	07/24/2015								x			B						<LOD	50	64	3	<LOD	3				
SM70b	92	93	07/24/2015									Gray		B	Damp					<LOD	46	75	4	7	1				
SM70b	93	94	07/24/2015									Gray		B	Dry					<LOD	50	225	6	6	2				
SM70b	94	95	07/24/2015									Gray		B	Dry					<LOD	46	317	7	6	2				
SM70b	95	96	07/24/2015									Gray		B	Dry					<LOD	52	179	6	<LOD	4				
SM70b	96	97	07/24/2015									Grayish Brown		B	Dry					<LOD	55	139	5	<LOD	4				
SM70b	97	98	07/24/2015									Dark Reddish Brown		B	Damp					<LOD	49	105	4	5	1				
SM70b	98	99	07/24/2015									Dark Grayish Brown		B	Moist					<LOD	44	112	4	<LOD	4				
SM70b	99	100	07/24/2015									Dark Brown		B	Wet					<LOD	49	96	4	<LOD	4				
SM70b	100	101	07/24/2015									Dark Gray		B	Wet					<LOD	47	111	4	<LOD	4				
SM70b	101	102	07/24/2015									Dark Gray		B	Wet					<LOD	50	109	4	<LOD	4				
SM70b	102	103	07/24/2015									Dark Gray		B	Wet					<LOD	47	115	4	6	1				
SM70b	103	104	07/24/2015									Dark Gray		B	Wet					<LOD	49	113	4	5	1				
SM70b	104	105	07/24/2015									Dark Gray		B	Wet					<LOD	50	56	3	<LOD	3				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM70b	59	60	19	4	<LOD	40	<LOD	6	148	11	11	2	7015	71	<LOD	5	104	4	<LOD	8	<LOD	3	33	2
SM70b	60	61	14	3	<LOD	42	11	2	59	8	<LOD	6	4163	44	<LOD	4	79	4	<LOD	7	<LOD	3	32	2
SM70b	61	62	22	3	<LOD	41	<LOD	5	84	9	8	2	4734	49	<LOD	4	45	3	<LOD	8	<LOD	3	37	2
SM70b	62	63	18	3	<LOD	39	5	2	115	8	17	2	4564	46	6	1	58	3	8	3	<LOD	3	36	2
SM70b	63	64	12	3	<LOD	39	<LOD	5	85	8	9	2	4451	45	6	1	94	4	<LOD	7	<LOD	3	30	2
SM70b	64	65	13	3	<LOD	42	9	2	85	9	10	2	4589	49	<LOD	4	190	5	<LOD	7	<LOD	3	27	2
SM70b	65	66	17	3	<LOD	40	<LOD	5	55	7	9	2	3112	34	<LOD	4	220	5	<LOD	6	<LOD	3	34	2
SM70b	66	67	23	3	<LOD	37	7	2	89	7	21	2	3296	33	8	1	62	3	8	2	5	1	41	2
SM70b	67	68	<LOD	12	<LOD	45	10	3	139	14	13	3	11307	124	<LOD	5	449	9	<LOD	11	<LOD	4	34	2
SM70b	68	69	24	3	<LOD	38	9	2	85	7	16	2	3861	39	8	2	59	3	7	2	4	1	42	2
SM70b	69	70	20	3	<LOD	41	5	2	80	9	21	2	4679	49	9	2	114	4	<LOD	7	<LOD	3	44	2
SM70b	70	71	27	3	<LOD	42	<LOD	6	109	9	32	3	4972	52	10	2	53	3	9	3	6	1	48	2
SM70b	71	72	21	3	<LOD	40	6	2	66	7	19	2	3513	37	11	2	46	3	9	2	3	1	55	2
SM70b	72	73	18	3	<LOD	39	<LOD	5	72	8	8	2	4141	42	4	1	99	4	<LOD	7	<LOD	3	34	2
SM70b	73	74	20	3	<LOD	40	6	2	68	8	22	2	3806	40	5	1	78	4	<LOD	7	<LOD	3	42	2
SM70b	74	75	21	3	<LOD	41	6	2	93	9	17	2	4758	50	10	2	82	4	<LOD	8	5	1	77	3
SM70b	75	76	16	3	<LOD	41	6	2	68	8	8	2	3663	40	6	2	65	3	<LOD	7	<LOD	3	30	2
SM70b	76	77	12	3	<LOD	44	<LOD	6	111	11	9	2	5803	66	8	2	149	5	<LOD	8	<LOD	4	43	2
SM70b	77	78	21	3	<LOD	41	<LOD	5	105	9	24	2	5458	57	6	2	140	5	<LOD	8	<LOD	3	52	2
SM70b	78	79	21	3	<LOD	39	<LOD	5	91	8	24	2	3889	40	9	2	89	4	<LOD	7	<LOD	3	60	2
SM70b	79	80	<LOD	8	<LOD	40	7	2	87	7	<LOD	6	3405	36	<LOD	4	53	3	<LOD	6	<LOD	3	24	2
SM70b	80	81	10	3	<LOD	48	<LOD	5	82	8	34	3	2813	36	10	2	46	3	<LOD	8	<LOD	4	40	3
SM70b	81	82	16	3	<LOD	45	<LOD	5	64	7	33	3	2541	32	7	2	27	3	<LOD	7	4	1	33	2
SM70b	82	83	17	3	<LOD	47	6	2	69	8	32	3	2652	34	<LOD	5	31	3	8	3	<LOD	3	48	3
SM70b	83	84	21	3	<LOD	45	<LOD	5	81	7	26	3	2606	32	<LOD	5	33	3	8	2	<LOD	3	43	2
SM70b	84	85	14	4	<LOD	49	<LOD	6	88	10	17	3	3742	49	<LOD	5	89	5	<LOD	9	<LOD	4	27	2
SM70b	85	86	22	4	<LOD	49	8	2	103	9	18	3	3112	41	<LOD	5	37	3	<LOD	8	<LOD	4	33	2
SM70b	86	87	21	4	<LOD	52	<LOD	6	68	9	25	3	3221	44	<LOD	5	39	4	<LOD	8	<LOD	4	38	3
SM70b	87	88	16	4	<LOD	48	7	2	67	8	22	3	2771	36	<LOD	5	30	3	<LOD	8	<LOD	4	37	3
SM70b	88	89	17	3	<LOD	47	<LOD	5	63	8	15	2	2672	34	5	2	28	3	<LOD	7	<LOD	3	35	2
SM70b	89	90	22	4	<LOD	47	6	2	89	8	12	2	2750	35	<LOD	5	33	3	<LOD	8	<LOD	4	35	2
SM70b	90	91	12	4	<LOD	48	6	2	66	9	9	2	3292	42	<LOD	5	35	3	<LOD	8	<LOD	4	35	2
SM70b	91	92	17	4	<LOD	50	<LOD	6	73	9	9	2	3094	41	<LOD	5	44	4	<LOD	8	<LOD	3	30	2
SM70b	92	93	14	3	<LOD	47	<LOD	6	69	8	9	2	2993	38	<LOD	5	40	3	<LOD	7	<LOD	4	27	2
SM70b	93	94	14	4	<LOD	49	<LOD	6	68	9	11	3	3473	45	<LOD	5	57	4	14	3	<LOD	4	37	3
SM70b	94	95	14	4	<LOD	47	<LOD	6	75	8	8	2	3144	40	6	2	44	3	<LOD	8	<LOD	4	33	2
SM70b	95	96	19	4	<LOD	52	<LOD	7	133	12	21	3	5253	69	9	2	95	5	<LOD	10	<LOD	4	50	3
SM70b	96	97	<LOD	12	<LOD	55	<LOD	7	79	11	<LOD	8	4248	60	<LOD	5	142	6	<LOD	9	<LOD	4	25	2
SM70b	97	98	14	4	<LOD	50	<LOD	6	61	9	17	3	3193	42	<LOD	5	73	4	<LOD	8	<LOD	4	32	2
SM70b	98	99	17	3	<LOD	45	<LOD	5	67	8	14	2	2866	35	<LOD	5	44	3	8	2	<LOD	4	31	2
SM70b	99	100	12	3	<LOD	49	<LOD	6	87	8	9	2	2599	35	<LOD	5	34	3	<LOD	7	<LOD	4	31	2
SM70b	100	101	15	3	<LOD	47	<LOD	5	73	8	11	2	2705	34	<LOD	5	34	3	<LOD	7	<LOD	3	26	2
SM70b	101	102	12	4	<LOD	50	7	2	114	10	13	3	3810	50	<LOD	5	42	4	<LOD	9	<LOD	4	24	2
SM70b	102	103	10	3	<LOD	47	7	2	78	8	21	3	2890	37	7	2	20	3	<LOD	8	<LOD	3	45	3
SM70b	103	104	17	4	<LOD	50	<LOD	6	91	10	17	3	3810	49	<LOD	5	100	5	<LOD	8	<LOD	4	34	3
SM70b	104	105	16	4	<LOD	50	7	2	46	8	<LOD	7	2636	36	6	2	119	5	<LOD	7	<LOD	4	20	2

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD	<LOD	<LOD	<LOD	<LOD	
SM70b	105	106	07/24/2015									Black		B	Wet					<LOD	51	122	5	6	1				
SM70b	106	107	07/24/2015							x		Dark Brownish Gray		B	Wet					<LOD	49	110	4	<LOD	4				
SM70b	107	108	07/24/2015							x		Dark Brownish Gray		B	Wet					<LOD	48	151	5	5	1				
SM70b	108	109	07/24/2015							x		Dark Gray		B	Wet					<LOD	47	139	5	<LOD	4				
SM70b	109	110	07/24/2015							x		Black		B	Wet					<LOD	47	98	4	<LOD	4				
SM70b	110	111	07/24/2015							x		Dark Gray		B	Moist					<LOD	46	124	4	<LOD	4				
SM70b	111	112	07/24/2015							x		Dark Gray		B	Wet					<LOD	50	90	4	<LOD	4				
SM70b	112	113	07/24/2015							x		Dark Gray		B	Wet					<LOD	48	112	4	<LOD	3				
SM70b	113	114	07/24/2015									Gray		B	Wet					<LOD	47	96	4	<LOD	4				
SM70b	114	115	07/24/2015									Dark Gray		B	Wet					<LOD	47	94	4	<LOD	3				
SM70b	115	116	07/24/2015							x		Dark Gray		B	Wet					<LOD	47	78	4	<LOD	4				
SM70b	116	117	07/24/2015							x		Gray		B	Wet					<LOD	46	90	4	5	1				
SM70b	117	118	07/24/2015									Black		B	Wet					<LOD	50	115	5	<LOD	4				
SM70b	118	119	07/24/2015							x		Black		B	Wet					<LOD	47	331	7	5	1				
SM70b	119	120	07/24/2015							x		Dark Gray		B	Wet	MW42	119 - 139			<LOD	45	346	7	<LOD	4				
SM70b	120	121	07/24/2015							x		Dark Gray		B	Wet	MW42	119 - 139			<LOD	43	480	9	4	1				
SM70b	121	122	07/24/2015							x		Dark Gray		B	Wet	MW42	119 - 139			<LOD	49	302	7	6	2				
SM70b	122	123	07/24/2015							x		Dark Gray		B	Wet	MW42	119 - 139			84	16	1312	19	8	2				
SM70b	123	124	07/24/2015							x		Dark Gray		B	Wet	MW42	119 - 139			<LOD	43	918	13	9	2				
SM70b	124	125	07/24/2015								x	Dark Gray		B	Wet	MW42	119 - 139			<LOD	47	783	13	10	2				
SM70b	125	126	07/24/2015							x		Dark Gray		B	Wet	MW42	119 - 139			<LOD	48	718	12	8	2				
SM70b	126	127	07/24/2015							x		Dark Gray		B	Wet	MW42	119 - 139			<LOD	46	475	9	5	1				
SM70b	127	128	07/24/2015								x	Dark Gray		B	Wet	MW42	119 - 139			<LOD	45	1713	22	8	2				
SM70b	128	129	07/24/2015								x	Dark Gray		B	Wet	MW42	119 - 139			<LOD	47	828	13	11	2				
SM70b	129	130	07/24/2015								x	Dark Gray		B	Wet	MW42	119 - 139			<LOD	46	1981	26	10	2				
SM70b	130	131	07/24/2015								x	Dark Gray		B	Wet	MW42	119 - 139			<LOD	48	2223	30	12	3				
SM70b	131	132	07/24/2015								x			B		MW42	119 - 139			<LOD	48	793	13	12	2				
SM70b	132	133	07/24/2015									Black		B	Wet	MW42	119 - 139			<LOD	47	727	12	39	3				
SM70b	133	134	07/24/2015							x		Dark Gray		B	Wet	MW42	119 - 139			<LOD	62	3133	51	<LOD	11				
SM70b	134	135	07/24/2015									Dark Gray		B	Wet	MW42	119 - 139			<LOD	52	3458	48	16	3				
SM70b	135	136	07/24/2015								x	Dark Gray		B	Wet	MW42	119 - 139			<LOD	48	475	9	11	2				
SM70b	136	137	07/24/2015								x	Black		B	Wet	MW42	119 - 139			<LOD	47	370	8	7	2				
SM70b	137	138	07/24/2015								x	Dark Gray		B	Wet	MW42	119 - 139			<LOD	46	371	8	8	2				
SM70b	138	139	07/24/2015								x	Dark Gray		B	Wet	MW42	119 - 139			<LOD	45	555	10	9	2				
SM70b	139	140	07/24/2015								x	Dark Gray		B	Wet														
SM71a	0	1	07/21/2015												DN (KG and Loess)					<LOD	38	197	4	5	1				
SM71a	1	2	07/21/2015	80								Brown	GM		DN (KG and Loess)	Moist				<LOD	41	253	6	6	1				
SM71a	2	3	07/21/2015												DN (KG and Loess)					<LOD	44	208	5	7	1				
SM71a	3	4	07/21/2015	90								Brown	GM		DN (KG and Loess)	Moist				<LOD	39	11	2	<LOD	3				
SM71a	4	5	07/21/2015												DN (loess)					<LOD	35	11	2	<LOD	2				
SM71a	5	6	07/21/2015	70								Grayish Brown	SP-SM		DN (loess)	Moist				<LOD	34	11	2	<LOD	2				
SM71a	6	7	07/21/2015												DN (KG and Loess)					<LOD	36	23	2	<LOD	2				
SM71a	7	8	07/21/2015	70								Brown	GM		DN (KG and Loess)	Moist				<LOD	44	62	3	<LOD	3				
SM71a	8	9	07/21/2015												DN (KG and Loess)					<LOD	36	49	2	<LOD	3				
SM71a	9	10	07/21/2015	95								Grayish Brown	GM		DN (KG and Loess)	Moist				<LOD	40	153	4	<LOD	3				
SM71a	11	12	07/21/2015	50								Grayish Brown	GP		DN (KG and Loess)	Damp				15SM71SB12	120	510	18	93	13	164	4	5	1

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM70b	105	106	16	4	<LOD	50	<LOD	6	77	9	18	3	3544	47	7	2	65	4	<LOD	9	<LOD	4	32	2
SM70b	106	107	12	4	<LOD	49	<LOD	6	89	9	12	2	3600	46	<LOD	5	54	4	<LOD	8	<LOD	4	32	2
SM70b	107	108	16	3	<LOD	48	<LOD	5	70	8	7	2	3135	39	<LOD	5	45	3	<LOD	8	<LOD	4	28	2
SM70b	108	109	16	3	<LOD	47	<LOD	6	103	9	11	2	4123	50	<LOD	5	74	4	<LOD	8	<LOD	4	26	2
SM70b	109	110	17	3	<LOD	47	<LOD	6	78	8	23	3	3262	41	6	2	54	4	<LOD	8	<LOD	3	44	3
SM70b	110	111	10	3	<LOD	46	<LOD	5	65	8	9	2	2962	37	<LOD	5	37	3	<LOD	7	<LOD	3	31	2
SM70b	111	112	<LOD	10	<LOD	50	<LOD	6	71	9	8	2	3114	41	<LOD	5	43	4	<LOD	8	<LOD	4	22	2
SM70b	112	113	<LOD	9	<LOD	48	<LOD	5	67	8	10	2	2532	33	<LOD	5	33	3	<LOD	7	<LOD	3	30	2
SM70b	113	114	13	3	<LOD	47	<LOD	5	68	8	<LOD	7	2703	34	<LOD	5	38	3	<LOD	7	4	1	22	2
SM70b	114	115	20	3	<LOD	47	<LOD	5	65	7	16	2	2552	33	6	2	33	3	8	2	<LOD	3	39	2
SM70b	115	116	17	3	<LOD	47	<LOD	5	83	9	8	2	3628	44	<LOD	5	40	3	<LOD	8	<LOD	3	25	2
SM70b	116	117	15	3	<LOD	46	<LOD	5	62	7	8	2	2521	31	<LOD	5	25	3	<LOD	7	<LOD	3	17	2
SM70b	117	118	19	4	<LOD	50	<LOD	6	59	9	17	3	3066	41	<LOD	5	33	3	<LOD	8	<LOD	4	41	3
SM70b	118	119	12	3	<LOD	47	6	2	62	8	<LOD	7	2713	35	<LOD	5	35	3	<LOD	7	<LOD	4	36	2
SM70b	119	120	17	3	<LOD	45	<LOD	5	63	7	10	2	2544	32	<LOD	5	27	3	<LOD	7	<LOD	4	24	2
SM70b	120	121	10	3	<LOD	43	<LOD	5	60	6	11	2	1931	24	<LOD	4	27	3	<LOD	6	<LOD	4	23	2
SM70b	121	122	<LOD	9	<LOD	50	<LOD	6	58	8	8	2	2876	39	<LOD	5	35	3	<LOD	8	<LOD	4	23	2
SM70b	122	123	9	3	<LOD	46	<LOD	5	51	7	7	2	2166	28	<LOD	5	33	3	<LOD	6	<LOD	5	29	2
SM70b	123	124	9	3	<LOD	43	<LOD	4	41	6	<LOD	6	1898	24	<LOD	4	23	2	<LOD	6	<LOD	5	29	2
SM70b	124	125	10	3	<LOD	46	<LOD	5	40	6	<LOD	6	1859	25	<LOD	5	19	2	<LOD	7	<LOD	4	19	2
SM70b	125	126	14	3	<LOD	48	<LOD	5	45	7	<LOD	7	2334	31	<LOD	5	48	3	<LOD	7	<LOD	4	29	2
SM70b	126	127	12	3	<LOD	45	<LOD	5	35	6	<LOD	6	1656	22	<LOD	5	20	2	<LOD	6	<LOD	4	21	2
SM70b	127	128	12	3	<LOD	45	<LOD	5	59	6	8	2	2006	25	<LOD	5	19	2	<LOD	6	<LOD	5	21	2
SM70b	128	129	12	3	<LOD	47	<LOD	5	36	6	<LOD	7	1870	25	<LOD	4	19	3	<LOD	7	<LOD	5	14	2
SM70b	129	130	9	3	<LOD	46	<LOD	5	35	6	<LOD	7	1517	21	<LOD	5	14	2	<LOD	6	<LOD	6	20	2
SM70b	130	131	13	3	<LOD	48	<LOD	5	48	7	<LOD	7	2304	31	<LOD	5	22	3	<LOD	7	<LOD	6	19	2
SM70b	131	132	14	3	<LOD	48	<LOD	6	76	9	13	3	3159	41	<LOD	5	41	3	10	3	<LOD	5	42	3
SM70b	132	133	12	3	<LOD	47	6	2	71	8	14	3	3108	39	8	2	39	3	<LOD	8	<LOD	5	53	3
SM70b	133	134	20	5	<LOD	62	<LOD	8	84	12	11	3	3891	62	<LOD	7	58	5	<LOD	11	<LOD	8	36	3
SM70b	134	135	<LOD	11	<LOD	52	<LOD	6	77	9	20	3	3320	46	<LOD	6	42	4	<LOD	9	<LOD	8	52	3
SM70b	135	136	11	3	<LOD	48	7	2	76	8	15	3	2870	37	<LOD	5	43	3	<LOD	8	<LOD	4	27	2
SM70b	136	137	15	3	<LOD	47	<LOD	5	67	8	14	2	2432	32	6	2	28	3	<LOD	7	<LOD	4	35	2
SM70b	137	138	20	4	<LOD	46	6	2	96	9	17	3	3334	41	9	2	49	4	<LOD	8	<LOD	4	38	2
SM70b	138	139	19	3	<LOD	45	<LOD	5	53	7	27	3	2122	27	<LOD	5	34	3	<LOD	7	<LOD	4	20	2
SM70b	139	140																						
SM71a	0	1	18	3	<LOD	38	6	2	75	6	14	2	2915	30	7	1	48	3	8	2	<LOD	3	42	2
SM71a	1	2	21	3	<LOD	41	6	2	89	8	21	2	3939	41	12	2	40	3	10	2	4	1	53	2
SM71a	2	3	11	3	<LOD	44	6	2	84	8	14	2	3546	42	7	2	34	3	<LOD	7	<LOD	3	31	2
SM71a	3	4	<LOD	8	<LOD	41	<LOD	4	37	5	7	2	1742	21	<LOD	4	23	2	<LOD	5	<LOD	3	14	2
SM71a	4	5	10	2	<LOD	35	<LOD	4	43	5	<LOD	5	1665	17	5	1	22	2	<LOD	5	<LOD	2	15	1
SM71a	5	6	11	2	<LOD	35	5	1	32	4	<LOD	5	1643	17	6	1	20	2	<LOD	5	<LOD	2	14	1
SM71a	6	7	12	2	<LOD	36	<LOD	4	42	5	<LOD	5	2099	21	6	1	24	2	<LOD	5	<LOD	2	16	1
SM71a	7	8	14	3	<LOD	44	<LOD	5	66	8	17	2	3073	37	7	2	179	5	<LOD	7	<LOD	3	31	2
SM71a	8	9	10	3	<LOD	37	6	1	74	7	9	2	3189	31	7	1	74	3	<LOD	6	<LOD	3	28	2
SM71a	9	10	17	3	<LOD	40	6	2	83	8	15	2	4043	43	9	2	31	3	<LOD	7	3	1	46	2
SM71a	11	12	18	3	<LOD	38	6	2	94	8	17	2	4750	46	6	1	141	4	9	2	<LOD	3	48	2



Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations							Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF		
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg							Cinnabar	White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD					
SM71a	12	13	07/21/2015																	<LOD	36	92	3	10	1				
SM71a	13	14	07/21/2015	60								Grayish Brown	GP	WB	Dry					<LOD	65	123	7	<LOD	5				
SM71a	14	15	07/21/2015					x						WB						<LOD	39	114	3	8	1				
SM71a	15	16	07/21/2015	80				x				Dark Grayish Brown		WB	Damp					<LOD	45	130	5	6	1				
SM71a	16	17	07/21/2015					x						WB						<LOD	49	109	4	5	1				
SM71a	17	18	07/21/2015	80				x				Dark Grayish Brown		WB	Dry					<LOD	38	95	3	4	1				
SM71a	18	19	07/21/2015					x						WB						<LOD	38	137	4	4	1				
SM71a	19	20	07/21/2015	80				x				Grayish Brown		WB	Damp					<LOD	37	93	3	5	1				
SM71a	20	21	07/21/2015											WB						<LOD	37	159	4	7	1				
SM71a	21	22	07/21/2015	100				x				Dark Grayish Brown		WB	Dry					<LOD	41	236	6	8	1				
SM71a	22	23	07/21/2015					x						WB						<LOD	42	112	4	4	1				
SM71a	23	24	07/21/2015	90				x				Dark Grayish Brown		WB	Dry					<LOD	37	76	3	4	1				
SM71a	24	25	07/21/2015					x				Brown		B	Damp					<LOD	37	81	3	5	1				
SM71a	25	26	07/21/2015					x				Brown		B	Damp					<LOD	37	104	3	5	1				
SM71a	26	27	07/21/2015					x				Brown		B	Damp					<LOD	39	123	4	5	1				
SM71a	27	28	07/21/2015					x				Dark Grayish Brown		B	Damp					42	13	121	4	5	1				
SM71a	28	29	07/21/2015									Dark Grayish Brown		B	Damp					<LOD	36	118	3	4	1				
SM71a	29	30	07/21/2015									Brown		B	Damp					<LOD	36	149	4	5	1				
SM71a	30	31	07/21/2015					x				Grayish Brown		B	Damp					<LOD	37	212	5	5	1				
SM71a	31	32	07/21/2015					x				Brown		B	Damp					<LOD	38	189	4	5	1				
SM71a	32	33	07/21/2015					x				Dark Grayish Brown		B	Damp					<LOD	37	247	5	6	1				
SM71a	33	34	07/21/2015					x				Dark Grayish Brown		B	Damp					<LOD	39	217	5	4	1				
SM71a	34	35	07/21/2015					x				Brown		B	Damp					<LOD	38	183	4	3	1				
SM71a	35	36	07/21/2015									Grayish Brown		B	Damp					<LOD	37	142	4	4	1				
SM71a	36	37	07/21/2015									Dark Brown		B	Damp					<LOD	35	86	3	5	1				
SM71a	37	38	07/21/2015									Very Dark Grayish Brown		B	Damp					<LOD	38	117	4	4	1				
SM71a	38	39	07/21/2015									Dark Brown		B	Damp					<LOD	38	145	4	5	1				
SM71a	39	40	07/21/2015					x				Dark Grayish Brown		B	Damp					<LOD	40	400	7	<LOD	4				
SM71a	40	41	07/21/2015					x				Dark Brown		B	Damp					<LOD	35	306	5	4	1				
SM71a	41	42	07/21/2015					x				Dark Grayish Brown		B	Damp					<LOD	36	170	4	4	1				
SM71a	42	43	07/21/2015					x				Dark Grayish Brown		B	Damp					<LOD	36	144	4	4	1				
SM71a	43	44	07/21/2015									Dark Grayish Brown		B	Damp					<LOD	36	99	3	6	1				
SM71a	44	45	07/21/2015					x				Very Dark Gray		B	Damp					<LOD	37	117	3	5	1				
SM71a	45	46	07/21/2015									Dark Grayish Brown		B	Damp					<LOD	37	125	4	3	1				
SM71a	46	47	07/21/2015									Dark Gray		B	Damp					<LOD	37	154	4	3	1				
SM71a	47	48	07/21/2015									Dark Grayish Brown		B	Damp					<LOD	36	115	3	4	1				
SM71a	48	49	07/21/2015									Dark Grayish Brown		B	Damp					<LOD	36	135	4	4	1				
SM71a	49	50	07/21/2015									Dark Grayish Brown		B	Damp					<LOD	38	114	4	7	1				
SM71a	50	51	07/21/2015									Very Dark Gray		B	Damp					<LOD	36	109	3	5	1				
SM71a	51	52	07/21/2015									Very Dark Gray		B	Damp					<LOD	36	88	3	5	1				
SM71a	52	53	07/21/2015									Black		B	Damp					<LOD	38	88	3	5	1				
SM71a	53	54	07/21/2015									Very Dark Gray		B	Damp					<LOD	35	97	3	5	1				
SM71a	54	55	07/21/2015									Black		B	Damp					<LOD	36	82	3	5	1				
SM71a	55	56	07/21/2015									Black		B	Damp					<LOD	36	101	3	6	1				
SM71a	56	57	07/21/2015									Dark Grayish Brown		B	Damp					<LOD	36	48	2	6	1				
SM71a	57	58	07/21/2015									Dark Gray		B	Damp					<LOD	35	46	2	4	1				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM71a	12	13	13	3	<LOD	37	6	1	62	6	6	2	2694	27	4	1	53	3	7	2	3	1	32	2
SM71a	13	14	21	5	<LOD	67	<LOD	8	58	13	19	4	3923	73	11	3	13	4	<LOD	11	<LOD	5	47	4
SM71a	14	15	19	3	<LOD	39	6	2	64	7	19	2	3050	31	7	1	30	3	7	2	<LOD	3	36	2
SM71a	15	16	24	4	<LOD	46	8	2	103	11	24	3	6270	73	15	2	37	4	<LOD	9	5	1	58	3
SM71a	16	17	10	3	<LOD	50	<LOD	6	53	9	8	2	3114	42	<LOD	6	32	3	<LOD	8	<LOD	4	32	2
SM71a	17	18	9	3	<LOD	38	6	2	48	6	8	2	2894	30	5	1	17	2	<LOD	6	<LOD	3	22	2
SM71a	18	19	13	3	<LOD	38	<LOD	4	47	6	20	2	2556	27	4	1	23	2	<LOD	6	<LOD	3	30	2
SM71a	19	20	16	3	<LOD	37	<LOD	4	53	6	6	2	3058	30	4	1	77	3	<LOD	6	<LOD	2	28	2
SM71a	20	21	23	3	<LOD	37	7	2	104	7	38	2	4099	39	13	2	36	3	14	2	4	1	59	2
SM71a	21	22	26	4	<LOD	41	8	2	178	12	32	3	8354	85	12	2	109	5	<LOD	10	<LOD	4	84	3
SM71a	22	23	11	3	<LOD	42	5	2	73	8	18	2	3309	37	9	2	41	3	<LOD	7	<LOD	3	39	2
SM71a	23	24	19	3	<LOD	37	7	2	68	6	21	2	2911	29	7	1	24	2	7	2	<LOD	3	39	2
SM71a	24	25	20	3	<LOD	38	8	2	66	7	11	2	3477	35	6	1	107	4	<LOD	6	<LOD	2	34	2
SM71a	25	26	16	3	<LOD	37	6	1	77	6	13	2	2947	29	6	1	29	2	<LOD	6	<LOD	3	36	2
SM71a	26	27	13	3	<LOD	39	7	2	107	9	13	2	4905	50	6	1	200	5	<LOD	8	<LOD	3	49	2
SM71a	27	28	23	3	<LOD	39	<LOD	5	86	7	16	2	3785	38	7	1	90	4	<LOD	7	<LOD	3	43	2
SM71a	28	29	11	2	<LOD	36	5	1	36	5	9	2	2065	21	<LOD	3	77	3	9	2	<LOD	3	22	2
SM71a	29	30	16	3	<LOD	36	7	1	43	5	6	2	2348	24	<LOD	3	146	4	9	2	<LOD	3	29	2
SM71a	30	31	<LOD	8	<LOD	37	9	2	69	7	7	2	3156	31	4	1	60	3	6	2	<LOD	3	35	2
SM71a	31	32	28	3	<LOD	38	9	2	105	8	28	2	3884	39	11	2	21	3	<LOD	7	<LOD	3	35	2
SM71a	32	33	15	3	<LOD	37	5	1	68	6	9	2	3006	29	5	1	123	4	7	2	<LOD	3	33	2
SM71a	33	34	12	3	<LOD	38	7	2	80	7	8	2	2983	30	<LOD	4	53	3	<LOD	6	<LOD	3	28	2
SM71a	34	35	17	3	<LOD	38	6	2	86	7	<LOD	5	3331	33	<LOD	4	56	3	<LOD	6	<LOD	3	35	2
SM71a	35	36	16	3	<LOD	37	9	2	89	7	12	2	3714	37	4	1	83	3	<LOD	7	<LOD	3	37	2
SM71a	36	37	17	3	<LOD	36	5	1	66	6	17	2	2604	26	10	1	26	2	<LOD	6	<LOD	2	29	2
SM71a	37	38	21	3	<LOD	38	7	2	103	7	22	2	3641	37	10	2	26	3	<LOD	7	3	1	40	2
SM71a	38	39	15	3	<LOD	38	<LOD	4	78	7	20	2	3308	34	5	1	49	3	<LOD	6	<LOD	3	36	2
SM71a	39	40	18	3	<LOD	41	<LOD	6	90	9	6	2	4719	50	<LOD	4	226	6	<LOD	8	<LOD	4	39	2
SM71a	40	41	9	2	<LOD	35	5	1	56	6	5	2	2499	24	<LOD	4	119	3	8	2	<LOD	3	31	2
SM71a	41	42	14	3	<LOD	36	<LOD	4	53	6	7	2	2451	24	<LOD	4	53	3	6	2	4	1	28	2
SM71a	42	43	16	3	<LOD	36	5	1	71	6	8	2	2655	26	<LOD	4	47	3	<LOD	6	<LOD	3	28	2
SM71a	43	44	16	3	<LOD	36	5	1	53	6	6	2	2748	27	4	1	22	2	8	2	<LOD	3	28	2
SM71a	44	45	23	3	<LOD	37	7	2	79	7	18	2	3152	31	10	1	36	3	8	2	<LOD	3	41	2
SM71a	45	46	19	3	<LOD	37	5	2	77	7	8	2	3758	37	5	1	51	3	7	2	<LOD	3	34	2
SM71a	46	47	13	3	<LOD	37	8	2	84	7	8	2	3306	33	5	1	48	3	<LOD	6	<LOD	3	26	2
SM71a	47	48	13	3	<LOD	36	9	2	82	6	6	2	2916	29	<LOD	4	40	3	<LOD	6	<LOD	3	22	2
SM71a	48	49	13	3	<LOD	37	7	2	72	6	8	2	2792	28	<LOD	4	44	3	<LOD	6	<LOD	3	28	2
SM71a	49	50	23	3	<LOD	38	6	2	101	7	20	2	3669	37	11	2	52	3	9	2	<LOD	3	41	2
SM71a	50	51	15	3	<LOD	36	<LOD	4	90	7	14	2	3375	33	7	1	65	3	8	2	<LOD	3	47	2
SM71a	51	52	22	3	<LOD	37	<LOD	4	82	7	19	2	3531	34	7	1	72	3	10	2	4	1	45	2
SM71a	52	53	16	3	<LOD	38	7	2	86	7	17	2	3015	31	6	1	115	4	7	2	<LOD	3	36	2
SM71a	53	54	16	3	<LOD	35	6	1	65	6	16	2	2607	26	9	1	34	2	10	2	3	1	42	2
SM71a	54	55	14	3	<LOD	36	7	1	64	6	16	2	2596	26	7	1	36	2	<LOD	6	3	1	43	2
SM71a	55	56	17	3	<LOD	36	6	1	79	6	29	2	2902	28	10	1	18	2	8	2	3	1	49	2
SM71a	56	57	15	3	<LOD	37	7	2	53	6	8	2	3051	30	<LOD	4	71	3	<LOD	6	<LOD	3	24	2
SM71a	57	58	12	2	<LOD	36	<LOD	4	51	6	6	2	2447	24	<LOD	4	29	2	<LOD	5	<LOD	3	25	2



Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis				XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)	Mercury Error (ppm)
																								<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
SM71a	58	59	07/21/2015									Very Dark Gray		B	Damp					<LOD	38	94	3	6	1				
SM71a	59	60	07/21/2015				x					Dark Grayish Brown		B	Damp					<LOD	37	72	3	5	1				
SM71a	60	61	07/21/2015								x	Dark Gray		B	Damp					<LOD	37	62	3	3	1				
SM71a	61	62	07/21/2015								x	Dark Gray		B	Damp					<LOD	36	52	2	5	1				
SM71a	62	63	07/21/2015								x	Very Dark Gray		B	Damp					<LOD	36	92	3	7	1				
SM71a	63	64	07/21/2015									Black		B	Damp					<LOD	38	90	3	4	1				
SM71a	64	65	07/21/2015									Black		B	Moist					<LOD	40	96	3	<LOD	3				
SM71a	65	66	07/21/2015									Black		B	Moist					<LOD	39	104	3	5	1				
SM71a	66	67	07/21/2015									Dark Gray		B	Damp					<LOD	36	117	3	3	1				
SM71a	67	68	07/21/2015									Very Dark Gray		B	Damp					<LOD	38	71	3	3	1				
SM71a	68	69	07/21/2015									Very Dark Gray		B	Damp					<LOD	37	82	3	3	1				
SM71a	69	70	07/21/2015									Very Dark Gray		B	Damp					<LOD	37	63	3	5	1				
SM71a	70	71	07/21/2015									Very Dark Gray		B	Damp					<LOD	37	53	2	<LOD	3				
SM71a	71	72	07/21/2015								x	Dark Gray		B	Damp					<LOD	39	54	3	3	1				
SM71a	72	73	07/21/2015								x	Dark Gray		B	Damp					<LOD	37	69	3	<LOD	3				
SM71a	73	74	07/21/2015								x	Dark Gray		B	Damp					<LOD	37	68	3	<LOD	3				
SM71a	74	75	07/21/2015								x	Black		B	Damp					<LOD	38	113	4	6	1				
SM71a	75	76	07/21/2015								x	Black		B	Damp					<LOD	38	99	3	8	1				
SM71a	76	77	07/21/2015								x	Black		B	Damp					<LOD	38	133	4	8	1				
SM71a	77	78	07/21/2015									Black		B	Damp					<LOD	39	129	4	6	1				
SM71a	78	79	07/21/2015									Black		B	Damp					<LOD	40	94	3	9	1				
SM71a	79	80	07/21/2015								x	Very Dark Gray		B	Damp					<LOD	38	51	2	<LOD	3				
SM71a	80	81	07/21/2015									Very Dark Gray		B	Damp					<LOD	38	59	3	5	1				
SM71a	81	82	07/21/2015									Very Dark Gray		B	Damp					<LOD	39	59	3	<LOD	3				
SM71a	82	83	07/21/2015								x	Very Dark Gray		B	Damp					<LOD	37	52	2	3	1				
SM71a	83	84	07/21/2015									Very Dark Gray		B	Damp					<LOD	37	74	3	5	1				
SM71a	84	85	07/21/2015									Very Dark Gray		B	Damp					<LOD	38	78	3	4	1				
SM71a	85	86	07/21/2015									Black		B	Damp					<LOD	38	80	3	5	1				
SM71a	86	87	07/21/2015									Black		B	Damp					<LOD	40	84	3	5	1				
SM71a	87	88	07/21/2015									Very Dark Gray		B	Damp					<LOD	44	62	3	5	1				
SM71a	88	89	07/21/2015									Very Dark Gray		B	Damp					<LOD	36	113	3	3	1				
SM71a	89	90	07/21/2015	0									NR	B															
SM71a	90	91	07/21/2015									Very Dark Gray		B	Moist														
SM71a	91	92	07/21/2015									Very Dark Gray		B	Moist					<LOD	37	87	3	4	1				
SM71a	92	93	07/21/2015									Very Dark Gray		B	Moist					<LOD	42	106	4	5	1				
SM71a	93	94	07/21/2015									Very Dark Gray		B	Moist					<LOD	54	100	5	6	2				
SM71a	94	95	07/21/2015									Very Dark Gray		B	Wet					<LOD	39	129	4	5	1				
SM71a	95	96	07/21/2015								x	Black		B	Wet					<LOD	39	180	4	4	1				
SM71a	96	97	07/21/2015								x	Very Dark Gray		B	Wet					<LOD	39	107	3	8	1				
SM71a	97	98	07/21/2015									Very Dark Gray		B	Wet					<LOD	32	69	3	<LOD	2				
SM71a	98	99	07/21/2015									Black		B	Wet					<LOD	35	139	4	7	1				
See borehole SM71a interval 0-100 ft.																													
SM71b	100	101	07/29/2015									Black		B	Wet	MW43	98 - 118			<LOD	46	86	4	<LOD	4				
SM71b	102	103	07/29/2015									Dark Gray		B	Wet	MW43	98 - 118			<LOD	62	55	4	<LOD	5				
SM71b	103	104	07/29/2015									Dark Gray		B	Wet	MW43	98 - 118			<LOD	45	125	4	4	1				

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM71a	58	59	16	3	<LOD	38	6	2	91	8	18	2	5121	50	10	2	89	4	16	3	<LOD	3	42	2
SM71a	59	60	15	3	<LOD	37	<LOD	4	74	7	<LOD	5	3060	31	<LOD	4	50	3	7	2	4	1	31	2
SM71a	60	61	13	3	<LOD	37	<LOD	4	44	6	6	2	2435	25	<LOD	4	46	3	6	2	<LOD	3	25	2
SM71a	61	62	10	3	<LOD	36	9	1	65	6	7	2	2828	28	<LOD	4	35	2	<LOD	6	<LOD	2	27	2
SM71a	62	63	16	3	<LOD	37	8	2	86	7	18	2	3341	33	9	1	27	2	10	2	<LOD	3	41	2
SM71a	63	64	17	3	<LOD	39	7	2	87	7	19	2	3703	37	7	1	40	3	<LOD	7	<LOD	3	45	2
SM71a	64	65	18	3	<LOD	40	<LOD	5	74	7	16	2	3133	33	<LOD	4	40	3	<LOD	6	<LOD	3	36	2
SM71a	65	66	17	3	<LOD	39	<LOD	5	59	6	22	2	2707	29	6	1	34	3	9	2	<LOD	3	40	2
SM71a	66	67	18	3	<LOD	36	<LOD	4	46	5	13	2	2075	21	5	1	20	2	9	2	<LOD	3	29	2
SM71a	67	68	18	3	<LOD	38	<LOD	4	62	6	11	2	2535	26	5	1	39	3	9	2	<LOD	2	31	2
SM71a	68	69	11	3	<LOD	37	5	1	65	6	<LOD	5	2578	26	<LOD	4	36	2	<LOD	6	<LOD	2	31	2
SM71a	69	70	14	3	<LOD	37	6	1	58	6	8	2	2719	28	<LOD	4	45	3	8	2	<LOD	3	30	2
SM71a	70	71	17	3	<LOD	37	<LOD	4	56	6	<LOD	5	2697	27	<LOD	4	40	3	<LOD	6	<LOD	3	26	2
SM71a	71	72	12	3	<LOD	39	6	2	59	6	9	2	2706	29	5	1	50	3	<LOD	6	<LOD	3	27	2
SM71a	72	73	11	3	<LOD	37	5	1	53	6	8	2	2861	29	<LOD	4	50	3	<LOD	6	<LOD	3	27	2
SM71a	73	74	10	3	<LOD	37	5	1	47	6	5	2	2788	28	4	1	45	3	<LOD	6	<LOD	3	23	2
SM71a	74	75	18	3	<LOD	38	<LOD	5	74	7	19	2	3701	37	11	2	101	4	7	2	<LOD	3	47	2
SM71a	75	76	21	3	<LOD	38	5	2	118	8	24	2	4458	44	7	1	88	4	<LOD	7	<LOD	3	49	2
SM71a	76	77	28	3	<LOD	39	6	2	92	8	30	2	4091	41	10	2	73	3	17	3	4	1	54	2
SM71a	77	78	15	3	<LOD	39	<LOD	5	76	7	14	2	3567	37	12	2	68	3	10	2	<LOD	3	64	3
SM71a	78	79	21	3	<LOD	40	5	2	100	8	25	2	4519	46	11	2	72	4	<LOD	7	<LOD	3	125	4
SM71a	79	80	12	3	<LOD	38	5	1	65	6	8	2	2982	30	4	1	53	3	<LOD	6	<LOD	3	31	2
SM71a	80	81	18	3	<LOD	38	<LOD	4	58	6	8	2	2700	28	<LOD	4	49	3	8	2	<LOD	3	30	2
SM71a	81	82	14	3	<LOD	39	<LOD	5	100	9	7	2	5574	54	<LOD	4	130	4	<LOD	8	4	1	21	2
SM71a	82	83	14	3	<LOD	37	<LOD	4	70	6	8	2	2951	30	<LOD	4	48	3	<LOD	6	<LOD	3	26	2
SM71a	83	84	23	3	<LOD	38	7	2	79	7	11	2	3120	31	5	1	34	3	8	2	<LOD	3	32	2
SM71a	84	85	12	3	<LOD	38	6	2	72	7	12	2	3035	31	<LOD	4	37	3	<LOD	6	<LOD	3	36	2
SM71a	85	86	19	3	<LOD	39	6	2	77	7	16	2	3308	34	5	1	45	3	<LOD	7	<LOD	3	43	2
SM71a	86	87	16	3	<LOD	40	6	2	88	8	26	2	4183	44	7	2	63	3	<LOD	7	<LOD	3	50	2
SM71a	87	88	22	3	<LOD	44	<LOD	5	78	9	20	2	4252	48	<LOD	5	65	4	<LOD	8	<LOD	3	38	2
SM71a	88	89	11	2	<LOD	36	5	1	41	6	6	2	2538	25	<LOD	4	43	3	<LOD	5	<LOD	3	30	2
SM71a	89	90																						
SM71a	90	91																						
SM71a	91	92	13	3	<LOD	37	4	1	55	6	<LOD	5	2562	26	<LOD	3	35	2	<LOD	6	<LOD	3	28	2
SM71a	92	93	15	3	<LOD	41	8	2	91	8	7	2	4266	46	<LOD	4	74	4	<LOD	7	<LOD	3	24	2
SM71a	93	94	17	4	<LOD	55	<LOD	6	64	9	12	3	2972	44	9	2	30	4	<LOD	8	<LOD	4	40	3
SM71a	94	95	15	3	<LOD	39	7	2	71	7	10	2	3105	32	<LOD	4	38	3	<LOD	6	<LOD	3	24	2
SM71a	95	96	15	3	<LOD	39	5	2	71	7	9	2	2998	31	6	1	39	3	<LOD	6	<LOD	3	46	2
SM71a	96	97	18	3	<LOD	39	6	2	74	7	14	2	3310	34	<LOD	4	42	3	<LOD	6	<LOD	3	34	2
SM71a	97	98	10	2	<LOD	33	<LOD	3	58	4	8	2	1333	14	12	1	11	2	<LOD	5	<LOD	2	35	2
SM71a	98	99	14	2	<LOD	35	<LOD	4	62	6	15	2	2490	24	5	1	33	2	10	2	<LOD	3	36	2
See borehole SM71a interval 0-100 ft.																								
SM71b	100	101	14	3	<LOD	47	6	2	75	8	16	2	2760	35	6	2	46	3	<LOD	7	<LOD	3	39	2
SM71b	102	103	<LOD	12	<LOD	63	<LOD	6	67	10	<LOD	9	2721	47	<LOD	7	40	4	<LOD	9	<LOD	5	27	3
SM71b	103	104	13	3	<LOD	45	<LOD	5	57	7	13	2	2464	31	<LOD	5	30	3	<LOD	7	<LOD	3	28	2

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		Date	Split Spoon % Recovery	Mineralogical/Lithological Observations								Soil Color	USCS Symbol	Soil Type	Moisture observed in Soil Sample or Rock Cuttings	Monitoring Well ID	Monitoring Well Screened Interval (feet bgs)	Laboratory Analysis			XRF	XRF	XRF	XRF	XRF	XRF	
	Top	Bottom			Red Porous Rock	Vitrious Slag	Red Rind	Realgar	Orpiment	Stibnite	Elemental Hg	Cinnabar							White Vein	Sample ID	Antimony 6020A (mg/kg)	Arsenic 6020A (mg/kg)	Mercury 7471A (mg/kg)	Antimony (ppm)	Antimony Error (ppm)	Arsenic (ppm)	As Error (ppm)	Mercury (ppm)
SM71b	104	105	07/29/2015										Dark Gray		B	Wet	MW43	98 - 118					<LOD	47	182	5	<LOD	4
SM71b	105	106	07/29/2015								x		Dark Gray		B	Wet	MW43	98 - 118					<LOD	49	185	6	5	1
SM71b	106	107	07/29/2015								x		Dark Gray		B	Wet	MW43	98 - 118					<LOD	50	225	6	<LOD	4
SM71b	107	108	07/29/2015								x		Dark Gray		B	Wet	MW43	98 - 118					<LOD	48	248	7	<LOD	4
SM71b	108	109	07/29/2015								x		Dark Gray		B	Wet	MW43	98 - 118					<LOD	49	475	9	<LOD	5
SM71b	109	110	07/29/2015								x		Dark Gray		B	Wet	MW43	98 - 118					<LOD	49	1285	19	7	2
SM71b	110	111	07/29/2015								x		dark gray and white		B	Wet	MW43	98 - 118					<LOD	47	803	13	6	2
SM71b	111	112	07/29/2015								x		Dark Gray		B	Wet	MW43	98 - 118					<LOD	48	4026	51	<LOD	10
SM71b	112	113	07/29/2015								x		Dark Gray		B	Wet	MW43	98 - 118					<LOD	48	2880	36	11	3
SM71b	113	114	07/29/2015										Black		B	Moist	MW43	98 - 118					61	16	1150	18	7	2
SM71b	114	115	07/29/2015								x		Dark Gray		B	Wet	MW43	98 - 118					51	16	3397	44	<LOD	9
SM71b	115	116	07/29/2015								x		Gray		B	Wet	MW43	98 - 118					<LOD	52	6954	94	<LOD	13
SM71b	116	117	07/29/2015								x		Gray		B	Wet	MW43	98 - 118					<LOD	47	916	14	7	2
SM71b	117	118	07/29/2015										Dark Gray		B	Wet	MW43	98 - 118					<LOD	42	431	8	6	1
SM71b	118	119	07/29/2015										Dark Gray		B	Wet	MW43	98 - 118					<LOD	48	478	10	<LOD	5
SM71b	119	120	07/29/2015								x		Black		B	Wet							<LOD	47	363	8	5	1
SM71b	120	121	07/29/2015										Black		B	Wet							<LOD	49	212	6	6	1

Appendix A

Soil Boring ID	Sample Depth Interval (feet)		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF		
	Top	Bottom	Barium (ppm)	Barium Error (ppm)	Cadmium (ppm)	Cadmium Error (ppm)	Chromium (ppm)	Chromium Error (ppm)	Cobalt (ppm)	Cobalt Error (ppm)	Copper (ppm)	Copper Error (ppm)	Iron (ppm)	Iron Error (ppm)	Lead (ppm)	Lead Error (ppm)	Manganese (ppm)	Manganese Error (ppm)	Nickel (ppm)	Nickel Error (ppm)	Selenium (ppm)	Selenium Error (ppm)	Zinc (ppm)	Zinc Error (ppm)
SM71b	104	105	14	3	<LOD	47	<LOD	5	70	8	14	2	2520	33	7	2	42	3	<LOD	7	<LOD	4	33	2
SM71b	105	106	13	3	<LOD	50	7	2	79	9	18	3	3030	40	<LOD	5	34	3	12	3	<LOD	4	39	3
SM71b	106	107	11	4	<LOD	50	<LOD	6	84	10	12	3	4231	55	<LOD	5	82	5	<LOD	9	<LOD	4	24	2
SM71b	107	108	17	4	<LOD	49	<LOD	6	76	9	14	3	3728	48	9	2	53	4	<LOD	9	<LOD	4	30	2
SM71b	108	109	<LOD	10	<LOD	49	6	2	87	8	12	2	2770	36	<LOD	5	29	3	<LOD	8	<LOD	4	36	3
SM71b	109	110	13	3	<LOD	49	<LOD	6	46	8	<LOD	7	2502	34	<LOD	5	28	3	<LOD	7	<LOD	5	31	2
SM71b	110	111	10	3	<LOD	47	<LOD	5	47	7	10	2	2000	27	<LOD	5	42	3	<LOD	7	<LOD	5	32	2
SM71b	111	112	<LOD	11	<LOD	49	<LOD	6	65	9	<LOD	8	3822	49	<LOD	5	67	4	<LOD	9	<LOD	8	28	2
SM71b	112	113	11	3	<LOD	47	<LOD	5	55	7	9	2	1993	27	<LOD	5	31	3	<LOD	7	<LOD	7	20	2
SM71b	113	114	19	4	<LOD	48	9	2	79	8	20	3	2749	36	<LOD	6	33	3	<LOD	8	<LOD	5	36	3
SM71b	114	115	15	4	<LOD	49	<LOD	6	101	9	16	3	3640	47	<LOD	6	63	4	<LOD	9	<LOD	8	56	3
SM71b	115	116	<LOD	12	<LOD	53	<LOD	7	130	14	<LOD	9	6731	91	<LOD	6	159	7	<LOD	11	<LOD	11	24	3
SM71b	116	117	17	3	<LOD	47	<LOD	6	88	8	18	3	3260	41	<LOD	5	62	4	<LOD	8	<LOD	5	38	2
SM71b	117	118	15	3	<LOD	43	<LOD	5	92	8	19	2	3308	38	<LOD	5	47	3	<LOD	7	<LOD	4	34	2
SM71b	118	119	14	4	<LOD	49	<LOD	6	88	9	19	3	3016	40	<LOD	5	24	3	<LOD	8	<LOD	4	38	3
SM71b	119	120	22	3	<LOD	47	<LOD	5	72	7	19	3	2416	31	6	2	32	3	<LOD	7	<LOD	4	37	2
SM71b	120	121	<LOD	10	<LOD	49	6	2	83	9	17	3	3092	40	<LOD	5	28	3	<LOD	8	<LOD	4	39	3

**Key**

<LOD = Less than level of detection  
bgs = Below ground surface  
ND = Not detected  
NR = Not reported  
ppm = Parts per million  
XRF = X-ray fluorescence spectroscopy

**RI Soil Type Descriptions**

B = Bedrock of the Kuskokwim Group.  
DN (KG and Loess) = Disturbed native soil that comprises a mixture of soil derived from Kuskokwim group bedrock and glacially-derived windblown silt and very fine sand.  
DN (KG) = Disturbed native soil that is derived from Kuskokwim Group bedrock and contains clasts of the same.  
DN (KG, MZ) = Disturbed native soil that is derived from mineralized Kuskokwim group bedrock.  
DN (loess) = Glacially derived windblown silt and very fine sand that has been disturbed by anthropogenic activity.  
DN = Native unconsolidated soil that do not appear to have been disturbed by anthropogenic activity.  
N (KG) = Native soil that is derived from Kuskokwim group bedrock and contains clasts of the same.  
N (KG, MZ) = Native soil that is derived from mineralized Kuskokwim group bedrock and contains clasts of the same.  
N (loess) = Glacially-derived windblown silt and very fine sand that is undisturbed by anthropogenic activity.  
N = Native unconsolidated soils not otherwise specified that are undisturbed by anthropogenic activity.  
N or DN (KG, MZ) = Native soil that may or may not have been disturbed that is derived from mineralized Kuskokwim Group bedrock.  
N or DN = Native soil not otherwise specified that may or may not have been disturbed.  
T/WR = Mine waste that includes tailings (thermally processed or) and/or waste rock. May also contain vitreous material and furnace dusts.  
WB = Weathered bedrock of the Kuskokwim Group.  
WR = Waste rock.

# B

## Data Review Memoranda

Please note: this appendix is not fully accessible. If you need assistance with this appendix, please contact the BLM Alaska Public Information Center 907-271-5960, [BLM\\_AK\\_AKSO\\_Public\\_Room@blm.gov](mailto:BLM_AK_AKSO_Public_Room@blm.gov).



*This page intentionally left blank.*



## DATA REVIEW MEMORANDUM

**DATE:** March 9, 2016  
**TO:** Mark Longtine, Project Manager, E & E, Seattle, WA  
**FROM:** Steven Elliott, E & E, Pensacola, FL  
**SUBJ:** Data Review: Red Devil Mine

**REFERENCE:**

Project ID	Lab Work Order	Lab
1001095.0002.03 Task 3 - GW/SW Monitoring Spring 2015	J51184-1	TestAmerica – Seattle (Mercury subcontracted to Brooks Rand Labs – Seattle)

### 1. SAMPLE IDENTIFICATION

For the sampling activities at Red Devil Mine, Ecology and Environment, Inc. (E & E) collected the samples listed in Table 1. Project-specific matrix spike/matrix spike duplicates (MS/MSD) were designated in the field; the laboratory also identified batch MS/MSD's as batch quality control (QC) for additional analytical testing. All samples were sent to TestAmerica's labs in Seattle, WA for analysis; select mercury analyses were forwarded to Brooks Rand Labs in Seattle Washington. All tables are included at the end of this memorandum.

Data were reviewed for field and laboratory precision, accuracy, and completeness in accordance with procedures and QC limits, the current laboratory Quality Assurance Manual (QAM), and current standard operating procedures (SOPs).

Laboratory data qualifiers for compound identification and quantitation were accepted. Any additional data review qualifiers added are noted below and listed on the tables at the end of this memorandum. Definitions of all data qualifiers are given in the report.

**Work Orders, Tests and Number of Samples included in this Data Review Memo**

<b>Work Orders</b>	<b>Matrix</b>	<b>Test Method</b>	<b>Method Name</b>	<b>Number of Samples</b>
J51184-1	SW	SM 2540C	TDS	9
J51184-1	GW & SW	SM 2540D	TSS	23
J51184-1	GW & SW	SM 2320B	Alkalinity	25
J51184-1	SW	EPA 9060	TOC	9
J51184-1	GW & SW	EPA 300.0	Anions	25
J51184-1	GW & SW	EPA 353.2	Nitrate/Nitrite	25
J51184-1	SW	EPA 6010B/3005A	Dissolved Metals (ICP_Fld Fltr)	9
J51184-1	GW & SW	EPA 6010B/3005A	Total Metals (ICP)	25
J51184-1	SW	EPA 6020A/3005A	Dissolved Metals (ICP/MS_Fld Fltr)	9
J51184-1	GW & SW	EPA 6020A/3005A	Total Metals (ICP/MS)	25
J51184-1	SW	EPA 7470A	Mercury (Dissolved)	24
J51184-1	GW & SW	EPA 7470A	Mercury (Total)	29
J51184-1	GW & SW	EPA 1631	Mercury (Low Level)	29
J51184-1	GW	EPA 8260C/5030B	VOC	4
J51184-1	GW	EPA 8270D/3520C	SVOC	4
J51184-1	GW	ADEC AK101	AK -GRO	4
J51184-1	GW	ADEC AK102&103	AK – DRO & RRO	4

**2. SAMPLE PROCEDURES**

All samples were collected as specified in the work plan and documented on the chain-of-custody (COC) and in field notebooks. Samples were analyzed as specified on the COC. Samples were packaged, shipped and received as specified in the work plan. All samples must be received cold (4 ±2 degrees Celsius [°C ]) and in good condition as documented on the Cooler Receipt Form. These results are presented in Table 2 (if applicable).

**REVIEW RESULTS**

All sample procedures were followed and the sample coolers were received at 2.4 to 5.8 °C. No problems with the condition of the sample upon receipt are documented.

### **3. LABORATORY DATA**

#### **3.1 HOLDING TIMES**

Holding times are established and monitored to ensure analytical results accurately represent analyte concentrations in a sample at the time of collection. These results are presented in Table 2 (if applicable). Exceeding the holding time for a sample generally results in a loss of the analyte due to a variety of mechanisms, such as deposition on the sample container walls or precipitation.

#### **REVIEW RESULTS**

All samples were analyzed within the project and method specified holding times for all analytes except for several samples for TDS, TSS, and SVOCs. The associated detected TDS and TSS results were qualified as estimated (J) and the non-detected results were qualified as estimated (UJ). The SVOC samples run outside of holding time were a reanalysis and were not used for final reporting so no qualification was necessary.

#### **3.2 BLANKS**

Laboratory and field blank samples are analyzed and evaluated to determine the existence and magnitude of possible contamination during the sampling and analysis process. These results are presented in Table 3 (if applicable). If the analyte is present in the sample at similar trace levels (less than 5 times the blank concentration), then the analyte is likely a common background contaminant from some phase of the sampling, extraction, or analytical procedure and associated low level sample concentrations are not considered to be site related. Sample results in these cases are qualified as not detected (U).

#### **REVIEW RESULTS**

All blanks were performed at the required frequency. It should be noted the field blank was collected on a day where no samples were collected but were applied to all samples collected for the event. The rinsate blank collected was applied to all samples collected with a submersible pump and associated materials.

As noted in Table 3a, analyte concentrations in the method blanks are below the practical quantitation limit (PQL). Calcium and barium were detected in method blanks however all associated sample results were greater than 5 times the blank result so qualification was not necessary (Table 3b).

Mercury was detected in a field blank at a concentration above the reporting limit resulting in two samples being qualified as not detected. Copper, chromium, manganese, TSS, and sulfate were detected in the rinsate blank at concentrations above the PQL (multiple other analytes were detected at concentrations between the PQL and MDL). Associated sample results above the PQL but less than 5 times the blank concentration have been qualified as not detected. A summary of samples qualified due to field blank contamination are presented in Table 3c.

### **3.3 SURROGATE SPIKE RECOVERY**

Laboratory performance for individual samples analyzed for organic compounds is established by means of surrogate spiking activities. Samples are spiked with surrogate compounds prior to preparation and analysis. Unusually low or high surrogate recovery values may indicate some deficiency in the analytical system or that some matrix effects exist, resulting in low or high sample results for target compounds. Sample surrogate recoveries outside QC limits (if applicable) are presented in Table 4.

### **REVIEW RESULTS**

Not applicable for these analyses.

### **3.4 MATRIX SPIKE AND MATRIX SPIKE DUPLICATE ANALYSIS**

The MS/MSD analyses are intended to provide information about the effects that the sample matrix exerts on the digestion/extraction and measurement methodology. MS recovery values that do not meet laboratory QC criteria may indicate that sample analyte results are being attenuated in the analysis procedure. These results are presented in Table 5 (if applicable). The potential sample bias may be estimated by noting the degree to which the MS concentration was elevated or lowered in the spike analysis. However, this estimated bias should serve only as an approximation; sample-specific problems may be the cause of the discrepancy, particularly in soil samples. Recoveries of a post-digestion spike or a laboratory control sample (LCS) are used to verify that the analytical

methodology is acceptable and that MS recoveries are due to matrix effects. An MSD analysis is performed to evaluate the precision of the sample results. Precision is measured as the relative percent difference (RPD) between analytical results for duplicate samples. The laboratory's failure to produce similar results for MSD samples may indicate that the samples were non-homogeneous (particularly in soil samples), or that method defects may exist in the laboratory's techniques.

## **REVIEW RESULTS**

The MS/MSD sample analyses were performed on sample 0615MW19GW and 0615RD10SW at the required frequency. MS/MSD recoveries were within the control limits generated by the laboratory with the following exceptions:

- The MS and/or MSD recoveries of several SVOC analytes and diesel-range organics (DRO) in sample 0615MW19GW were below laboratory limits while the associated sample results were reported as not detected.
- The parent sample results have been qualified as estimated not detected with a low bias, "UJ-" (Table 5).
- Several other analytes were detected above the lab limits; however, since the recoveries were high and the bias is low, no qualification was necessary.

### **3.5 LABORATORY CONTROL SAMPLE ANALYSIS**

The LCS is analyzed to monitor the efficiency of the digestion/extraction procedure and analytical instrument operation. The ability of the laboratory to successfully analyze an LCS demonstrates that there are no analytical problems related to the digestion/sample preparation procedures and/or instrument operations. The LCS results outside QC limits are presented in Table 6 (if applicable). Sporadic and marginal QC failures for multiple component methods do not indicate an analytical concern. If recoveries are high and the compounds are not detected in the samples, then no data qualification is required. All recoveries should be above 10% or the non-detect results flagged "UR" as rejected.

## **REVIEW RESULTS**

All LCS analyses were within control limits and performed at the required frequency with the following exceptions:

- LCS 580-193674 had high recoveries for several analytes; however, the associated samples were all reported as not detected and since the bias is high, no qualification was necessary.
- The same LCS had low recoveries of 2,4-dinitrophenol, 3,3-dichlorobenzidine, 4-chloroaniline, and hexachlorocyclopentadiene; recoveries for 4-chloroaniline and hexachlorocyclopentadiene were less than 10%.
- All associated sample results for 2,4-dinitrophenol and 3,3-dichlorobenzidine were reported as not detected and have been qualified as estimated not detected, "UJ", in samples 0615MW19GW, 0615MW22GW, 0615MW50GW, and 0615MW54GW.
- All associated sample results for 4-chloroaniline and hexachlorocyclopentadiene were reported as not detected and have been qualified as rejected not detected, "UR", in the same samples.

### **3.6 COMPOUND IDENTIFICATION AND QUANTITATION**

Compound identities are assigned by comparing sample compound retention times to retention times from known (standard) compounds and identification of an acceptable mass spectrum. Compounds detected below the PQL in samples should be considered estimated and are qualified "J."

### **REVIEW RESULTS**

All compound identification and quantitation criteria were achieved.

As noted in Table 7, several samples were reanalyzed due to LCS issues with several analytes. However, the samples were reanalyzed outside of holding time and as a result, all analytes in those runs are qualified as estimated. The original results, run within holding time, have been used for final reporting purposes.

### **4. FIELD DUPLICATE SAMPLE RESULTS**

Field duplicate samples were collected and analyzed as an indication of overall precision for both field and laboratory. Field duplicate results are summarized in Table 8 (if applicable). The results are expected to have more variability than laboratory duplicates, which measure only laboratory precision. It is expected also that soil field duplicates will exhibit greater variance than water field duplicates due to the difficulties associated with



collecting identical field samples. The QC criteria used to assess field duplicate samples for this project was limits of 70% RPD for soils and 40% RPD for waters, or twice the general laboratory duplicate criteria. If a given compound in both the regular sample and associated field duplicate sample was below the laboratory PQL, or the compound was not detected in one of the samples, then the compound is generally not qualified due to field duplicate precision.

## **REVIEW RESULTS**

Two field duplicate analyses were performed on this SDG. The RPD ratings are listed on Tables 8a and 8b as “Good” if the RPD is less than field duplicate QC criteria of 40% and as “Poor” if the RPD exceeded the field duplicate QC criteria.

All the results show good precision in the sample pair as noted on Table 8b with the exception of manganese in samples 0615MW19GW and 0615MW51GW. Manganese has been qualified as estimated, “J”, in these samples.

## **5. OVERALL ASSESSMENT OF DATA**

All data were reviewed and considered usable with qualification as noted in this report with the exceptions of the associated sample results for 4-chloroaniline and hexachlorocyclopentadiene (reported as not detected in associated samples) which have been qualified as rejected not detected, “UR”, in the associated batch samples, due to low LCS recoveries.

TSS was not collected for sample 0615MW51GW (field duplicate of 0615MW19GW) due to a field sampling error.

Several samples were reanalyzed outside of the holding time for SVOCs due to an LCS error. However, the original sample result is used for final reporting as fewer analytes were qualified. The reanalysis results can be used for supporting data.

**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analyses
J51184-1	Water	0615MW01GW	580-51184-1	6/19/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW06GW	580-51184-2	6/20/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW08GW	580-51184-3	6/20/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW10GW	580-51184-4	6/20/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW19GW	580-51184-5	6/23/2015	MS/MSD	8260, 8270, AK101, AK102&1036010B, 6020A(T), 7470A(T) 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW22GW	580-51184-6	6/23/2015	FD1	8260, 8270, AK101, AK102&1036010B, 6020A(T), 7470A(T) 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW26GW	580-51184-7	6/22/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW27GW	580-51184-8	6/21/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW28GW	580-51184-9	6/22/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW29GW	580-51184-10	6/23/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW31GW	580-51184-11	6/22/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW32GW	580-51184-12	6/21/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW33GW	580-51184-13	6/21/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW50GW	580-51184-14	6/23/2015	FD1	8260, 8270, AK101, AK102&1036010B(T), 6020A(T), 7470A(T) 2320B, 2540D, 300, 353.2, 1631(T&D)
J51184-1	Water	0615MW51GW	580-51184-15	6/23/2015		6010B(T), 6020A(T), 7470A(T), 2320B, 2540D, 300, 353.2, 1631(T&D)

**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analyses
J51184-1	Water	0615RD05SW	580-51184-17	6/18/2015		6010B(T&D),6020A (T&D), 7470A (T&D) 2320B, 2540C, 2540D, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD06SW	580-51184-18	6/17/2015		6010B(T&D),6020A (T&D), 7470A (T&D) 2320B, 2540C, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD08SW	580-51184-19	6/17/2015		6010B(T&D),6020A (T&D), 7470A (T&D) 2320B, 2540C, 2540D, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD09SW	580-51184-20	6/18/2015		6010B(T&D),6020A (T&D), 7470A (T&D) 2320B, 2540C, 2540D, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD10SW	580-51184-21	6/18/2015	MS/MSD	6010B(T&D), 6020A (T&D), 7470A (T&D) 2320B, 2540C, 2540D, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD14SW	580-51184-22	6/18/2015		6010B(T&D),6020A (T&D), 7470A (T&D) 2320B, 2540C, 2540D, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD15SW	580-51184-23	6/18/2015		6010B(T&D),6020A (T&D), 7470A (T&D) 2320B, 2540C, 2540D , 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD16SW	580-51184-24	6/18/2015		6010B(T&D),6020A (T&D), 7470A (T&D) 2320B, 2540C, 2540D, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD50SW	580-51184-25	6/18/2015		6010B(T&D),6020A (T&D), 7470A (T&D) 2320B, 2540C, 2540D, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	0615RD51SW	580-51184-26	6/24/2015	Ambient Blank	1631(T)
J51184-1	Water	0615MW52GW	580-51184-28	6/24/2015	Ambient Blank	1631(T)
J51184-1	Water	0615MW53GW	580-51184-16	6/24/2015	Ambient Blank	1631(T)
J51184-1	Water	0615MW54GW	580-51184-29	6/24/2015	Rinsate Blank: submersible pump*	8260, 8270, AK101, AK102&103, 6010B(T), 6020A(T) 7470A(T), 2320B, 2540D, 300, 353.2, 9060, 1631(T&D)
J51184-1	Water	LL Trip Blank	580-51184-27	6/25/2015	Trip Blank	1631(T)

NOTE: EPA 1631 performed by Brooks Rand Labs

\*applicable to 0615MW01GW, 0615MW10GW, 0615MW26GW, 0615MW27GW, 0615MW28GW, 0615MW29GW, 0615MW31GW

**Table 2 - List of Samples Qualified for Holding Time Exceedance**

Method	Analyte	Sample IDs	HT	Sampling Date	Analysis Date	Qual
SM 2540D	TSS	0615MW01GW	7 days	6/19/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615MW06GW	7 days	6/20/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615MW08GW	7 days	6/20/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615MW10GW	7 days	6/20/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615MW27GW	7 days	6/21/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615MW32GW	7 days	6/21/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615MW33GW	7 days	6/21/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615RD05SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615RD06SW	7 days	6/17/2015	6/30/2015	J/UJ
SM 2540D	TSS	0615RD08SW	7 days	6/17/2015	6/30/2015	J/UJ
SM 2540D	TSS	0615RD09SW	7 days	6/18/2015	6/30/2015	J/UJ
SM 2540D	TSS	0615RD10SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615RD14SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615RD15SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615RD16SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540D	TSS	0615RD50SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540C	TDS	0615RD05SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540C	TDS	0615RD06SW	7 days	6/17/2015	6/30/2015	J/UJ
SM 2540C	TDS	0615RD08SW	7 days	6/17/2015	6/30/2015	J/UJ
SM 2540C	TDS	0615RD09SW	7 days	6/18/2015	6/30/2015	J/UJ
SM 2540C	TDS	0615RD10SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540C	TDS	0615RD14SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540C	TDS	0615RD15SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540C	TDS	0615RD16SW	7 days	6/18/2015	6/29/2015	J/UJ
SM 2540C	TDS	0615RD50SW	7 days	6/18/2015	6/29/2015	J/UJ

**Table 3a - List of Positive Results for Blank Samples**

Method	Sample ID	Sample Type	Analyte	Result	Qual	Anal Type	Units	PQL
EPA 8270D	MB 580-193674	Water	Diethyl Phthalate	0.220	J	MB	ug/L	0.40
EPA 8270D	MB 580-195222	Water	Diethyl Phthalate	0.441	J	MB	ug/L	0.40
EPA 6010C	MB 580-194099	Water	Calcium	0.024	J	MB	mg/L	1.1
EPA 6010C	MB 580-194493	Water	Calcium	0.054	J	MB	mg/L	1.1
EPA 6020A (Total)	MB 580-194060	Water	Barium	0.0008	J	MB	mg/L	0.0012
EPA 6020A (Total)	MB 580-194060	Water	Manganese	0.0005	J	MB	mg/L	0.0020
EPA 1631	0615MW53GW	Water	Mercury	0.44		Ambient	ng/L	0.40
EPA 8270D	0615MW54GW	Water	Benzoic Acid	1.0	J	Rinsate	ug/L	2.8
EPA 8270D	0615MW54GW	Water	Benzyl Alcohol	0.19	J	Rinsate	ug/L	0.38
EPA 8270D	0615MW54GW	Water	Butyl benzyl phthalate	0.19	J	Rinsate	ug/L	0.57
EPA 8270D	0615MW54GW	Water	Diethyl phthalate	0.22	J	Rinsate	ug/L	0.38
EPA 8270D	0615MW54GW	Water	Di-n-octyl phthalate	0.33	J	Rinsate	ug/L	0.38
EPA 8270D	0615MW54GW	Water	DRO	0.095	J	Rinsate	mg/L	0.100
EPA 6010B (Total)	0615MW54GW	Water	Calcium	0.082	J	Rinsate	mg/L	1.1
EPA 6020A (Total)	0615MW54GW	Water	Arsenic	0.00068	J	Rinsate	mg/L	0.0010
EPA 6020A (Total)	0615MW54GW	Water	Antimony	0.00022	J	Rinsate	mg/L	0.00040
EPA 6020A (Total)	0615MW54GW	Water	Barium	0.0011	J	Rinsate	mg/L	0.0012
EPA 6020A (Total)	0615MW54GW	Water	Cadmium	0.000043	J	Rinsate	mg/L	0.00040
EPA 6020A (Total)	0615MW54GW	Water	Chromium	0.00065		Rinsate	mg/L	0.00040
EPA 6020A (Total)	0615MW54GW	Water	Cobalt	0.00011	J	Rinsate	mg/L	0.00040
EPA 6020A (Total)	0615MW54GW	Water	Copper	0.0022		Rinsate	mg/L	0.0020
EPA 6020A (Total)	0615MW54GW	Water	Lead	0.00012	J	Rinsate	mg/L	0.00040
EPA 6020A (Total)	0615MW54GW	Water	Manganese	0.0056		Rinsate	mg/L	0.0020
EPA 6020A (Total)	0615MW54GW	Water	Nickel	0.0027	J	Rinsate	mg/L	0.0030
EPA 6020A (Total)	0615MW54GW	Water	Zinc	0.0064	J	Rinsate	mg/L	0.0070
EPA 300	0615MW54GW	Water	Sulfate	300		Rinsate	mg/L	12
EPA 353.2	0615MW54GW	Water	Nitrate/Nitrite	0.0070	J	Rinsate	mg/L	0.050
SM 2540D	0615MW54GW	Water	TSS	9.7		Rinsate	mg/L	2.2
EPA 1631 (Total)	0615MW54GW	Water	Mercury	6.28		Rinsate	ng/L	0.40
EPA 1631 (Dissolved)	0615MW54GW	Water	Mercury	1.77		Rinsate	ng/L	0.40

**Table 3b - List of Samples Qualified for Method Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
None						

**Table 3c - List of Samples Qualified for Field Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
EPA 6020A	0615MW01GW	Copper	0.0022	0.0072	U	0.0020
EPA 300	0615MW01GW	Sulfate	300	11	U	1.2
EPA 300	0615MW10GW	Sulfate	300	8.9	U	1.2
EPA 6020A	0615MW26GW	Chromium	0.00065	0.0019	U	0.00040
EPA 300	0615MW26GW	Sulfate	300	70	U	1.2
EPA 6020A	0615MW27GW	Copper	0.0022	0.0040	U	0.0020
EPA 300	0615MW27GW	Sulfate	300	170	U	1.2
EPA 300	0615MW28GW	Sulfate	300	40	U	1.2
EPA 6020A	0615MW29GW	Copper	0.0022	0.0029	U	0.0020
EPA 300	0615MW29GW	Sulfate	300	32	U	1.2
EPA 6020A	0615MW31GW	Copper	0.0022	0.011	U	0.0020
EPA 300	0615MW31GW	Sulfate	300	1.0	U	1.2
SM 2540D	0615MW31GW	TSS	9.7	35	U	2.0
EPA 1631 (Total)*	0615MW19GW	Mercury	0.44	2.01	U	0.40
EPA 1631 (Total)*	0615MW51GW	Mercury	0.44	2.20	U	0.40

**Table 4 - List of Samples with Surrogates outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Rec.	Low Limit	High Limit	Dil Fac	Sample Qual.
None.								



**Table 5 - List of MS/MSD Recoveries and RPDs outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac.	Low Limit	High Limit	Sample Qual	Reportable
EPA 8270D	0615MW19GW	Water	2,4-Dimethylphenol	ND	1.90	22	1	30	135	UJ-	Yes
EPA 8270D	0615MW19GW	Water	3,3-Dichlorobenzidine	ND	3.80	6	1	20	175	UJ-	Yes
EPA 8270D	0615MW19GW	Water	3-Nitroaniline	ND	1.90	45	1	75	140	UJ-	Yes
EPA 8270D	0615MW19GW	Water	4-Chloroaniline	ND	1.90	0	1	35	175	UJ-	Yes
EPA 8270D	0615MW19GW	Water	Benzo(ghi)perylene	ND	1.90	55	1	75	125	UJ-	Yes
EPA 8270D	0615MW19GW	Water	Dibenz(ah)anthracene	ND	1.90	60	1	75	130	UJ-	Yes
EPA 8270D	0615MW19GW	Water	Hexachlorocyclopentadiene	ND	1.90	0	1	20	125	UJ-	Yes
EPA 8270D	0615MW19GW	Water	Indeno (123cd)pyrene	ND	1.90	70	1	75	125	UJ-	Yes
AK102	0615MW19GW	Water	DRO	0.055	2.05	71	1	75	125	UJ-	Yes

**Table 6 - List of LCS Recoveries outside Control Limits**

Method	LCS ID	Analyte	%Rec.	Low Limit	High Limit	No. of Affected Samples	Samp Qual
EPA 8270D	580-193674	2,4-Dimethylphenol	28	30	135	4 (0615MW19GW, 0615MW22GW, 0615MW50GW, 0615MW54GW)	UJ
EPA 8270D	580-193674	3,3-Dichlorobenzidine	16	20	175	4 (0615MW19GW, 0615MW22GW, 0615MW50GW, 0615MW54GW)	UJ
EPA 8270D	580-193674	4-Chloroaniline	8	20	150	4 (0615MW19GW, 0615MW22GW, 0615MW50GW, 0615MW54GW)	UR
EPA 8270D	580-193674	Hexachlorocyclopentadiene	3	20	125	4 (0615MW19GW, 0615MW22GW, 0615MW50GW, 0615MW54GW)	UR

**Table 7 –Samples that were Re-analyzed**

<b>Sample ID</b>	<b>Lab ID</b>	<b>Method</b>	<b>Sample Type</b>	<b>Action</b>
0615MW19GW	580-51184-5	EPA 8270D	GW	Not used due to holding time exceedance but can be used for supporting data. Original analysis used for reporting purposes.
0615MW22GW	580-51184-6	EPA 8270D	GW	Not used due to holding time exceedance but can be used for supporting data. Original analysis used for reporting purposes.
0615MW50GW	580-51184-14	EPA 8270D	GW	Not used due to holding time exceedance but can be used for supporting data. Original analysis used for reporting purposes.
0615MW54GW	580-51184-29	EPA 8270D	GW	Not used due to holding time exceedance but can be used for supporting data. Original analysis used for reporting purposes.

**Table 8a – Summary of Field Duplicate Results**

Method	Analyte	Units	0615MW22GW	0615MW50GW	RPD	Rating	Sample Qualifier
EPA 300	Fluoride	mg/L	0.12	0.11	8.7%	Good	None
EPA 300	Sulfate	mg/L	5.3	5.3	0.0%	Good	None
SM 2320B	Alkalinity	mg/L	78	75	3.9%	Good	None
SM 2320B	Bicarbonate	mg/L	78	75	3.9%	Good	None
EPA 6010B	Calcium	mg/L	14	13	7.4%	Good	None
EPA 6010B	Magnesium	mg/L	11	10	9.5%	Good	None
EPA 6010B	Sodium	mg/L	2.6	2.7	3.8%	Good	None
EPA 6020A	Arsenic	mg/L	0.059	0.061	3.3%	Good	None
EPA 6020A	Antimony	mg/L	0.34	0.35	2.9%	Good	None
EPA 6020A	Barium	mg/L	0.046	0.045	2.2%	Good	None

**Table 8b – Summary of Field Duplicate Results**

Method	Analyte	Units	0615MW19GW	0615MW51GW	RPD	Rating	Sample Qualifier
EPA 300	Fluoride	mg/L	0.13	0.13	0.0%	Good	None
EPA 300	Sulfate	mg/L	5.6	5.5	1.8%	Good	None
EPA 353.2	Nitrate/nitrite	mg/L	0.12	0.12	0.0%	Good	None
SM 2320B	Alkalinity	mg/L	110	96	13.6%	Good	None
SM 2320B	Bicarbonate	mg/L	110	96	13.6%	Good	None
EPA 6010B	Calcium	mg/L	18	19	5.4%	Good	None
EPA 6010B	Magnesium	mg/L	13	12	8.0%	Good	None
EPA 6010B	Sodium	mg/L	2.4	2.4	0.0%	Good	None
EPA 6020A	Barium	mg/L	0.046	0.051	10.3%	Good	None
EPA 6020A	Manganese	mg/L	0.0067	0.0037	57.7%	Poor	J

## DATA REVIEW MEMORANDUM

**DATE:** May 11, 2016  
**TO:** Mark Longtine, Project Manager, E & E, Seattle, WA  
**FROM:** Steven Elliott, E & E, Pensacola, FL  
**SUBJ:** Data Review: Red Devil Mine

**REFERENCE:**

Project ID	Lab Work Order	Lab
1001095.0002.02 Task 2 - Soil Characterization	J52160-1	TestAmerica – Seattle (Mercury subcontracted to Brooks Rand Labs – Seattle)

### 1. SAMPLE IDENTIFICATION

For the sampling activities at Red Devil Mine, Ecology and Environment, Inc. (E & E) collected the samples listed in Table 1. Project-specific matrix spike/matrix spike duplicates (MS/MSD) were designated in the field; the laboratory also identified batch MS/MSD's as batch quality control (QC) for additional analytical testing. All samples were sent to TestAmerica's labs in Seattle, Washington, for analysis; select mercury analyses were forwarded to Brooks Rand Labs in Seattle, Washington. All tables are included at the end of this memorandum.

A revision to the lab report was issued by TestAmerica (Revision 1, dated April 21, 2016) to correct three sample IDs and associated results. At the time of sample log in, the lab misidentified sample 15MP097SB06 as 15MP097SB05; however, no sample identified as 15MP097SB05 was collected. Results for the sample originally misidentified and reported by the lab as 15MP097SB05 have been reassigned to the correct sample ID of 15MP097SB06 for total metals and Hg SSE in the revised lab report and EDD. In addition, E & E collected sample 15MP097SB09 for total metals; however, no results were provided for this sample in the original report. Results for the sample originally

misidentified as 15MP097SB06 have been reassigned to the correct sample ID of 15MP097SB09 for total metals in the revised lab report and EDD.

Data were reviewed for field and laboratory precision, accuracy, and completeness in accordance with procedures and quality control (QC) limits, the current laboratory Quality Assurance Manual (QAM) and current standard operating procedures (SOPs).

Laboratory data qualifiers for compound identification and quantitation were accepted. Any additional data review qualifiers added are noted below and listed on the tables at the end of this memorandum. Definitions of all data qualifiers are given in the report.

**Work Orders, Tests and Number of Samples included in this Data Review Memo**

Work Orders	Matrix	Test Method	Method Name	Number of Samples
580-52160-1	Soil	EPA 6010B/3050B	Total Metals (ICP)	50
580-52160-1	Soil	EPA 6020A/3050B	Total Metals (ICP/MS)	50
580-52160-1	Soil	EPA 7471A	Mercury (CVAA)	50
580-52160-1	Soil	ASTM D 2216	Percent Moisture	50
580-52160-1	Soil	Hg SSE (F0-F5) *	Subcontract	28
580-52160-1	Water	EPA 6010B/3050B	Total Recoverable Metals (ICP)	4
580-52160-1	Water	EPA 6020A/3050B	Metals (ICP/MS)	4
580-52160-1	Water	EPA 7470A	Mercury (CVAA)	4

\*Brooks Rand Labs proprietary method

**2. SAMPLE PROCEDURES**

All samples were collected as specified in the work plan and documented on the chain-of-custody (COC) and in field notebooks. Samples were analyzed as specified on the COC. Samples were packaged, shipped and received as specified in the work plan. All samples must be received cold (4 ±2 degrees Celsius [°C]) and in good condition as documented on the Cooler Receipt Form.

**REVIEW RESULTS**

All sample procedures were followed and the sample coolers were received at -0.2 to 2.5 °C. No problems with the condition of the samples upon receipt are documented.

### **3. LABORATORY DATA**

#### **3.1 HOLDING TIMES**

Holding times are established and monitored to ensure analytical results accurately represent analyte concentrations in a sample at the time of collection. These results are presented in Table 2 (if applicable). Exceeding the holding time for a sample generally results in a loss of the analyte due to a variety of mechanisms, such as deposition on the sample container walls or precipitation.

#### **REVIEW RESULTS**

All samples were analyzed within the project and method specified holding times for all analytes (see Table 2).

#### **3.2 BLANKS**

Laboratory and field blank samples are analyzed and evaluated to determine the existence and magnitude of possible contamination during the sampling and analysis process. These results are presented in Table 3 (if applicable). If the analyte is present in the sample at similar trace levels (less than 5 times the blank concentration), then the analyte is likely a common background contaminant from some phase of the sampling, extraction, or analytical procedure and associated low level sample concentrations are not considered to be site related. Sample results in these cases are qualified as not detected, U.

#### **REVIEW RESULTS**

All laboratory blanks were performed at the required frequency. As noted in Table 3a, analyte concentrations in the blanks are generally below the practical quantitation limit (PQL); the only exception was cobalt detected in two method blanks. All cobalt sample results associated with the MB199100 detection were reported at concentrations greater than 5 times the blank and therefore no qualification was necessary. The method blank 198020 applies to all rinsate blank samples only. The cobalt results in all four rinsate blanks have been qualified as not detected, "U". A summary of qualified data due to method blank contamination is presented in Table 3b.

Four equipment rinsate blanks were collected for the split spoon equipment, with several Method 6010 and 6020 analytes detected in each at concentrations greater than the PQL. As the field blanks were collected the same day and no specific associations were noted, the highest concentration of each analyte detected has been used for comparison purposes. Blank results reported in mg/L were converted to mg/Kg equivalents using the volume of water and weight of soil analyzed. All sample results were detected at levels greater than 5 times the blank and therefore no qualification was necessary (Table 3c).

### **3.3 SURROGATE SPIKE RECOVERY**

Laboratory performance for individual samples analyzed for organic compounds is established by means of surrogate spiking activities. Samples are spiked with surrogate compounds prior to preparation and analysis. Unusually low or high surrogate recovery values may indicate some deficiency in the analytical system or that some matrix effects exist, resulting in low or high sample results for target compounds. Sample surrogate recoveries outside QC limits (if applicable) are presented in Table 4.

## **REVIEW RESULTS**

All surrogates were run at the required frequency with no exceptions noted.

### **3.4 MATRIX SPIKE AND MATRIX SPIKE DUPLICATE ANALYSIS**

The matrix spike and matrix spike duplicate (MS/MSD) analyses are intended to provide information about the effects that the sample matrix exerts on the digestion / extraction and measurement methodology. MS recovery values that do not meet laboratory QC criteria may indicate that sample analyte results are being attenuated in the analysis procedure. The potential sample bias may be estimated by noting the degree to which the MS concentration was elevated or lowered in the spike analysis. However, this estimated bias should serve only as an approximation; sample-specific problems may be the cause of the discrepancy, particularly in soil samples.

Recoveries of a post-digestion spike or a laboratory control sample (LCS) are used to verify that the analytical methodology is acceptable and that MS recoveries are due to matrix effects. An MSD analysis is performed to evaluate the precision of the sample results. Precision is measured as the relative percent difference (RPD) between analytical results for duplicate samples. The laboratory's failure to produce similar results



for MSD samples may indicate that the samples were non-homogeneous (particularly in soil samples), or that method defects may exist in the laboratory's techniques.

Recovery calculations are not required if the spiking concentration added is less than 25% of the sample background concentration.

## **REVIEW RESULTS**

The MS/MSD sample analyses were performed on samples 15MP094SB17, 15MP097SB11, 15MP100SB19, and 15RD22SB09 at the required frequency. MS/MSD recoveries were within the control limits generated by the laboratory with the following exceptions:

- For sample 15MP094SB17, the EPA Methods 6010, 6020, and 7470 MS and/or MSD recoveries of several analytes were above laboratory limits. The sample result for aluminum, iron, magnesium, arsenic, manganese, antimony, and mercury were greater than 4 times the spiking concentration and therefore MS evaluation is not appropriate and no results are qualified. The results for calcium, potassium, barium, chromium, nickel, vanadium in the parent sample have been qualified as estimated with a high bias, "J+".
- For sample 15MP097SB11, the EPA Methods 6010, 6020, and 7470 MS and/or MSD recoveries of several analytes were above laboratory limits. The sample result for aluminum, antimony, iron, manganese and mercury were greater than 4 times the spiking concentration and therefore MS evaluation is not appropriate and no results are qualified. The results for potassium, arsenic, barium, chromium, lead, nickel, silver, vanadium and zinc in the parent sample have been qualified as estimated with a high bias, "J+".
- For sample 15MP100SB19, the EPA Methods 6010, 6020, and 7470 MS and/or MSD recoveries of several analytes were above laboratory limits. The sample result for aluminum, iron, magnesium, manganese and mercury were greater than 4 times the spiking concentration and therefore MS evaluation is not appropriate and no results are qualified. The results for calcium, potassium, and all Method 6020 analytes except manganese in the parent sample have been qualified as estimated with a high bias, "J+". Potassium and sodium had high MS/MSD RPDs and have been qualified as estimated, "J".

- For sample 15RD22SB09, the EPA Methods 6010, 6020, and 7470 MS and/or MSD recoveries of several analytes were above laboratory limits. The sample result for aluminum, iron, and mercury were greater than 4 times the spiking concentration and therefore MS evaluation is not appropriate and no results are qualified. The results for calcium, magnesium, potassium, arsenic, barium, chromium, cobalt, copper, lead, manganese, nickel, silver, vanadium, and zinc in the parent sample have been qualified as estimated with a high bias, “J+”. Manganese had a high MS/MSD RPD and has been qualified as estimated, “J”.

A summary of sample data qualified due to MS/MSD precision and accuracy are presented in Tables 5a and 5b.

### **3.5 LABORATORY CONTROL SAMPLE ANALYSIS**

The LCS is analyzed to monitor the efficiency of the digestion/extraction procedure and analytical instrument operation. The ability of the laboratory to successfully analyze an LCS demonstrates that there are no analytical problems related to the digestion/sample preparation procedures and/or instrument operations. The LCS results outside QC limits are presented in Table 6 (if applicable). Sporadic and marginal QC failures for multiple component methods do not indicate an analytical concern. If recoveries are high and the compounds are not detected in the samples, then no data qualification is required. All recoveries should be above 10% or the non-detect results flagged “UR” as rejected.

### **REVIEW RESULTS**

All LCS analyses were within control limits and performed at the required frequency.

### **3.6 MERCURY SPECIATION ASSESSMENT**

Mercury is extracted from an accurately weighed sediment sample into five different solutions that can be broadly linked to types of mercury compounds based on solubility under the various test conditions. The extractants used are: deionized water (F0 & F1), a synthetic “stomach acid” (F2), 1M potassium hydroxide solution (F3), 12M nitric acid (F4), and aqua regia (F5). All sample extracts are analyzed in accordance with EPA Method 1631.

## **REVIEW RESULTS**

All data were reviewed and considered usable with qualification as noted in this report with the following exceptions:

- Sample 15MP094SB17 had a high lab duplicate RPD in fractions F1 and F4.
- Sample 15MP100SB19 had a high lab duplicate RPD in fractions F4 and F5.
- Sample 15RD22SB09 had a high lab duplicate RPD in fractions F1, F3, and F5.

Associated sample results have been qualified as estimated, "J".

Method blank detections are subtracted out per the method so no qualification was necessary for any method blank detections

### **3.7 COMPOUND IDENTIFICATION AND QUANTITATION**

Compound identities are assigned by comparing sample compound retention times to retention times from known (standard) compounds and identification of an acceptable mass spectrum. Compounds detected below the PQL in samples should be considered estimated and are qualified "J." The samples with compounds above the linear range were all re-analyzed at a higher dilution factor.

## **REVIEW RESULTS**

All compound identification and quantitation criteria were achieved. As noted in Table 7, no samples were reported as reanalyzed.

## **4. FIELD DUPLICATE SAMPLE RESULTS**

Field duplicate samples were collected and analyzed as an indication of overall precision for both field and laboratory. Field duplicate results are summarized in Table 8 (if applicable). The results are expected to have more variability than laboratory duplicates, which measure only laboratory precision. It is expected also that soil field duplicates will exhibit greater variance than water field duplicates due to the difficulties associated with collecting identical field samples. The QC criteria used to assess field duplicate samples for this project was limits of 70% RPD for soils and 40% RPD for waters, or twice the general laboratory duplicate criteria. If a given compound in both the regular sample and associated field duplicate sample was below the laboratory PQL, or the compound was not detected in one of the samples, then the compound is generally not qualified due to field duplicate precision. There are no guidelines regarding data qualification based on

poor field duplicate precision. Professional judgment was used to determine whether or not to qualify results.

## **REVIEW RESULTS**

Five field duplicates analyses were performed on this SDG. The RPD ratings are listed on Tables 8a through 8e as “Good” if the RPD is less than field duplicate QC criteria of 70% (for soils) and as “Poor” if the RPD exceeded the field duplicate QC criteria.

All the results show good precision in the sample pair with the exceptions noted on Tables 8a through 8e. Qualifiers were only added to the field duplicate sample pair results as noted.

## **5. OVERALL ASSESSMENT OF DATA**

All data were reviewed and considered usable with qualification as noted in this report.

**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analysis
580-52160-1	Soil	15MP094SB13	580-52160-1	7/8/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP094SB17	580-52160-2	7/8/2015	MS/MSD	6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP094SB19	580-52160-3	7/8/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP094SB20	580-52160-4	7/8/2015	FD1	6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP095SB04	580-52160-5	7/7/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP095SB05	580-52160-6	7/7/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP095SB10	580-52160-7	7/7/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP095SB11	580-52160-8	7/7/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP095SB13	580-52160-9	7/7/2015	FD2	6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP096SB06	580-52160-10	7/8/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP096SB13	580-52160-11	7/8/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP096SB17	580-52160-12	7/8/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP096SB19	580-52160-13	7/8/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP096SB26	580-52160-14	7/8/2015	FD3	6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP097SB02	580-52160-15	7/8/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP097SB09	580-52160-16	7/8/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP097SB11	580-52160-17	7/8/2015	MS/MSD, FD4	6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP097SB13	580-52160-18	7/8/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP098SB20	580-52160-19	7/9/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP098SB26	580-52160-20	7/9/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP098SB33	580-52160-21	7/9/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP098SB36	580-52160-22	7/9/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP098SB38	580-52160-23	7/9/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP099SB11	580-52160-24	7/9/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP099SB12	580-52160-25	7/9/2015		6010B, 6020A, 7471A, D2216

**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analysis
580-52160-1	Soil	15MP099SB13	580-52160-26	7/9/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP099SB17	580-52160-27	7/9/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP099SB19	580-52160-28	7/9/2015	FD5	6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP100SB09	580-52160-29	7/10/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP100SB11	580-52160-30	7/10/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP100SB17	580-52160-31	7/10/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP100SB19	580-52160-32	7/10/2015	MS/MSD	6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP100SB21	580-52160-33	7/10/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP101SB11	580-52160-34	7/10/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP101SB13	580-52160-35	7/10/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP101SB14	580-52160-36	7/10/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP200SB01	580-52160-37	7/8/2015	FD1	6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP200SB02	580-52160-38	7/7/2015	FD2	6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP200SB03	580-52160-39	7/8/2015	FD3	6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP200SB04	580-52160-40	7/8/2015	FD4	6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP200SB05	580-52160-41	7/9/2015	FD5	6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Water	15MP202RS01	580-52160-42	7/10/2015	Rinsate	6010B, 6020A, 7471A, D2216
580-52160-1	Water	15MP202RS02	580-52160-43	7/10/2015	Rinsate	6010B, 6020A, 7471A, D2216
580-52160-1	Water	15MP202RS03	580-52160-44	7/10/2015	Rinsate	6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15RD21SB05	580-52160-45	7/11/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15RD22SB01	580-52160-46	7/11/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15RD22SB09	580-52160-47	7/11/2015	MS/MSD	6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15SM200RS04	580-52160-48	7/10/2015	Rinsate	6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15SM200SB02	580-52160-49	7/21/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15SM68SB11	580-52160-50	7/16/2015		6010B, 6020A, 7471A, D2216

**Table 1 - Sample Listing**

<b>Work Order</b>	<b>Matrix</b>	<b>Sample ID</b>	<b>Lab ID</b>	<b>Sample Date</b>	<b>QA/QC</b>	<b>Analysis</b>
580-52160-1	Soil	15SM70SB02	580-52160-51	7/18/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15SM71SB12	580-52160-52	7/21/2015		6010B, 6020A, 7471A, D2216
580-52160-1	Soil	15MP094SB11	580-52160-53	7/8/2015		6010B, 6020A, 7471A, D2216, Hg Speciation
580-52160-1	Soil	15MP097SB06	580-52160-54	7/8/2015		6010B, 6020A, 7471A, D2216, Hg Speciation



**Table 2 - List of Samples Qualified for Holding Time Exceedance**

Method	Analyte	Sample IDs	HT	Sampling Date	Analysis Date	Qual
None						

**Table 3a - List of Positive Results for Blank Samples**

Method	Sample ID	Sample Type	Analyte	Result	Analysis Type	Units	PQL
EPA 6020A	MB 198020	AQ	Cobalt	0.0000442	MB	mg/L	0.0004
EPA 6020A	MB 199100	AQ	Cobalt	0.00992	MB	mg/L	0.0004
EPA 6010B	15MP202RS01	AQ	Iron	3.4	Rinsate	mg/L	0.5
EPA 6020A	15MP202RS01	AQ	Chromium	0.014	Rinsate	mg/L	0.0004
EPA 6020A	15MP202RS01	AQ	Copper	0.0033	Rinsate	mg/L	0.0020
EPA 6020A	15MP202RS01	AQ	Manganese	0.036	Rinsate	mg/L	0.0020
EPA 6010B	15MP202RS02	AQ	Iron	2.1	Rinsate	mg/L	0.50
EPA 6020A	15MP202RS02	AQ	Arsenic	0.0013	Rinsate	mg/L	0.0004
EPA 6020A	15MP202RS02	AQ	Manganese	0.023	Rinsate	mg/L	0.0020
EPA 6010B	15MP202RS03	AQ	Iron	0.67	Rinsate	mg/L	0.5
EPA 6020A	15MP202RS03	AQ	Chromium	0.00083	Rinsate	mg/L	0.0004
EPA 6020A	15MP202RS03	AQ	Manganese	0.011	Rinsate	mg/L	0.0020
EPA 6010B	15SM200RS04	AQ	Iron	2.0	Rinsate	mg/L	0.50
EPA 6020A	15SM200RS04	AQ	Copper	0.0048	Rinsate	mg/L	0.0020
EPA 6020A	15SM200RS04	AQ	Chromium	0.0090	Rinsate	mg/L	0.0004
EPA 6020A	15SM200RS04	AQ	Manganese	0.024	Rinsate	mg/L	0.0020
EPA 6020A	15SM200RS04	AQ	Nickel	0.003	Rinsate	mg/L	0.0030

**Table 3b - List of Samples Qualified for Method Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
EPA 6020A	15MP202RS01	Cobalt	0.0000442	0.00024	U	0.0004
EPA 6020A	15MP202RS02	Cobalt	0.0000442	0.00014	U	0.0004
EPA 6020A	15MP202RS03	Cobalt	0.0000442	0.000073	U	0.0004
EPA 6020A	15SM200RS04	Cobalt	0.0000442	0.00025	U	0.0004

**Table 3c - List of Samples Qualified for Field Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
None.						

**Table 4 - List of Samples with Surrogates outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Rec.	Low Limit	High Limit	Dil Fac.	Sample Qual.
None.								

**Table 5a - List of MS/MSD Recoveries outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac.	Low Limit	High Limit	Sample Qual
EPA 6010B	15MP100SB19	Soil	Aluminum	7400	449	173	1.0	80	120	None – 4X
EPA 6010B	15MP100SB19	Soil	Iron	20000	968	833	1.0	80	120	None – 4X
EPA 6010B	15MP100SB19	Soil	Magnesium	3000	707	164	1.0	80	120	None – 4X
EPA 6010B	15MP100SB19	Soil	Calcium	1700	898	171	1.0	80	120	J+
EPA 6010B	15MP100SB19	Soil	Potassium	550	898	160	1.0	80	120	J+
EPA 7471A	15MP100SB19	Soil	Mercury	28.0	0.172	3602	100	80	120	None – 4X
EPA 6020A	15MP100SB19	Soil	All analytes except Mn	NA	NA	NA	NA	NA	NA	J+ (Mn 4x)
EPA 6010B	15MP097SB11	Soil	Aluminum	7000	416	650	1.0	80	120	None – 4X
EPA 6010B	15MP097SB11	Soil	Iron	21000	916	352	1.0	80	120	None – 4X

**Table 5a - List of MS/MSD Recoveries outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac.	Low Limit	High Limit	Sample Qual
EPA 6010B	15MP097SB11	Soil	Potassium	700	833	128	1.0	80	120	J+
EPA 7471A	15MP097SB13	Soil	Mercury	24.9	0.159	2070	200	80	120	None – 4X
EPA 6010B	15RD22SB09	Soil	Aluminum	6400	435	763	1.0	80	120	None – 4X
EPA 6010B	15RD22SB09	Soil	Iron	15000	956	586	1.0	80	120	None – 4X
EPA 6010B	15RD22SB09	Soil	Calcium	1700	869	137	1.0	80	120	J+
EPA 6010B	15RD22SB09	Soil	Magnesium	2600	870	157	1.0	80	120	J+
EPA 6010B	15RD22SB09	Soil	Potassium	470	869	158	1.0	80	120	J+
EPA 7471A	15RD22SB09	Soil	Mercury	3.5	0.152	473	100	80	120	None – 4X
EPA 6010B	15MP094SB17	Soil	Aluminum	6500	407	1003	1.0	80	120	None – 4X
EPA 6010B	15MP094SB17	Soil	Iron	23000	896	610	1.0	80	120	None – 4X
EPA 6010B	15MP094SB17	Soil	Magnesium	3400	815	243	1.0	80	120	None – 4X
EPA 6010B	15MP094SB17	Soil	Calcium	1900	815	195	1.0	80	120	J+
EPA 6010B	15MP094SB17	Soil	Potassium	730	815	168	1.0	80	120	J+
EPA 6020A	15MP097SB11	Soil	Arsenic	800	218	156	50	80	120	J+
EPA 6020A	15MP097SB11	Soil	Antimony	650	160	538	50	80	120	None – 4X
EPA 6020A	15MP097SB11	Soil	Barium	160	218	141	50	80	120	J+
EPA 6020A	15MP097SB11	Soil	Chromium	24	21.8	151	50	80	120	J+
EPA 6020A	15MP097SB11	Soil	Copper	36	27.2	123	50	80	120	J+
EPA 6020A	15MP097SB11	Soil	Lead	9.9	53.3	126	50	80	120	J+
EPA 6020A	15MP097SB11	Soil	Manganese	330	54	314	50	80	120	None – 4X
EPA 6020A	15MP097SB11	Soil	Nickel	40	54	127	50	80	120	J+
EPA 6020A	15MP097SB11	Soil	Silver	0.12	32	128	50	80	120	J+
EPA 6020A	15MP097SB11	Soil	Vanadium	33	54	136	50	80	120	J+
EPA 6020A	15MP097SB11	Soil	Zinc	93	213	126	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Arsenic	24	207	122	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Barium	74	207	141	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Chromium	20	20.7	182	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Cobalt	9.4	52	136	50	80	120	J+

**Table 5a - List of MS/MSD Recoveries outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac.	Low Limit	High Limit	Sample Qual
EPA 6020A	15RD22SB09	Soil	Copper	26	26	156	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Lead	8.2	52	123	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Manganese	170	52	499	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Nickel	29	52	151	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Silver	0.12	31	124	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Vanadium	30	52	148	50	80	120	J+
EPA 6020A	15RD22SB09	Soil	Zinc	68	207	124	50	80	120	J+
EPA 6020A	15MP094SB17	Soil	Arsenic	1100	169	192	50	80	120	None – 4X
EPA 6020A	15MP094SB17	Soil	Barium	190	188	134	50	80	120	J+
EPA 6020A	15MP094SB17	Soil	Chromium	21	19	162	50	80	120	J+
EPA 6020A	15MP094SB17	Soil	Nickel	44	42	128	50	80	120	J+
EPA 6020A	15MP094SB17	Soil	Vanadium	30	47	126	50	80	120	J+
EPA 6020A	15MP094SB17	Soil	Manganese	380	46.9	292	50	80	120	None – 4X
EPA 6020A	15MP094SB17	Soil	Antimony	2300	141	369	5000	80	120	None – 4X
EPA 7471A	15MP094SB17	Soil	Mercury	120	0.19	7138	200	80	120	None – 4X

**Table 5b - List of Lab and MS Duplicate RPDs outside Control Limits**

Sample ID	Analyte	Method	RPD	RPD Limit	No. of Affected Samples	Samp Qual
15MP100SB19	Potassium	EPA 6010B	21	20	1	J*
15MP100SB19	Sodium	EPA 6010B	25	20	1	J
15MP100SB19	Hg F4 Fraction	Hg SSE	38	35	1	J
15MP100SB19	Hg F5 Fraction	Hg SSE	98	35	1	J
15RD22SB09	Manganese	EPA 6020A	25	20	1	J*
15RD22SB09	Hg F1 Fraction	Hg SSE	49	35	1	J
15RD22SB09	Hg F3 Fraction	Hg SSE	48	35	1	J
15RD22SB09	Hg F5 Fraction	Hg SSE	72	35	1	J
15MP094SB17	Hg F1 Fraction	Hg SSE	47	35	1	J
15MP094SB17	Hg F4 Fraction	Hg SSE	44	35	1	J

\*already qualified due to MS/MSD recoveries.

**Table 6 - List of LCS Recoveries outside Control Limits**

Method	Sample ID	Analyte	%Rec.	Low Limit	High Limit	No. of Affected Samples	Samp Qual
None							

**Table 7 –Samples that were Re-analyzed**

Sample ID	Lab ID	Method	Sample Type	Action
None.				

**Table 8a – Summary of Field Duplicate Results**

Method	Analyte	Units	15MP094SB20	15MP200SB01	RPD	Rating	Sample Qualifier
EPA 6010B	Aluminum	mg/Kg	7300	8900	19.8%	Good	None
EPA 6010B	Calcium	mg/Kg	1600	1600	0.0%	Good	None
EPA 6010B	Iron	mg/Kg	26000	26000	0.0%	Good	None
EPA 6010B	Magnesium	mg/Kg	2300	2900	23.1%	Good	None
EPA 6010B	Potassium	mg/Kg	570	580	1.7%	Good	None
EPA 6020A	Antimony	mg/Kg	410	1300	104.1%	Poor	J
EPA 6020A	Arsenic	mg/Kg	37	48	25.9%	Good	None
EPA 6020A	Barium	mg/Kg	110	140	24.0%	Good	None
EPA 6020A	Beryllium	mg/Kg	0.55	0.54	1.8%	Good	None
EPA 6020A	Cadmium	mg/Kg	0.66	0.60	9.5%	Good	None
EPA 6020A	Chromium	mg/Kg	22	25	12.8%	Good	None
EPA 6020A	Cobalt	mg/Kg	13	15	14.3%	Good	None
EPA 6020A	Copper	mg/Kg	47	48	2.1%	Good	None
EPA 6020A	Lead	mg/Kg	12	14	15.4%	Good	None
EPA 6020A	Manganese	mg/Kg	330	610	59.6%	Good	None
EPA 6020A	Nickel	mg/Kg	44	53	18.6%	Good	None
EPA 6020A	Selenium	mg/Kg	3.2	2.1	41.5%	Good	None
EPA 6020A	Silver	mg/Kg	0.10	0.15	40.0%	Good	None
EPA 6020A	Vanadium	mg/Kg	40	39	2.5%	Good	None
EPA 6020A	Zinc	mg/Kg	100	120	18.2%	Good	None
EPA 7471	Mercury	mg/Kg	1.8	1.1	48.3%	Good	None
D 2216	% solids	%	86	86	0.0%	Good	None

**Table 8b – Summary of Field Duplicate Results**

Method	Analyte	Units	15MP095SB13	15MP200SB02	RPD	Rating	Sample Qualifier
EPA 6010B	Aluminum	mg/Kg	9500	9500	0.0%	Good	None
EPA 6010B	Calcium	mg/Kg	2000	2300	14.0%	Good	None
EPA 6010B	Iron	mg/Kg	19000	26000	31.1%	Good	None
EPA 6010B	Magnesium	mg/Kg	3200	3200	0.0%	Good	None
EPA 6010B	Potassium	mg/Kg	590	600	1.7%	Good	None
EPA 6020A	Antimony	mg/Kg	140	540	117.6%	Poor	J
EPA 6020A	Arsenic	mg/Kg	80	360	127.3%	Poor	J
EPA 6020A	Barium	mg/Kg	160	180	11.8%	Good	None
EPA 6020A	Beryllium	mg/Kg	0.58	0.51	12.8%	Good	None
EPA 6020A	Cadmium	mg/Kg	0.41	0.40	2.5%	Good	None
EPA 6020A	Chromium	mg/Kg	26	31	17.5%	Good	None
EPA 6020A	Cobalt	mg/Kg	13	13	0.0%	Good	None
EPA 6020A	Copper	mg/Kg	49	44	10.8%	Good	None
EPA 6020A	Lead	mg/Kg	13	13	0.0%	Good	None
EPA 6020A	Manganese	mg/Kg	530	660	21.8%	Good	None
EPA 6020A	Nickel	mg/Kg	45	44	2.2%	Good	None
EPA 6020A	Selenium	mg/Kg	1.7	1.5	12.5%	Good	None
EPA 6020A	Silver	mg/Kg	0.14	0.15	6.9%	Good	None
EPA 6020A	Vanadium	mg/Kg	39	39	0.0%	Good	None
EPA 6020A	Zinc	mg/Kg	110	110	0.0%	Good	None
EPA 7471	Mercury	mg/Kg	29	6.4	127.7%	Poor	J
D 2216	% solids	%	86	85	1.2%	Good	None



**Table 8c – Summary of Field Duplicate Results**

Method	Analyte	Units	15MP096SB26	15MP200SB03	RPD	Rating	Sample Qualifier
EPA 6010B	Aluminum	mg/Kg	7100	10000	33.9%	Good	None
EPA 6010B	Calcium	mg/Kg	1800	1700	5.7%	Good	None
EPA 6010B	Iron	mg/Kg	23000	12000	62.9%	Good	None
EPA 6010B	Magnesium	mg/Kg	2800	3900	32.8%	Good	None
EPA 6010B	Potassium	mg/Kg	510	440	14.7%	Good	None
EPA 6020A	Antimony	mg/Kg	60	20	100.0%	Poor	J
EPA 6020A	Arsenic	mg/Kg	71	16	126.4%	Poor	J
EPA 6020A	Barium	mg/Kg	120	160	28.6%	Good	None
EPA 6020A	Beryllium	mg/Kg	0.43	0.42	2.4%	Good	None
EPA 6020A	Cadmium	mg/Kg	0.26	0.36	32.3%	Good	None
EPA 6020A	Chromium	mg/Kg	24	33	31.6%	Good	None
EPA 6020A	Cobalt	mg/Kg	13	9.6	30.1%	Good	None
EPA 6020A	Copper	mg/Kg	31	29	6.7%	Good	None
EPA 6020A	Lead	mg/Kg	8.0	9.2	14.0%	Good	None
EPA 6020A	Manganese	mg/Kg	310	180	53.1%	Good	None
EPA 6020A	Nickel	mg/Kg	36	29	21.5%	Good	None
EPA 6020A	Selenium	mg/Kg	1.6	1.9	17.1%	Good	None
EPA 6020A	Vanadium	mg/Kg	38	44	14.6%	Good	None
EPA 6020A	Zinc	mg/Kg	84	79	6.1%	Good	None
EPA 7471	Mercury	mg/Kg	19	0.90	181.9%	Poor	J
D 2216	% solids	%	83	79	4.9%	Good	None

**Table 8d – Summary of Field Duplicate Results**

Method	Analyte	Units	15MP097SB11	15MP200SB04	RPD	Rating	Sample Qualifier
EPA 6010B	Aluminum	mg/Kg	6700	7300	8.6%	Good	None
EPA 6010B	Calcium	mg/Kg	1800	1600	11.8%	Good	None
EPA 6010B	Iron	mg/Kg	20000	38000	62.1%	Good	None
EPA 6010B	Magnesium	mg/Kg	2900	3000	3.4%	Good	None
EPA 6010B	Potassium	mg/Kg	700	600	15.4%	Good	None
EPA 6020A	Antimony	mg/Kg	650	1100	51.4%	Good	None
EPA 6020A	Arsenic	mg/Kg	800	760	5.1%	Good	None
EPA 6020A	Barium	mg/Kg	160	140	13.3%	Good	None
EPA 6020A	Beryllium	mg/Kg	0.44	0.51	14.7%	Good	None
EPA 6020A	Cadmium	mg/Kg	0.36	0.39	8.0%	Good	None
EPA 6020A	Chromium	mg/Kg	24	23	4.3%	Good	None
EPA 6020A	Cobalt	mg/Kg	14	16	13.3%	Good	None
EPA 6020A	Copper	mg/Kg	36	42	15.4%	Good	None
EPA 6020A	Lead	mg/Kg	9.9	11	10.5%	Good	None
EPA 6020A	Manganese	mg/Kg	330	410	21.6%	Good	None
EPA 6020A	Nickel	mg/Kg	40	53	28.0%	Good	None
EPA 6020A	Selenium	mg/Kg	1.5	1.7	12.5%	Good	None
EPA 6020A	Vanadium	mg/Kg	33	34	3.0%	Good	None
EPA 6020A	Zinc	mg/Kg	93	110	16.7%	Good	None
EPA 7471	Mercury	mg/Kg	110	95	14.6%	Good	None
D 2216	% solids	%	76	87	13.5%	Good	None

**Table 8e – Summary of Field Duplicate Results**

Method	Analyte	Units	15MP099SB19	15MP200SB05	RPD	Rating	Sample Qualifier
EPA 6010B	Aluminum	mg/Kg	1400	2000	35.3%	Good	None
EPA 6010B	Calcium	mg/Kg	890	960	7.6%	Good	None
EPA 6010B	Iron	mg/Kg	37000	41000	10.3%	Good	None
EPA 6010B	Magnesium	mg/Kg	240	490	68.5%	Good	None
EPA 6010B	Potassium	mg/Kg	540	650	18.5%	Good	None
EPA 6020A	Antimony	mg/Kg	25	170	148.7%	Poor	J
EPA 6020A	Arsenic	mg/Kg	200	230	14.0%	Good	None
EPA 6020A	Barium	mg/Kg	120	110	8.7%	Good	None
EPA 6020A	Beryllium	mg/Kg	0.52	0.65	22.2%	Good	None
EPA 6020A	Cadmium	mg/Kg	1.2	0.60	66.7%	Good	None
EPA 6020A	Chromium	mg/Kg	14	20	35.3%	Good	None
EPA 6020A	Cobalt	mg/Kg	14	15	6.9%	Good	None
EPA 6020A	Copper	mg/Kg	53	70	27.6%	Good	None
EPA 6020A	Lead	mg/Kg	9.1	15	49.0%	Good	None
EPA 6020A	Manganese	mg/Kg	1900	540	111.5%	Poor	J
EPA 6020A	Nickel	mg/Kg	46	60	26.4%	Good	None
EPA 6020A	Selenium	mg/Kg	1.2	1.6	28.6%	Good	None
EPA 6020A	Vanadium	mg/Kg	21	35	50.0%	Good	None
EPA 6020A	Zinc	mg/Kg	150	130	14.3%	Good	None
EPA 7471	Mercury	mg/Kg	16	14	13.3%	Good	None
D 2216	% solids	%	88	90	2.2%	Good	None

**DATA REVIEW MEMORANDUM**

**DATE:** March 9, 2016  
**TO:** Mark Longtine, Project Manager, E & E, Seattle, WA  
**FROM:** Steven Elliott, E & E, Pensacola, FL  
**SUBJ:** Data Review: Red Devil Mine

**REFERENCE:**

Project ID	Lab Work Order	Lab
1001095.0002.03 Task 3 - GW/SW Monitoring Summer/Fall	53253-1	TestAmerica – Seattle (Mercury subcontracted to Brooks Rand Labs – Seattle)
1001095.0002.04 Task 4 - Kuskokwim River Sediment		

**1. SAMPLE IDENTIFICATION**

For the sampling activities at Red Devil Mine, Ecology and Environment, Inc. (E & E) collected the samples listed on Table 1. Project-specific matrix spike/matrix spike duplicates (MS/MSD) were designated in the field; the laboratory also identified batch MS/MSD's as batch QC for additional analytical testing. All samples were sent to TestAmerica Labs in Seattle, WA for analysis; select mercury analyses were forwarded to Brooks Rand Labs in Seattle WA. All tables are included at the end of this memorandum.

Data were reviewed for field and laboratory precision, accuracy, and completeness in accordance with procedures and quality control (QC) limits, the current laboratory Quality Assurance Manual (QAM) and current standard operating procedures (SOPs). Laboratory data qualifiers for compound identification and quantitation were accepted. Any additional data review qualifiers added are noted below and listed on the tables at the end of this memorandum. Definitions of all data qualifiers are given in the report.

## Work Orders, Tests and Number of Samples included in this Data Review Memo

Work Orders	Matrix	Test Method	Method Name	Number of Samples
580-53253-1	SW	SM 2540C	TDS	9
580-53253-1	GW & SW	SM 2540D	TSS	32
580-53253-1	GW & SW	SM 2320B	Alkalinity	32
580-53253-1	SW	EPA 9060	TOC	39
580-53253-1	GW & SW	EPA 300.0	Anions	32
580-53253-1	GW & SW	EPA 353.2	Nitrate/Nitrite	32
580-53253-1	SW	EPA 6010B/3005A	Dissolved Metals (ICP_Fld Fltr)	13
580-53253-1	Soil, GW & SW	EPA 6010B/3005A	Total Metals (ICP)	67
580-53253-1	SW	EPA 6020A/3005A	Dissolved Metals (ICP/MS_Fld Fltr)	13
580-53253-1	Soil, GW & SW	EPA 6020A/3005A	Total Metals (ICP/MS)	67
580-53253-1	SW	EPA 7470A	Mercury (Dissolved)	13
580-53253-1	GW & SW	EPA 7470A	Mercury (Total)	35
580-53253-1	Soil	EPA 7471A	Mercury (Total)	32
580-53253-1	GW	EPA 8260C/5030B	VOC	3
580-53253-1	GW	EPA 8270D/3520C	SVOC	3
580-53253-1	GW	ADEC AK101	AK -GRO	3
580-53253-1	GW	ADEC AK102&103	AK – DRO & RRO	3
580-53253-1	Soil	ASTM D422	Grain Size	23
580-53253-1	Soil	Hg SSE (F0-F5)	Subcontract	16
580-53253-1	Water	EPA 1631	Total Mercury	33
580-53253-1	Water	EPA 1631	Dissolved Mercury	29
580-53253-1	Soil	EPA 1630	Methyl Mercury	16
580-53253-1	Solids	SM 2540G	Percent Solids	16
580-53253-1	Solids	ASTM D2216	Percent Moisture	28

## **2. SAMPLE PROCEDURES**

All samples were collected as specified in the work plan and documented on the chain-of-custody (COC) and in field notebooks. Samples were analyzed as specified on the COC. Samples were packaged, shipped and received as specified in the work plan. All samples must be received cold ( $4 \pm 2$ ) °C and in good condition as documented on the Cooler Receipt Form.

## **REVIEW RESULTS**

All sample procedures were followed. All of the coolers containing all water and soil (sediment) samples were received by TestAmerica in good condition and at temperatures of 4 °C or colder. TestAmerica subsequently delivered one cooler each of water samples and soil (sediment) samples to TestAmerica's sub-subcontract lab, Brooks Rand Labs, for selected mercury analyses. The cooler containing the water samples (for EPA Method 1631 analysis) was received at 5.9 °C and the cooler containing 16 soil (sediment) samples (for EPA Method 1630 for methyl mercury and Hg SSE analyses) was received at 7.3 °C. All methyl mercury and Hg SSE results for the 14 soil samples have been qualified as estimated, "J", due to the temperature exceedance. While the data has been qualified, the temperature exceedance was less than 2 °C above the limit indicating the samples were preserved on ice for shipping, although not enough to maintain the required temperature. It is likely the samples were exposed to the slightly elevated temperature for only a short time and results should not have been impacted significantly.

The Method 1631 sample bottle for 0915TB01 was broken while in the custody of the lab. No result has been reported. No other problems with the condition of the samples upon receipt are documented.

## **3. LABORATORY DATA**

### **3.1 HOLDING TIMES**

Holding times are established and monitored to ensure analytical results accurately represent analyte concentrations in a sample at the time of collection. Exceeding the holding time for a sample generally results in a loss of the analyte due to a variety of mechanisms, such as deposition on the sample container walls or precipitation.

## REVIEW RESULTS

All samples were analyzed within the project and method specified holding times for all analytes.

### 3.2 BLANKS

Laboratory and field blank samples are analyzed and evaluated to determine the existence and magnitude of possible contamination during the sampling and analysis process. These results are presented in Table 3 (if applicable). As noted in Table 3a, analyte concentrations in the blanks are generally below the practical quantitation limit (PQL). If the analyte is present in the sample at similar trace levels (less than 5 times the blank concentration), then the analyte is likely a common background contaminant from some phase of the sampling, extraction, or analytical procedure and associated low level sample concentrations are not considered to be site related. Sample results in these cases are qualified as not detected, U.

## REVIEW RESULTS

All laboratory blanks were performed at the required frequency. No analytes were detected in the laboratory blanks with the following exceptions:

- DRO was detected in one Method AK102&103 method blank at a concentration between the MDL and PQL. Associated sample results less than 5 times the blank results have been qualified as not detected, "U" (Table 3b).
- Calcium was detected in one Method 6010 method blank at a concentration between the MDL and PQL. However all associated sample results were either not detected or detected at concentrations greater than 5 times the blank concentration and therefore no qualification was necessary.
- Mercury was detected in the Method 1631 method blank at a concentration between the MDL and PQL; reanalysis confirmed results. Associated detected sample results less than 5 times the blank have been qualified as not detected, "U". A summary of qualified samples is presented in Table 3b.
- A total of ten blanks were submitted with this event: six equipment blanks; three ambient field blanks; and one trip blank.

- For the groundwater samples, two equipment rinsate blanks (one for the submersible pump: 0915RS01GW; and one for the bladder pump: 0915RS02GW) were submitted for the analyses noted in Table 1. Fourteen analytes were detected in each blank. Associated sample results less than 5 times the blank concentration have been qualified as not detected, “U”. Data qualified due to these detections are noted in Table 3c.
- For the groundwater and surface water samples, three ambient field blanks (0915FB01, 0915FB02, 0915FB03) and one trip blank (0915TB01) were submitted for total low level mercury. Mercury was detected in one ambient field blank and the trip blank. However, these results have been qualified due to method blank contamination and are therefore not appropriate for field blank evaluation.
- Surface waters and some groundwater samples were collected using a peristaltic pump with dedicated tubing so no equipment blank was applicable.
- For the soil (sediment) samples, four equipment rinsate blanks (hand scoop: 0915EB01; van Veen sampler: 0915RS03; large auger types 0915RS04; small auger: 0915RS05) were submitted the analyses noted in Table 1.

Blank results reported in mg/L were converted to mg/kg equivalents using the volume of water and weight of soil analyzed. Six analytes were detected in the hand scoop equipment blank; eight in the van Veen sampler blank; five in the large auger blank; and three in the small auger blank. A summary of the detections is presented in Table 3a. All associated sample results were either not detected or detected at levels greater than 5 times the corresponding blank and therefore no qualification was necessary. No soil (sediment samples that were collected using the van Veen sampler were submitted for analysis.

### **3.3 SURROGATE SPIKE RECOVERY**

Laboratory performance for individual samples analyzed for organic compounds is established by means of surrogate spiking activities. Samples are spiked with surrogate compounds prior to preparation and analysis. Unusually low or high surrogate recovery values may indicate some deficiency in the analytical system or that some matrix effects exist, resulting in low or high sample results for target compounds. Sample surrogate recoveries outside QC limits (if applicable) are presented in Table 4.



## REVIEW RESULTS

Not applicable for these analyses.

### 3.4 MATRIX SPIKE AND MATRIX SPIKE DUPLICATE ANALYSIS

The matrix spike and matrix spike duplicate (MS/MSD) analyses are intended to provide information about the effects that the sample matrix exerts on the digestion/extraction and measurement methodology. MS recovery values that do not meet laboratory QC criteria may indicate that sample analyte results are being attenuated in the analysis procedure. These results are presented in Table 5 (if applicable). The potential sample bias may be estimated by noting the degree to which the MS concentration was elevated or lowered in the spike analysis. However, this estimated bias should serve only as an approximation; sample-specific problems may be the cause of the discrepancy, particularly in soil samples. Recoveries of a post-digestion spike or a laboratory control sample (LCS) are used to verify that the analytical methodology is acceptable and that MS recoveries are due to matrix effects. An MSD analysis is performed to evaluate the precision of the sample results. Precision is measured as the relative percent difference (RPD) between analytical results for duplicate samples. The laboratory's failure to produce similar results for MSD samples may indicate that the samples were non-homogeneous (particularly in soil samples), or that method defects may exist in the laboratory's techniques.

## REVIEW RESULTS

The MS/MSD sample analyses were performed on sample 0915MW17GW, 0915MW28GW, 0915RD05SW, and 15KR089SD at the required frequency. MS/MSD recoveries were within the control limits generated by the laboratory with the following exceptions:

- The Method 1630 MS/MSD recoveries of total mercury were above laboratory limits in sample 15KR089SD. The parent sample results have been qualified as estimated with a high bias, "J+".
- The Method 1631 MS/MSD RPDs for total mercury were above laboratory limits in samples 0915MW17GW, 0915MW28GW, and 0915RD05SW. The total mercury results in the parent samples have been qualified as estimated, "J".
- The Method 8260 MS/MSD recoveries for toluene, ethyl benzene, and o-xylene were above laboratory limits in sample 0915MW19GW. Parent sample results for

- these analytes were reported as not detected and since the bias was high, no qualification was necessary.
- The Method 8270 MS/MSD recoveries for 16 analytes were below laboratory limits and 2 were above laboratory limits in sample 0915MW19GW; 2 of these analytes had high RPDs as well. Of the 16 analytes below limits, 13 were already qualified as estimated with a low bias due to LCS recoveries. 2,6-Dinitrotoluene, 4-nitroaniline, and nitrobenzene have been qualified as estimated with a low bias, “UJ-“/”J-“, in the parent sample. Butyl benzyl phthalate and benzoic acid, detected above laboratory limits, were reported as not detected and since the bias was high, were not qualified.
  - The Method AK102&103 MS/MSD recoveries for DRO was below laboratory limits in sample 0915MW19GW. Parent sample results have been qualified as estimated with a low bias, “J-“.
  - The Method 300 MS/MSD recoveries for calcium, fluoride, and sulfate were above laboratory limits in sample 0915MW19GW. Parent sample results have been qualified as estimated with a high bias, “J+“.
  - The Method 6010 MS/MSD recoveries for aluminum, calcium, iron, and magnesium were below laboratory limits in sample 15KR089SD; calcium also had a high RPD. However, the sample results were greater than 4 times the spiking concentration and therefore no qualification was necessary. Sodium had a high MS/MSD RPD and parent sample results have been qualified as estimated.
  - The Method 6020 MS/MSD recoveries for 9 analytes were above laboratory limits in sample 15KR089SD. These analytes have been qualified as estimated with high bias, “J+“, with the exception of manganese. The manganese result was greater than 4 times the spiking concentration so no qualification was necessary. Eleven analytes had high RPDs. Three of these were qualified due to MS recoveries. Eight analytes have been qualified as estimated, “J”, due to the high RPDs.
  - The Method 7470 MS/MSD recoveries for mercury were above laboratory limits in sample 15KR089SD; the RPD was high as well. The parent sample result was greater than 4 times the spiking concentration so no qualification was necessary.
  - The Method 6010 MS/MSD recoveries for aluminum, calcium, iron, magnesium, and potassium were above laboratory limits in sample 15KR097SD. Parent sample results for calcium, magnesium, and potassium have been qualified as

estimated with a high bias, "J+". The sample results for aluminum and iron were greater than 4 times the spiking concentration and therefore no qualification was necessary.

- The Method 6020 MS/MSD recoveries for 6 analytes were above laboratory limits in sample 15KR097SD. These analytes have been qualified as estimated with high bias, "J+", with the exception of manganese. The manganese result was greater than 4 times the spiking concentration so no qualification was necessary.

### **3.5 LABORATORY CONTROL SAMPLE ANALYSIS**

The LCS is analyzed to monitor the efficiency of the digestion/extraction procedure and analytical instrument operation. The ability of the laboratory to successfully analyze an LCS demonstrates that there are no analytical problems related to the digestion/sample preparation procedures and/or instrument operations. Sporadic and marginal QC failures for multiple component methods do not indicate an analytical concern. If recoveries are high and the compounds are not detected in the samples, then no data qualification is required. All recoveries should be above 10% or the non-detect results flagged "UR" as rejected.

### **REVIEW RESULTS**

All LCS analyses performed at the required frequency and within control limits with the following exceptions:

- The Method 8260 LCS recoveries for o-xylene were above laboratory limits. Associated sample results were reported as not detected and since the bias was high, no qualification was necessary.
- The Method 8270 LCS recoveries were below laboratory limits for twelve analytes; nine of those had high duplicate RPDs. Associated sample results have been qualified as estimated with a low bias, "UJ-/J-".

### **3.6 MERCURY SPECIATION ASSESSMENT**

Mercury is extracted from an accurately weighed sediment sample into five different solutions that can be broadly linked to types of mercury compounds based on solubility under the various test conditions. The extractants used are: deionized water (F0 & F1), a synthetic "stomach acid" (F2), 1M potassium hydroxide solution (F3), 12M nitric acid (F4),

and aqua regia (F5). All sample extracts are analyzed in accordance with EPA Method 1631.

## **REVIEW RESULTS**

All data were reviewed and considered usable with qualification as noted in this report with the following exception:

- Sample 15KR089SD had a high lab duplicate RPD in fractions F3, F4, and F5. Associated sample results have been qualified as estimated, "J".

Method blank detections are subtracted out per the method so no qualification was necessary for any method blank detections.

### **3.7 COMPOUND IDENTIFICATION AND QUANTITATION**

Compound identities are assigned by comparing sample compound retention times to retention times from known (standard) compounds and identification of an acceptable mass spectrum. Compounds detected below the PQL in samples should be considered estimated and are qualified "J." The samples with compounds above the linear range were all re-analyzed at a higher dilution factor.

## **REVIEW RESULTS**

All compound identification and quantitation criteria were achieved.

Samples 0915FB03 and 0915TB02 were reanalyzed due to detections. Reanalysis confirmed results.

## **4. FIELD DUPLICATE SAMPLE RESULTS**

Field duplicate samples were collected and analyzed as an indication of overall precision for both field and laboratory. Field duplicate results are summarized in Table 8 (if applicable). The results are expected to have more variability than laboratory duplicates, which measure only laboratory precision. It is expected also that soil field duplicates will exhibit greater variance than water field duplicates due to the difficulties associated with collecting identical field samples. The QC criteria used to assess field duplicate samples for this project was limits of 70% RPD for soils and 40% RPD for waters, or twice the general laboratory duplicate criteria. If a given compound in both the regular sample and

associated field duplicate sample was below the laboratory PQL, or the compound was not detected in one of the samples, then the compound is generally not qualified due to field duplicate precision.

## **REVIEW RESULTS**

Three groundwater, one surface water, and three soil field duplicates were analyzed in this SDG. The RPD ratings are listed on Table 8 as “Good” if the RPD is less than field duplicate QC criteria of 40% for waters and 70% for soils and as “Poor” if the RPD exceeded the field duplicate QC criteria.

All the results show good precision in the sample pairs with the exceptions noted in Tables 8a through 8g.

## **5. OVERALL ASSESSMENT OF DATA**

All data were reviewed and considered usable with qualification as noted in this report.

All of the coolers containing all water and soil (sediment) samples were received by TestAmerica in good condition and at temperatures of 4 °C or colder. TestAmerica subsequently delivered one cooler each of water samples and soil (sediment) samples to TestAmerica’s sub-subcontract lab, Brooks Rand Labs for selected mercury analyses. The cooler containing the water samples (for EPA Method 1631 analysis) was received at 5.9 °C and the cooler containing 14 soil (sediment) samples (for EPA Method 1630 for methyl mercury and Hg SSE analyses) was received at 7.3 °C. All methyl mercury and Hg SSE results for the 14 soil samples have been qualified as estimated, “J”, due to the temperature exceedance. While the data has been qualified, the temperature exceedance was less than 2 °C above the limit indicating the samples were preserved on ice for shipping, although not enough to maintain the required temperature. It is likely the samples were exposed to the slightly elevated temperature for only a short time and results should not have been impacted significantly.

**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analysis
580-53253-1	GW	0915MW01GW	580-53253-5	9/3/2015	RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW06GW	580-53253-6	9/8/2015		6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW08GW	580-53253-7	9/8/2015		6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW09GW	580-53253-8	9/9/2015	RS02	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW10GW	580-53253-9	9/5/2015	FD1, RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW16GW	580-53253-10	9/5/2015	RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW17GW	580-53253-11	9/5/2015	RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW19GW	580-53253-12	9/8/2015	MS/MSD	8260, 8270, AK101, 102, 103, 6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW22GW	580-53253-13	9/9/2015		8260, 8270, AK101, 102, 103, 6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW26GW	580-53253-14	9/4/2015	RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW27GW	580-53253-15	9/4/2015	RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW28GW	580-53253-16	9/4/2015	RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW29GW	580-53253-17	9/7/2015	RS02	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW31GW	580-53253-18	9/6/2015	RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW32GW	580-53253-19	9/8/2015		6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	GW	0915MW33GW	580-53253-20	9/8/2015		6010, 6020, 7470, 300, 353.2, 2320, 2540D, 1631 (T&D)

**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analysis
580-53253-1	GW	0915MW40GW	580-53253-21	9/6/2015	RS02	6010, 6020, 7470, 300, 353.2, 2320, 2540D,1631 (T&D)
580-53253-1	GW	0915MW42GW	580-53253-22	9/6/2015	RS02	6010, 6020, 7470, 300, 353.2, 2320, 2540D,1631 (T&D)
580-53253-1	GW	0915MW43GW	580-53253-23	9/6/2015	FD2, RS02	6010, 6020, 7470, 300, 353.2, 2320, 2540D,1631 (T&D)
580-53253-1	GW	0915MW50GW	580-53253-24	9/5/2015	FD1, RS01	6010, 6020, 7470, 300, 353.2, 2320, 2540D,1631 (T&D)
580-53253-1	GW	0915MW51GW	580-53253-25	9/6/2015	FD2, RS02	6010, 6020, 7470, 300, 353.2, 2320, 2540D,1631 (T&D)
580-53253-1	SW	0915RD52GW	580-53253-26	9/9/2015		8260, 8270, AK101, 102, 103,
580-53253-1	SW	0915RD05SW	580-53253-27	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)
580-53253-1	SW	0915RD06SW	580-53253-28	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)
580-53253-1	SW	0915RD08SW	580-53253-29	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)
580-53253-1	SW	0915RD09SW	580-53253-30	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)
580-53253-1	SW	0915RD10SW	580-53253-31	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)
580-53253-1	SW	0915RD14SW	580-53253-32	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)
580-53253-1	SW	0915RD15SW	580-53253-33	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)
580-53253-1	SW	0915RD16SW	580-53253-34	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)

**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analysis
580-53253-1	SW	0915RD25SW	580-53253-35	9/9/2015		6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540(C&D), 9060, 1631 (T&D)
580-53253-1	AQ	0915RS01GW	580-53253-36	9/7/2015	Rinsate - Submersible pump	6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	AQ	0915RS02GW	580-53253-37	9/7/2015	Rinsate - Bladder Pump	6010(T&D), 6020 (T&D), 7470(T&D), 300, 353.2, 2320, 2540D, 1631 (T&D)
580-53253-1	AQ	0915FB01	580-53253-2	9/10/2015	Ambient Field Blank	1631 (T)
580-53253-1	AQ	0915FB02	580-53253-3	9/10/2015	Ambient Field Blank	1631 (T)
580-53253-1	AQ	0915FB03	580-53253-4	9/10/2015	Ambient Field Blank	1631 (T)
580-53253-1	AQ	0915TB02	580-53253-42	9/10/2015	Trip Blank	1631 (T)
580-53253-1	Soil	15KR082SD	580-53253-43	9/2/2015		6010, 6020, 7471, 9060, 2216, 422
580-53253-1	Soil	15KR083SD	580-53253-44	9/2/2015		6010, 6020, 7471, 9060, 2216, 422
580-53253-1	Soil	15KR084SD	580-53253-45	9/5/2015	FD5, RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR085SD	580-53253-46	9/5/2015		6010, 6020, 7471, 9060, 2216, 422
580-53253-1	Soil	15KR086SD	580-53253-47	9/2/2015		6010, 6020, 7471, 9060, 2216, 422
580-53253-1	Soil	15KR087SD	580-53253-48	9/6/2015		6010, 6020, 7471, 9060, 2216, 422
580-53253-1	Soil	15KR088SD	580-53253-49	9/2/2015	RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR089SD	580-53253-50	9/6/2015	MS/MSD RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR090SD	580-53253-51	9/3/2015		6010, 6020, 7471, 9060, 2216, 422
580-53253-1	Soil	15KR091SD	580-53253-52	9/6/2015	RS05	6010, 6020, 7471, 9060, 2216, , 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR092SD	580-53253-53	9/3/2015	RS04	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR093SD	580-53253-54	9/6/2015	RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G



**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analysis
580-53253-1	Soil	15KR094SD	580-53253-55	9/3/2015		6010, 6020, 7471, 9060, 2216, 422,
580-53253-1	Soil	15KR095SD	580-53253-56	9/3/2015		6010, 6020, 7471, 9060, 2216, 422,
580-53253-1	Soil	15KR096SD	580-53253-57	9/3/2015	FD3, RS04	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR097SD	580-53253-58	9/3/2015	MS/MSD, RS04	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR098SD	580-53253-59	9/4/2015	RS04	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR099SD	580-53253-60	9/5/2015	FD4	6010, 6020, 7471, 9060, 2216, 422,
580-53253-1	Soil	15KR100SD	580-53253-61	9/4/2015	RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR101SD	580-53253-62	9/4/2015	RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR102SD	580-53253-63	9/5/2015	RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR103SD	580-53253-64	9/5/2015		6010, 6020, 7471, 9060, 2216, 422,
580-53253-1	Soil	15KR104SD	580-53253-65	9/5/2015	RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR105SD	580-53253-66	9/5/2015	RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR106SD	580-53253-67	9/4/2015		6010, 6020, 7471, 2216
580-53253-1	Soil	15KR107SD	580-53253-68	9/4/2015		6010, 6020, 7471, 2216
580-53253-1	Soil	15KR108SD	580-53253-69	9/4/2015	EB	6010, 6020, 7471, 2216
580-53253-1	Soil	15KR109SD	580-53253-70	9/4/2015		6010, 6020, 7471, 2216
580-53253-1	Soil	15KR200SD	580-53253-71	9/4/2015	FD3, RS04	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	Soil	15KR201SD	580-53253-72	9/5/2015	FD4	6010, 6020, 7471, 9060, 2216, 422,
580-53253-1	Soil	15KR202SD	580-53253-73	9/5/2015	FD5, RS05	6010, 6020, 7471, 9060, 2216, 422, Hg Speciation, 1630, 2540G
580-53253-1	AQ	0915EB01	580-53253-1	9/10/2015	Hand Scoop	6010, 6020, 7470, 1630 (T)
580-53253-1	AQ	0915RS03	580-53253-38	9/7/2015	Rinsate van Veen	6010, 6020, 7471, 1630 (T)
580-53253-1	AQ	0915RS04	580-53253-39	9/7/2015	Rinsate Lg auger	6010(T&D), 6020 (T&D), 7470(T&D), 1630 (T)

**Table 1 - Sample Listing**

Work Order	Matrix	Sample ID	Lab ID	Sample Date	QA/QC	Analysis
580-53253-1	AQ	0915RS05	580-53253-40	9/7/2015	Rinsate auger	6010(T&D), 6020 (T&D), 7470(T&D), 1630 (T)

**Table 2 - List of Samples Qualified for Preservation Exceedance**

Analyses	Sample IDs	Cooler Temp (°C)	Temp Limit (°C)	Qual
Hg Speciation, 1630, 2540G	15KR084SD	7.3	6.0	J
Hg Speciation, 1630, 2540G	15KR088SD	7.3	6.0	J
Hg Speciation, 1630, 2540G	15KR089SD	7.3	6.0	J
Hg Speciation, 1630, 2540G	15KR091SD	7.3	6.0	J
Hg Speciation, 1630, 2540G	15KR092SD	7.3	6.0	J
Hg Speciation, 1630, 2540G	15KR093SD	7.3	6.0	J
1630, 2540G	15KR096SD	7.3	6.0	J
Hg Speciation, 1630, 2540G	15KR097SD	7.3	6.0	J
1630, 2540G	15KR098SD	7.3	6.0	J
1630, 2540G	15KR100SD	7.3	6.0	J
1630, 2540G	15KR101SD	7.3	6.0	J
1630, 2540G	15KR102SD	7.3	6.0	J
1630, 2540G	15KR104SD	7.3	6.0	J
1630, 2540G	15KR105SD	7.3	6.0	J
1630, 2540G	15KR200SD	7.3	6.0	J
Hg Speciation, 1630, 2540G	15KR202SD	7.3	6.0	J

**Table 3a - List of Positive Results for Blank Samples**

Method	Sample ID	Sample Type	Analyte	Result	Qual	Anal Type	Units	PQL
AK102&103	580-201180	Method Blank	DRO	0.031	J	MB	mg/L	0.10
EPA 6010	580-202249	Method Blank	Calcium	0.119	J	MB	mg/L	1.1
EPA 1631	MB 151533	Method Blank	Mercury (T&D)	0.50	None	MB	ng/L	0.58
EPA 300	0915RS01GW	Rinsate Blank	Chloride	0.090	J	Water	mg/L	0.50
EPA 300	0915RS01GW	Rinsate Blank	Fluoride	0.030	J	Water	mg/L	0.20
EPA 300	0915RS01GW	Rinsate Blank	Sulfate	410		Water	mg/L	12
EPA 6010	0915RS01GW	Rinsate Blank	Calcium	0.33	J	Water	mg/L	1.1
EPA 6020	0915RS01GW	Rinsate Blank	Antimony	0.0014		Water	mg/L	0.0004
EPA 6020	0915RS01GW	Rinsate Blank	Arsenic	0.0057		Water	mg/L	0.0010
EPA 6020	0915RS01GW	Rinsate Blank	Barium	0.0015		Water	mg/L	0.0012
EPA 6020	0915RS01GW	Rinsate Blank	Cadmium	0.00005	J	Water	mg/L	0.0004
EPA 6020	0915RS01GW	Rinsate Blank	Chromium	0.00081		Water	mg/L	0.0004
EPA 6020	0915RS01GW	Rinsate Blank	Copper	0.0021		Water	mg/L	0.002
EPA 6020	0915RS01GW	Rinsate Blank	Lead	0.00023	J	Water	mg/L	0.0004
EPA 6020	0915RS01GW	Rinsate Blank	Manganese	0.0028		Water	mg/L	0.002
EPA 6020	0915RS01GW	Rinsate Blank	Nickel	0.00089	J	Water	mg/L	0.003
EPA 6020	0915RS01GW	Rinsate Blank	Zinc	0.0055	J	Water	mg/L	0.007
EPA 1631	0915RS01GW	Rinsate Blank	Mercury (T)	41.1	None	Water	ng/L	0.58
EPA 1631	0915RS01GW	Rinsate Blank	Mercury (D)	1.40	J*	Water	ng/L	0.58
EPA 300	0915RS02GW	Rinsate Blank	Chloride	0.14	J	Water	mg/L	0.50
EPA 300	0915RS02GW	Rinsate Blank	Fluoride	0.040	J	Water	mg/L	0.20
EPA 300	0915RS02GW	Rinsate Blank	Sulfate	1500		Water	mg/L	120
EPA 353.2	0915RS02GW	Rinsate Blank	Nitrate/nitrite	0.0084	J	Water	mg/L	0.050
EPA 6010	0915RS02GW	Rinsate Blank	Calcium	0.11	J	Water	mg/L	1.1
EPA 6020	0915RS02GW	Rinsate Blank	Antimony	0.0012		Water	mg/L	0.0004
EPA 6020	0915RS02GW	Rinsate Blank	Arsenic	0.0063		Water	mg/L	0.0010
EPA 6020	0915RS02GW	Rinsate Blank	Barium	0.0012		Water	mg/L	0.0012
EPA 6020	0915RS02GW	Rinsate Blank	Chromium	0.00071		Water	mg/L	0.00040
EPA 6020	0915RS02GW	Rinsate Blank	Copper	0.0013	J	Water	mg/L	0.0020
EPA 6020	0915RS02GW	Rinsate Blank	Lead	0.000096	J	Water	mg/L	0.00040

**Table 3a - List of Positive Results for Blank Samples**

Method	Sample ID	Sample Type	Analyte	Result	Qual	Anal Type	Units	PQL
EPA 6020	0915RS02GW	Rinsate Blank	Manganese	0.0018	J	Water	mg/L	0.0020
EPA 6020	0915RS02GW	Rinsate Blank	Nickel	0.00064	J	Water	mg/L	0.0030
EPA 6020	0915RS02GW	Rinsate Blank	Zinc	0.0051	J	Water	mg/L	0.0070
EPA 1631	0915RS02GW	Rinsate Blank	Mercury (T)	69.7	None	Water	ng/L	0.58
EPA 1631	0915RS02GW	Rinsate Blank	Mercury (D)	2.04	J*	Water	ng/L	0.58
EPA 1631	0915FB03	GW Ambient	Mercury (T)	1.82	J*	Water	ng/L	0.58
EPA 1631	0915TB02	Trip Blank	Mercury (T)	0.88	J*	Water	ng/L	0.58
EPA 6020	0915EB01	Equipment Blank	Antimony	0.000084	J	Water	mg/L	0.00040
EPA 6020	0915EB01	Equipment Blank	Barium	0.00012	J	Water	mg/L	0.0012
EPA 6020	0915EB01	Equipment Blank	Cadmium	0.00041		Water	mg/L	0.00040
EPA 6020	0915EB01	Equipment Blank	Chromium	0.00021	J	Water	mg/L	0.00040
EPA 6020	0915EB01	Equipment Blank	Lead	0.000042	J	Water	mg/L	0.00040
EPA 6020	0915EB01	Equipment Blank	Zinc	0.0019	J	Water	mg/L	0.0070
EPA 6010	0915RS03	Rinsate Blank	Calcium	0.036	J	Water	mg/L	1.1
EPA 6020	0915RS03	Rinsate Blank	Antimony	0.00018	J	Water	mg/L	0.00040
EPA 6020	0915RS03	Rinsate Blank	Barium	0.00072	J	Water	mg/L	0.0012
EPA 6020	0915RS03	Rinsate Blank	Chromium	0.00031	J	Water	mg/L	0.00040
EPA 6020	0915RS03	Rinsate Blank	Copper	0.00076	J	Water	mg/L	0.0020
EPA 6020	0915RS03	Rinsate Blank	Lead	0.00012	J	Water	mg/L	0.00040
EPA 6020	0915RS03	Rinsate Blank	Manganese	0.0040		Water	mg/L	0.0020
EPA 6020	0915RS03	Rinsate Blank	Zinc	0.0033	J	Water	mg/L	0.0070
EPA 6020	0915RS04	Rinsate Blank	Antimony	0.00012	J	Water	mg/L	0.00040
EPA 6020	0915RS04	Rinsate Blank	Barium	0.0083		Water	mg/L	0.0012
EPA 6020	0915RS04	Rinsate Blank	Chromium	0.00042		Water	mg/L	0.00040
EPA 6020	0915RS04	Rinsate Blank	Manganese	0.0013	J	Water	mg/L	0.0020
EPA 6020	0915RS04	Rinsate Blank	Zinc	0.0027	J	Water	mg/L	0.0070
EPA 6020	0915RS05	Rinsate Blank	Barium	0.00026	J	Water	mg/L	0.0012
EPA 6020	0915RS05	Rinsate Blank	Chromium	0.00025	J	Water	mg/L	0.00040
EPA 6020	0915RS05	Rinsate Blank	Manganese	0.00061	J	Water	mg/L	0.0020

\*qualified due to MB contamination and not appropriate for field blank evaluation

**Table 3b - List of Samples Qualified for Method Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
AK102&103	0915MW19GW	DRO	0.031	0.052	U	0.10
AK102&103	0915MW52GW	DRO	0.031	0.072	U	0.10
EPA 1631	0915MW08GW	Mercury (D)	0.50	0.45	U	0.58
EPA 1631	0915MW19GW	Mercury (D)	0.50	1.15	U	0.58
EPA 1631	0915MW31GW	Mercury (D)	0.50	1.12	U	0.58
EPA 1631	0915MW40GW	Mercury (D)	0.50	1.87	U	0.58
EPA 1631	0915RD05SW	Mercury (D)	0.50	1.48	U	0.58
EPA 1631	0915RD10SW	Mercury (D)	0.50	1.96	U	0.58
EPA 1631	0915RS01GW	Mercury (D)	0.50	1.40	U	0.58
EPA 1631	0915RS02GW	Mercury (D)	0.50	2.04	U	0.58
EPA 1631	0915TB02	Mercury (T)	0.50	0.88	U	1.44
EPA 1631	0915FB03	Mercury (T)	0.50	1.82	U	0.58

**Table 3c - List of Samples Qualified for Field Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
EPA 300	0915MW01GW	Fluoride	0.030	0.13	U	0.2
EPA 300	0915MW01GW	Sulfate	410	10	U	1.2
EPA 6020	0915MW01GW	Antimony	0.0014	0.0018	U	0.00040
EPA 6020	0915MW01GW	Arsenic	0.0057	0.0068	U	0.001
EPA 6020	0915MW01GW	Cadmium	0.00005	0.00020	U	0.00040
EPA 6020	0915MW01GW	Chromium	0.00081	0.00120	U	0.00040
EPA 6020	0915MW01GW	Copper	0.0021	0.0029	U	0.002
EPA 6020	0915MW01GW	Lead	0.00023	0.00039	U	0.00040
EPA 6020	0915MW01GW	Nickel	0.00089	0.0042	U	0.003

**Table 3c - List of Samples Qualified for Field Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
EPA 6020	0915MW01GW	Zinc	0.0055	0.016	U	0.007
EPA 300	0915MW10GW	Sulfate	410	7.9	U	1.2
EPA 6020	0915MW10GW	Antimony	0.0014	0.0056	U	0.00040
EPA 6020	0915MW10GW	Cadmium	0.00005	0.000037	U	0.00040
EPA 6020	0915MW10GW	Chromium	0.00081	0.00017	U	0.00040
EPA 6020	0915MW10GW	Lead	0.00023	0.00011	U	0.00040
EPA 300	0915MW16GW	Sulfate	410	220	U	1.2
EPA 6020	0915MW16GW	Cadmium	0.00005	0.0005	U	0.00040
EPA 6020	0915MW16GW	Chromium	0.00081	0.0012	U	0.00040
EPA 6020	0915MW16GW	Copper	0.0021	0.0016	U	0.002
EPA 6020	0915MW16GW	Lead	0.00023	0.00034	U	0.00040
EPA 6020	0915MW16GW	Zinc	0.0055	0.0077	U	0.007
EPA 300	0915MW17GW	Fluoride	0.030	0.12	U	0.2
EPA 6020	0915MW17GW	Sulfate	410	7.1	U	1.2
EPA 6020	0915MW17GW	Arsenic	0.0057	0.0053	U	0.00040
EPA 6020	0915MW17GW	Cadmium	0.00005	0.00013	U	0.00040
EPA 6020	0915MW17GW	Chromium	0.00081	0.00053	U	0.00040
EPA 6020	0915MW17GW	Lead	0.00023	0.00033	U	0.00040
EPA 6020	0915MW17GW	Nickel	0.00089	0.00056	U	0.003
EPA 6020	0915MW17GW	Zinc	0.0055	0.0024	U	0.007
EPA 300	0915MW26GW	Sulfate	410	45	U	1.2
EPA 6020	0915MW26GW	Cadmium	0.00005	0.000076	U	0.00040
EPA 6020	0915MW26GW	Chromium	0.00081	0.00080	U	0.00040
EPA 6020	0915MW26GW	Copper	0.0021	0.00087	U	0.002
EPA 6020	0915MW26GW	Lead	0.00023	0.00011	U	0.00040
EPA 6020	0915MW26GW	Zinc	0.0055	0.0042	U	0.007
EPA 300	0915MW27GW	Sulfate	410	170	U	1.2
EPA 6020	0915MW27GW	Cadmium	0.00005	0.00013	U	0.00040
EPA 6020	0915MW27GW	Chromium	0.00081	0.00068	U	0.00040

**Table 3c - List of Samples Qualified for Field Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
EPA 6020	0915MW27GW	Zinc	0.0055	0.22	U	0.007
EPA 300	0915MW28GW	Sulfate	410	37	U	1.2
EPA 6020	0915MW28GW	Cadmium	0.00005	0.00003	U	0.00040
EPA 6020	0915MW28GW	Chromium	0.00081	0.0033	U	0.00040
EPA 6020	0915MW28GW	Copper	0.0021	0.0018	U	0.002
EPA 6020	0915MW28GW	Lead	0.00023	0.00045	U	0.00040
EPA 6020	0915MW28GW	Nickel	0.00089	0.010	U	0.003
EPA 6020	0915MW28GW	Zinc	0.0055	0.0051	U	0.007
EPA 6020	0915MW31GW	Fluoride	0.030	0.090	U	0.2
EPA 6020	0915MW31GW	Sulfate	410	0.78	U	1.2
EPA 6020	0915MW31GW	Antimony	0.0014	0.00014	U	0.00040
EPA 6020	0915MW31GW	Arsenic	0.0057	0.00082	U	0.001
EPA 6020	0915MW31GW	Cadmium	0.00005	0.0028	U	0.00040
EPA 6020	0915MW31GW	Chromium	0.00081	0.00093	U	0.00040
EPA 6020	0915MW31GW	Lead	0.00023	0.00033	U	0.00040
EPA 6020	0915MW31GW	Nickel	0.00089	0.0014	U	0.003
EPA 6020	0915MW31GW	Zinc	0.0055	0.0035	U	0.007
EPA 300	0915MW50GW	Sulfate	410	8.0	U	1.2
EPA 6020	0915MW50GW	Antimony	0.0014	0.00060	U	0.00040
EPA 6020	0915MW50GW	Chromium	0.00081	0.00021	U	0.00040
EPA 6020	0915MW50GW	Lead	0.00023	0.00075	U	0.00040
EPA 300	0915MW09GW	Fluoride	0.040	0.17	U	0.2
EPA 300	0915MW09GW	Sulfate	1500	6.9	U	1.2
EPA 6020	0915MW09GW	Arsenic	0.0063	0.0076	U	0.0010
EPA 6020	0915MW09GW	Chromium	0.00071	0.00047	U	0.0004
EPA 6020	0915MW09GW	Copper	0.0013	0.0017	U	0.002
EPA 6020	0915MW09GW	Zinc	0.0051	0.0053	U	0.007
EPA 300	0915MW29GW	Fluoride	0.040	0.14	U	0.2
EPA 300	0915MW29GW	Sulfate	1500	32	U	1.2



**Table 3c - List of Samples Qualified for Field Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
EPA 6020	0915MW29GW	Antimony	0.0012	0.00023	U	0.0004
EPA 6020	0915MW29GW	Chromium	0.00071	0.00032	U	0.0004
EPA 6020	0915MW29GW	Zinc	0.0051	0.0022	U	0.007
EPA 300	0915MW40GW	Fluoride	0.040	0.23	U	0.2
EPA 300	0915MW40GW	Sulfate	1500	9.3	U	1.2
EPA 6020	0915MW40GW	Chromium	0.00071	0.00037	U	0.0004
EPA 6020	0915MW40GW	Lead	0.000096	0.000075	U	0.0004
EPA 6020	0915MW40GW	Zinc	0.0051	0.0050	U	0.007
EPA 300	0915MW42GW	Fluoride	0.040	0.16	U	0.2
EPA 300	0915MW42GW	Sulfate	1500	17	U	1.2
EPA 6020	0915MW42GW	Chromium	0.00071	0.0016	U	0.0004
EPA 6020	0915MW42GW	Copper	0.0013	0.0014	U	0.002
EPA 6020	0915MW42GW	Lead	0.000096	0.00018	U	0.0004
EPA 6020	0915MW42GW	Zinc	0.0051	0.012	U	0.007
EPA 300	0915MW43GW	Fluoride	0.040	0.19	U	0.2
EPA 300	0915MW43GW	Sulfate	1500	15	U	1.2
EPA 6020	0915MW43GW	Chromium	0.00071	0.0013	U	0.0004
EPA 6020	0915MW43GW	Copper	0.0013	0.00075	U	0.002
EPA 6020	0915MW43GW	Lead	0.000096	0.00010	U	0.0004
EPA 6020	0915MW43GW	Zinc	0.0051	0.0060	U	0.007
EPA 300	0915MW51GW	Fluoride	0.040	0.19	U	0.2
EPA 300	0915MW51GW	Sulfate	1500	15	U	1.2
EPA 6020	0915MW51GW	Chromium	0.00071	0.00034	U	0.0004
EPA 6020	0915MW51GW	Copper	0.0013	0.00061	U	0.002
EPA 6020	0915MW51GW	Lead	0.000096	0.000097	U	0.0004
EPA 6020	0915MW51GW	Zinc	0.0051	0.0064	U	0.007
EPA 1631	0915MW01GW	Mercury (T)	41.1	16.9	U	0.58
EPA 1631	0915MW10GW	Mercury (T)	41.1	26.1	U	0.58
EPA 1631	0915MW31GW	Mercury (T)	41.1	35.5	U	0.58

**Table 3c - List of Samples Qualified for Field Blank Contamination**

Method	Sample ID	Analyte	Blank Result	Sample Result	Sample Qual	PQL
EPA 1631	0915MW50GW	Mercury (T)	41.1	37.2	U	0.58
EPA 1631	0915MW29GW	Mercury (T)	69.7	11.7	U	0.58
EPA 1631	0915MW40GW	Mercury (T)	69.7	30.9	U	0.58
EPA 1631	0915MW42GW	Mercury (T)	69.7	259	U	0.58
EPA 1631	0915MW43GW	Mercury (T)	69.7	74.2	U	0.58
EPA 1631	0915MW51GW	Mercury (T)	69.7	68.2	U	0.58

**Table 4 - List of Samples with Surrogates outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Rec.	Low Limit	High Limit	Dil Fac.	Sample Qual.
None.								

**Table 5a - List of MS/MSD Recoveries outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac.	Low Limit	High Limit	Sample Qual	Reportable
EPA 8260	0915MW19GW	Water	Toluene	ND	5.0	128	1.0	80	126	None	Yes
EPA 8260	0915MW19GW	Water	Ethyl benzene	ND	5.0	133	1.0	79	132	None	Yes
EPA 8260	0915MW19GW	Water	o-Xylene	ND	5.0	141	1.0	72	137	None	Yes
EPA 8270	0915MW19GW	Water	2,4-Dimethylphenol	ND	2.0	21	1.0	30	135	UJ-	Yes
EPA 8270	0915MW19GW	Water	2,4-Dinitrophenol	ND	4.0	0	1.0	50	130	UJ-	Yes
EPA 8270	0915MW19GW	Water	2,4-Dinitrotoluene	ND	2.0	73	1.0	75	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	2,6-Dinitrotoluene	ND	2.0	68	1.0	75	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	2-Nitrophenol	ND	2.0	33	1.0	55	140	UJ-	Yes

**Table 5a - List of MS/MSD Recoveries outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac.	Low Limit	High Limit	Sample Qual	Reportable
EPA 8270	0915MW19GW	Water	3,3'-Dichlorobenzidine	ND	2.0	4	1.0	20	175	UJ-	Yes
EPA 8270	0915MW19GW	Water	3-Nitroaniline	ND	2.0	18	1.0	75	140	UJ-	Yes
EPA 8270	0915MW19GW	Water	4,6-Dinitro-2-methylphenol	ND	4.0	0	1.0	50	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	4-Chloroaniline	ND	2.0	0	1.0	35	175	UJ-	Yes
EPA 8270	0915MW19GW	Water	4-Nitroaniline	ND	2.0	51	1.0	70	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	Acenaphthylene	ND	2.0	34	1.0	65	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	Anthracene	ND	2.0	20	1.0	50	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	Benzo[a]pyrene	ND	2.0	15	1.0	45	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	Benzoic acid	ND	4.0	148	1.0	20	140	None	Yes
EPA 8270	0915MW19GW	Water	Benzyl alcohol	ND	2.0	21	1.0	65	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	Butyl benzyl phthalate	ND	2.0	151	1.0	60	150	None	Yes
EPA 8270	0915MW19GW	Water	Hexachlorocyclopentadiene	ND	2.0	0	1.0	20	125	UJ-	Yes
EPA 8270	0915MW19GW	Water	Nitrobenzene	0.83	2.0	38	1.0	70	125	J-	Yes
AK102&103	0915MW19GW	Water	DRO	0.052	2.0	61	1.0	75	125	J-	Yes
EPA 300	0915MW19GW	Water	Chloride	0.59	50	127	1.0	90	110	J+	Yes
EPA 300	0915MW19GW	Water	Fluoride	0.13	5	120	1.0	90	110	J+	Yes
EPA 300	0915MW19GW	Water	Sulfate	4.8	50	123	1.0	90	110	J+	Yes
EPA 6010	15KR089SD	Soil	Aluminum	8600	364	985	1.0	80	120	None – 4X	Yes
EPA 6010	15KR089SD	Soil	Calcium	3300	728	31	1.0	80	120	None – 4X	Yes
EPA 6010	15KR089SD	Soil	Iron	57000	801	- 1746	1.0	80	120	None – 4X	Yes
EPA 6010	15KR089SD	Soil	Magnesium	6600	728	63	1.0	80	120	None – 4X	Yes
EPA 6020	15KR089SD	Soil	Arsenic	27	168	145	50	80	120	J+	Yes
EPA 6020	15KR089SD	Soil	Antimony	17	126	163	50	80	120	J+	Yes
EPA 6020	15KR089SD	Soil	Barium	96	168	123	50	80	120	J+	Yes
EPA 6020	15KR089SD	Soil	Chromium	23	17	180	50	80	120	J+	Yes

**Table 5a - List of MS/MSD Recoveries outside Control Limits**

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac.	Low Limit	High Limit	Sample Qual	Reportable
EPA 6020	15KR089SD	Soil	Copper	40	21	202	50	80	120	J+	Yes
EPA 6020	15KR089SD	Soil	Manganese	3800	42	- 2343	50	80	120	None – 4X	Yes
EPA 6020	15KR089SD	Soil	Nickel	51	42	172	50	80	120	J+	Yes
EPA 6020	15KR089SD	Soil	Vanadium	32	42	131	50	80	120	J+	Yes
EPA 6020	15KR089SD	Soil	Zinc	96	168	124	50	80	120	J+	Yes
EPA 7470	15KR089SD	Soil	Mercury	2.1	0.17	2788	10	80	120	None – 4X	Yes
EPA 6010	15KR097SD	Soil	Aluminum	4700	423	433	1.0	80	120	None – 4X	Yes
EPA 6010	15KR097SD	Soil	Calcium	2400	847	312	1.0	80	120	J+	Yes
EPA 6010	15KR097SD	Soil	Iron	12000	931	238	1.0	80	120	None – 4X	Yes
EPA 6010	15KR097SD	Soil	Magnesium	2800	847	149	1.0	80	120	J+	Yes
EPA 6010	15KR097SD	Soil	Potassium	480	847	141	1.0	80	120	J+	Yes
EPA 6020	15KR097SD	Soil	Barium	74	210	142	50	80	120	J+	Yes
EPA 6020	15KR097SD	Soil	Chromium	15	21	133	50	80	120	J+	Yes
EPA 6020	15KR097SD	Soil	Copper	9.3	26	126	50	80	120	J+	Yes
EPA 6020	15KR097SD	Soil	Manganese	340	52	299	50	80	120	None – 4X	Yes
EPA 6020	15KR097SD	Soil	Nickel	18	52	123	50	80	120	J+	Yes
EPA 6020	15KR097SD	Soil	Vanadium	22	52	127	50	80	120	J+	Yes
EPA 1630	15KR089SD	Soil	Methyl Mercury	0.061	93	62	1	65	135	UJ-	Yes

**Table 5b – List of Lab Duplicate and MSD RPDs outside Control Limits**

Sample ID	Analyte	Method	RPD	RPD Limit	No. of Affected Samples	Samp Qual
LCS 580-200775	2,4-Dimethylphenol	EPA 8270	31	20	3	J
LCS 580-200775	2,4-Dinitrophenol	EPA 8270	38	20	3	J
LCS 580-200775	2-Nitrophenol	EPA 8270	33	20	3	J
LCS 580-200775	4,6-Dinitro-2-methylphenol	EPA 8270	37	20	3	J
LCS 580-200775	4-Chloroaniline	EPA 8270	24	20	3	J
LCS 580-200775	Acenaphthylene	EPA 8270	28	20	3	J
LCS 580-200775	Benzo[a]pyrene	EPA 8270	29	20	3	J
LCS 580-200775	Benzyl alcohol	EPA 8270	185	20	3	J
LCS 580-200775	Hexachlorocyclopentadiene	EPA 8270	101	20	3	J
0915MW19GW	2,4-Dimethylphenol	EPA 8270	54	20	1	J
0915MW19GW	Benzo[a]pyrene	EPA 8270	35	20	1	J
15KR089SD	Sodium	EPA 6010	30	20	1	J
15KR089SD	Calcium	EPA 6010	21	20	1	J
15KR089SD	Arsenic	EPA 6020	56	20	1	J
15KR089SD	Antimony	EPA 6020	48	20	1	J
15KR089SD	Barium	EPA 6020	31	20	1	J
15KR089SD	Beryllium	EPA 6020	24	20	1	J
15KR089SD	Cadmium	EPA 6020	30	20	1	J
15KR089SD	Cobalt	EPA 6020	21	20	1	J
15KR089SD	Lead	EPA 6020	24	20	1	J
15KR089SD	Manganese	EPA 6020	24	20	1	None – 4X
15KR089SD	Selenium	EPA 6020	30	20	1	J
15KR089SD	Silver	EPA 6020	29	20	1	J
15KR089SD	Thallium	EPA 6020	30	20	1	J
15KR089SD	Mercury	7470	122	20	1	None – 4X
15KR097SD	Manganese	EPA 6020	39	20	1	None – 4X
0915MW17GW	Mercury (T)	EPA 1631	27	24	1	J

**Table 5b – List of Lab Duplicate and MSD RPDs outside Control Limits**

Sample ID	Analyte	Method	RPD	RPD Limit	No. of Affected Samples	Samp Qual
0915MW28GW	Mercury (T)	EPA 1631	33	24	1	J
0915RD05SW	Mercury (T)	EPA 1631	32	24	1	J
15KR097SD	Mercury (T)	EPA 1630	41	30	1	J
15KR089SD	Hg Spec (F3)	Hg Speciation	88	35	1	J
15KR089SD	Hg Spec (F4)	Hg Speciation	70	35	1	J
15KR089SD	Hg Spec (F5)	Hg Speciation	85	35	1	J
15KR089SD	Methyl mercury	EPA 1630	42	35	1	J

**Table 6 - List of LCS Recoveries outside Control Limits**

Method	Sample ID	Analyte	%Rec.	Low Limit	High Limit	No. of Affected Samples	Samp Qual
EPA 8260	LCS 580-200928	o-Xylene	128	80	120	3	Det results J+, ND no qual
EPA 8270	LCS 580-200775	2,4-Dimethylphenol	13	30	125	3	UJ-/J-
EPA 8270	LCS 580-200775	2,4-Dinitrophenol	19	24	146	3	UJ-/J-
EPA 8270	LCS 580-200775	2-Nitrophenol	48	55	140	3	UJ-/J-
EPA 8270	LCS 580-200775	3,3'-Dichlorobenzidine	4	20	175	3	UJ-/J-
EPA 8270	LCS 580-200775	3-Nitroaniline	19	22	124	3	UJ-/J-
EPA 8270	LCS 580-200775	4,6-Dinitro-2-methylphenol	13	50	136	3	UJ-/J-
EPA 8270	LCS 580-200775	4-Chloroaniline	1	20	150	3	UJ-/J-
EPA 8270	LCS 580-200775	Acenaphthylene	46	62	125	3	UJ-/J-
EPA 8270	LCS 580-200775	Anthracene	32	50	125	3	UJ-/J-
EPA 8270	LCS 580-200775	Benzo[a]pyrene	20	45	125	3	UJ-/J-
EPA 8270	LCS 580-200775	Benzyl alcohol	3	41	144	3	UJ-/J-
EPA 8270	LCS 580-200775	Hexachlorocyclopentadiene	3	20	125	3	UJ-/J-

**Table 7 –Samples that were Re-analyzed**

Sample ID	Method	Sample Type	Action
0915FB03	EPA 1631	FB	Confirmed
0915TB02	EPA 1631	FB	Confirmed

**Table 8a – Summary of Field Duplicate Results**

Method	Analyte	Units	0915MW10GW	0915MW50GW	RPD	Rating	Sample Qualifier
EPA 300	Chloride	mg/L	0.76	0.75	1.3%	Good	None
EPA 300	Sulfate	mg/L	7.9	8.0	1.3%	Good	None
SM 2320	Alkalinity	mg/L	170	170	0.0%	Good	None
EPA 6010	Calcium	mg/L	21	21	0.0%	Good	None
EPA 6010	Magnesium	mg/L	32	31	3.2%	Good	None
EPA 6010	Sodium	mg/L	3.3	3.2	3.1%	Good	None
EPA 6020	Antimony	mg/L	0.00056	0.00060	6.9%	Good	None
EPA 6020	Arsenic	mg/L	0.10	0.032	103.0%	Poor	J
EPA 6020	Barium	mg/L	0.086	0.086	0.0%	Good	None
EPA 6020	Manganese	mg/L	0.13	0.12	8.0%	Good	None
EPA 1631	Mercury (T)	ng/L	26.1	37.2	35.1%	Good	None
EPA 1631	Mercury (D)	ng/L	32.3	6.43	133.6%	Poor	J



**Table 8b – Summary of Field Duplicate Results**

Method	Analyte	Units	0915MW43GW	0915MW51GW	RPD	Rating	Sample Qualifier
EPA 300	Chloride	mg/L	1.3	1.3	0.0%	Good	None
EPA 300	Sulfate	mg/L	15	15	0.0%	Good	None
SM 2320	Alkalinity	mg/L	120	120	0.0%	Good	None
SM 2540	TSS	mg/L	3.2	3.0	6.5%	Good	None
EPA 6010	Calcium	mg/L	22	22	0.0%	Good	None
EPA 6010	Magnesium	mg/L	17	17	0.0%	Good	None
EPA 6010	Sodium	mg/L	5.3	5.5	3.7%	Good	None
EPA 6020	Antimony	mg/L	0.0092	0.0090	2.2%	Good	None
EPA 6020	Arsenic	mg/L	0.038	0.039	2.6%	Good	None
EPA 6020	Barium	mg/L	0.086	0.087	1.2%	Good	None
EPA 6020	Cobalt	mg/L	0.033	0.034	3.0%	Good	None
EPA 6020	Manganese	mg/L	2.5	2.5	0.0%	Good	None
EPA 6020	Nickel	mg/L	0.10	0.10	0.0%	Good	None
EPA 1631	Mercury (T)	ng/L	74.3	68.2	8.6%	Good	None
EPA 1631	Mercury (D)	ng/L	7.55	4.48	51.0%	Poor	J

**Table 8c – Summary of Field Duplicate Results**

Method	Analyte	Units	0915MW22GW	0915MW52GW	RPD	Rating	Sample Qualifier
EPA 1631	Mercury (T)	ng/L	74.3	68.2	8.6%	Good	None

**Table 8d – Summary of Field Duplicate Results**

Method	Analyte	Units	0915RD14SW	0915RD25SW	RPD	Rating	Sample Qualifier
EPA 300	Chloride	mg/L	0.57	0.50	13.1%	Good	None
EPA 300	Sulfate	mg/L	8.4	8.4	0.0%	Good	None
EPA 353.2	Nitrate/nitrite	mg/L	0.14	0.15	6.9%	Good	None
EPA 9060	TOC	mg/L	2.4	2.4	0.0%	Good	None
SM 2320	Alkalinity	mg/L	86	110	24.5%	Good	None
SM 2540	TDS	mg/L	120	100	18.2%	Good	None
EPA 6010	Calcium (D)	mg/L	20	20	0.0%	Good	None
EPA 6010	Magnesium (D)	mg/L	11	11	0.0%	Good	None
EPA 6020	Antimony (D)	mg/L	0.0086	0.0086	0.0%	Good	None
EPA 6020	Arsenic (D)	mg/L	0.0062	0.0063	1.6%	Good	None
EPA 6020	Barium (D)	mg/L	0.026	0.026	0.0%	Good	None
EPA 6020	Manganese (D)	mg/L	0.015	0.015	0.0%	Good	None
EPA 6010	Calcium (T)	mg/L	20	19	5.1%	Good	None
EPA 6010	Magnesium (T)	mg/L	11	11	0.0%	Good	None
EPA 6020	Antimony (T)	mg/L	0.0085	0.0083	2.4%	Good	None
EPA 6020	Arsenic (T)	mg/L	0.0064	0.0064	0.0%	Good	None
EPA 6020	Barium (T)	mg/L	0.025	0.025	0.0%	Good	None
EPA 6020	Manganese (T)	mg/L	0.020	0.020	0.0%	Good	None
EPA 1631	Mercury (T)	ng/L	10.1	8.43	18.0%	Good	None
EPA 1631	Mercury (D)	ng/L	3.32	4.47	29.5%	Good	None

**Table 8e – Summary of Field Duplicate Results**

Method	Analyte	Units	15KR098SD	15KR200SD	RPD	Rating	Sample Qualifier
EPA 6010	Aluminum	mg/Kg	3700	5300	35.6%	Good	None
EPA 6010	Calcium	mg/Kg	1000	1900	62.1%	Good	None
EPA 6010	Iron	mg/Kg	9800	14000	35.3%	Good	None
EPA 6010	Magnesium	mg/Kg	2100	2900	32.0%	Good	None
EPA 6010	Potassium	mg/Kg	410	460	11.5%	Good	None
EPA 6020	Arsenic	mg/Kg	8.6	14	47.8%	Good	None
EPA 6020	Antimony	mg/Kg	0.85	1.7	66.7%	Good	None
EPA 6020	Barium	mg/Kg	58	65	11.4%	Good	None
EPA 6020	Beryllium	mg/Kg	0.14	0.20	35.3%	Good	None
EPA 6020	Cadmium	mg/Kg	0.14	0.19	30.3%	Good	None
EPA 6020	Chromium	mg/Kg	12	15	22.2%	Good	None
EPA 6020	Cobalt	mg/Kg	4.8	7.6	45.2%	Good	None
EPA 6020	Copper	mg/Kg	7.0	12	52.6%	Good	None
EPA 6020	Lead	mg/Kg	2.6	3.8	37.5%	Good	None
EPA 6020	Manganese	mg/Kg	310	420	30.1%	Good	None
EPA 6020	Nickel	mg/Kg	15	22	37.8%	Good	None
EPA 6020	Vanadium	mg/Kg	17	23	30.0%	Good	None
EPA 6020	Zinc	mg/Kg	29	43	38.9%	Good	None
EPA 7471	Mercury	mg/Kg	0.37	2.1	140.1%	Poor	J
EPA 9060	TOC - Quad	mg/Kg	2400	1700	34.1%	Good	None
D 422	Gravel	%	43.2	47.7	9.9%	Good	None
D 422	Course sand	%	15.1	13.9	8.3%	Good	None
D 422	Medium sand	%	17.1	15.7	8.5%	Good	None
D 422	Fine sand	%	23.1	21.9	5.3%	Good	None
D 422	Silt	%	1.1	0.9	20.0%	Good	None
D2216	% Solids	%	81	85	4.8%	Good	None
2540G	% Solids	%	80.09	80.81	0.9%	Good	None

**Table 8f – Summary of Field Duplicate Results**

Method	Analyte	Units	15KR099SD	15KR201SD	RPD	Rating	Sample Qualifier
EPA 6010	Aluminum	mg/Kg	5300	5200	1.9%	Good	None
EPA 6010	Calcium	mg/Kg	1700	2000	16.2%	Good	None
EPA 6010	Iron	mg/Kg	12000	13000	8.0%	Good	None
EPA 6010	Magnesium	mg/Kg	3000	3000	0.0%	Good	None
EPA 6010	Potassium	mg/Kg	510	540	5.7%	Good	None
EPA 6020	Arsenic	mg/Kg	8.4	8.1	3.6%	Good	None
EPA 6020	Antimony	mg/Kg	0.51	0.55	7.5%	Good	None
EPA 6020	Barium	mg/Kg	70	71	1.4%	Good	None
EPA 6020	Beryllium	mg/Kg	0.25	0.23	8.3%	Good	None
EPA 6020	Cadmium	mg/Kg	0.14	0.42	100.0%	Poor	J
EPA 6020	Chromium	mg/Kg	17	16	6.1%	Good	None
EPA 6020	Cobalt	mg/Kg	6.7	6.2	7.8%	Good	None
EPA 6020	Copper	mg/Kg	12	12	0.0%	Good	None
EPA 6020	Lead	mg/Kg	4.6	4.4	4.4%	Good	None
EPA 6020	Manganese	mg/Kg	180	170	5.7%	Good	None
EPA 6020	Nickel	mg/Kg	22	21	4.7%	Good	None
EPA 6020	Selenium	mg/Kg	0.89	0.95	6.5%	Good	None
EPA 6020	Vanadium	mg/Kg	24	24	0.0%	Good	None
EPA 6020	Zinc	mg/Kg	52	49	5.9%	Good	None
EPA 9060	TOC - Quad	mg/Kg	4200	3900	7.4%	Good	None
D 422	Gravel	%	10.4	3.7	95.0%	Poor	J
D 422	Course sand	%	3.5	2.7	25.8%	Good	None
D 422	Medium sand	%	4.6	4.8	4.3%	Good	None
D 422	Fine sand	%	73.4	80.3	9.0%	Good	None
D 422	Silt	%	4.5	6.6	37.8%	Good	None
D 422	Clay	%	3.6	2.1	52.6%	Good	None
D2216	% Solids	%	68	77	12.4%	Good	None
SM 2540G	% Solids	%	80.09	80.81	0.9%	Good	None

**Table 8g – Summary of Field Duplicate Results**

Method	Analyte	Units	15KR084SD	15KR202SD	RPD	Rating	Sample Qualifier
EPA 6010	Aluminum	mg/Kg	5200	5100	1.9%	Good	None
EPA 6010	Calcium	mg/Kg	1600	1600	0.0%	Good	None
EPA 6010	Iron	mg/Kg	19000	19000	0.0%	Good	None
EPA 6010	Magnesium	mg/Kg	2500	2500	0.0%	Good	None
EPA 6010	Potassium	mg/Kg	590	600	1.7%	Good	None
EPA 6020	Arsenic	mg/Kg	510	320	45.8%	Good	None
EPA 6020	Antimony	mg/Kg	920	880	4.4%	Good	None
EPA 6020	Barium	mg/Kg	120	120	0.0%	Good	None
EPA 6020	Beryllium	mg/Kg	0.29	0.29	0.0%	Good	None
EPA 6020	Cadmium	mg/Kg	0.18	0.23	24.4%	Good	None
EPA 6020	Chromium	mg/Kg	19	19	0.0%	Good	None
EPA 6020	Cobalt	mg/Kg	8.0	8.9	10.7%	Good	None
EPA 6020	Copper	mg/Kg	19	21	10.0%	Good	None
EPA 6020	Lead	mg/Kg	6.7	6.3	6.2%	Good	None
EPA 6020	Manganese	mg/Kg	350	320	9.0%	Good	None
EPA 6020	Nickel	mg/Kg	27	31	13.8%	Good	None
EPA 6020	Selenium	mg/Kg	0.88	1.0	12.8%	Good	None
EPA 6020	Vanadium	mg/Kg	23	25	8.3%	Good	None
EPA 6020	Zinc	mg/Kg	54	60	10.5%	Good	None
EPA 7471	Mercury	mg/Kg	31	27	13.8%	Good	None
EPA 9060	TOC - Quad	mg/Kg	4500	5500	20.0%	Good	None
D 422	Gravel	%	48.3	24.7	64.7%	Good	None
D 422	Course sand	%	9.1	14.3	44.4%	Good	None
D 422	Medium sand	%	10.4	15.7	40.6%	Good	None
D 422	Fine sand	%	25.3	35.3	33.0%	Good	None
D 422	Silt	%	5.5	7.7	33.3%	Good	None
D 422	Clay	%	1.5	2.2	37.8%	Good	None
D2216	% Solids	%	82	82	0.0%	Good	None

**Table 8g – Summary of Field Duplicate Results**

<b>Method</b>	<b>Analyte</b>	<b>Units</b>	<b>15KR084SD</b>	<b>15KR202SD</b>	<b>RPD</b>	<b>Rating</b>	<b>Sample Qualifier</b>
2540G	% Solids	%	81.84	76.81	6.3%	Good	None
EPA 1630	Mercury	ng/g	18700	33100	55.6%	Good	None
Hg Speciation	Mercury F1	ng/g	271	244	10.5%	Good	None
Hg Speciation	Mercury F3	ng/g	1680	1960	15.4%	Good	None
Hg Speciation	Mercury F4	ng/g	6000	3720	46.9%	Good	None
Hg Speciation	Mercury F5	ng/g	9140	9790	6.9%	Good	None
Hg Speciation	Methyl mercury	ng/g	0.788	1.05	28.5%	Good	None

# C

## Sediment Toxicity Testing Report

This appendix was provided by a third party lab, as a scanned document. It is not fully accessible. If you need assistance with this appendix, please contact the BLM Alaska Public Information Center 907-271-5960, [BLM\\_AK\\_AKSO\\_Public\\_Room@blm.gov](mailto:BLM_AK_AKSO_Public_Room@blm.gov).



*This page intentionally left blank.*



## ANALYTICAL REPORT

Job Number: 580-53253-3

Job Description: Red Devil Mine - 2014-2015

For:  
Ecology and Environment, Inc.  
Pacific Building  
720 Third Avenue  
Suite 1700  
Seattle, WA 98104  
Attention: Mark Longtine



Approved for release.  
Kristine D Allen  
Manager of Project Management  
12/22/2015 5:18 PM

---

Kristine D Allen, Manager of Project Management  
5755 8th Street East, Tacoma, WA, 98424  
(253)248-4970  
kristine.allen@testamericainc.com  
12/22/2015

cc: Sub contracting

TestAmerica Tacoma is a part of TestAmerica Laboratories, Inc.

This report is issued solely for the use of the person or company to whom it is addressed. Any use, copying or disclosure other than by the intended recipient is unauthorized. If you have received this report in error, please notify the sender immediately at 253-922-2310 and destroy this report immediately.

This report shall not be reproduced except in full, without prior express written approval by the laboratory. The results relate only to the item(s) tested and the sample(s) as received by the laboratory.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan and meet all requirements of NELAC. All data have been found to be compliant with laboratory protocol, with the exception of any items noted in the case narrative.

**TestAmerica Laboratories, Inc.**

TestAmerica Seattle 5755 8th Street East, Tacoma, WA 98424  
Tel (253) 922-2310 Fax (253) 922-5047 [www.testamericainc.com](http://www.testamericainc.com)



# Table of Contents

Cover Title Page .....	1
Data Summaries .....	3
Report Narrative .....	3
Sample Summary .....	4
Method Summary .....	5
Data Qualifiers .....	6
Certification Summary .....	7
Subcontracted Data .....	8
Shipping and Receiving Documents .....	184
Client Chain of Custody .....	185
Sample Receipt Checklist .....	216

**Job Narrative**  
**580-53253-3**

**Comments**

No additional comments.

**Receipt**

The samples were received on 9/12/2015 11:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 19 coolers at receipt time were 1.3° C, 1.4° C, 1.6° C, 1.7° C, 2.0° C, 2.1° C, 2.4° C, 2.7° C, 2.7° C, 2.9° C, 3.0° C, 3.1° C, 3.4° C, 3.6° C, 3.6° C, 3.9° C, 3.9° C and 4.0° C.

**Subcontract Work**

Method Toxicity - EPA 100.4 was subcontracted to Northwestern Aquatic Sciences. The subcontract laboratory certification is different from that of the facility issuing the final report.

## SAMPLE SUMMARY

Client: Ecology and Environment, Inc.

Job Number: 580-53253-3

<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>Client Matrix</b>	<b>Date/Time Sampled</b>	<b>Date/Time Received</b>
580-53253-43	15KR082SD	Solid	09/02/2015 1111	09/11/2015 1711
580-53253-44	15KR083SD	Solid	09/02/2015 1320	09/11/2015 1711
580-53253-45	15KR084SD	Solid	09/05/2015 1616	09/11/2015 1711
580-53253-46	15KR085SD	Solid	09/02/2015 1700	09/11/2015 1711
580-53253-48	15KR087SD	Solid	09/02/2015 1825	09/11/2015 1711
580-53253-49	15KR088SD	Solid	09/02/2015 1900	09/11/2015 1711
580-53253-50	15KR089SD	Solid	09/06/2015 1330	09/11/2015 1711
580-53253-51	15KR090SD	Solid	09/03/2015 0944	09/11/2015 1711
580-53253-52	15KR091SD	Solid	09/06/2015 1730	09/11/2015 1711
580-53253-53	15KR092SD	Solid	09/03/2015 1140	09/11/2015 1711
580-53253-54	15KR093SD	Solid	09/06/2015 1930	09/11/2015 1711
580-53253-60	15KR099SD	Solid	09/05/2015 1050	09/11/2015 1711

## METHOD SUMMARY

Client: Ecology and Environment, Inc.

Job Number: 580-53253-3

<b>Description</b>	<b>Lab Location</b>	<b>Method</b>	<b>Preparation Method</b>
<b>Matrix: Solid</b>			
General Sub Contract Method	TAL SEA	Subcontract	

### Lab References:

TAL SEA = TestAmerica Seattle

### Method References:

## DATA REPORTING QUALIFIERS

Lab Section	Qualifier	Description
-------------	-----------	-------------

---

# Certification Summary

Client: Ecology and Environment, Inc.  
Project/Site: Red Devil Mine - 2014-2015

TestAmerica Job ID: 580-53253-3

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Seattle	Alaska (UST)	State Program	10	UST-022
TestAmerica Seattle	California	State Program	9	2901
TestAmerica Seattle	L-A-B	DoD ELAP		L2236
TestAmerica Seattle	L-A-B	ISO/IEC 17025		L2236
TestAmerica Seattle	Montana (UST)	State Program	8	N/A
TestAmerica Seattle	Oregon	NELAP	10	WA100007
TestAmerica Seattle	US Fish & Wildlife	Federal		LE058448-0
TestAmerica Seattle	USDA	Federal		P330-14-00126
TestAmerica Seattle	Washington	State Program	10	C553

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

**Report**

**of**

**Test No. 874-1**

**Assessment of Freshwater Sediments Using a 28-day Amphipod, *Hyalella azteca*, Sediment Bioassay as Part of the Kuskokwim River Sediment Characterization**

**Submitted to**

**Test America  
5755 8th Street East  
Tacoma, WA 98424**

**Prepared by**

**Northwestern Aquatic Sciences  
3814 Yaquina Bay Road  
P.O. Box 1437  
Newport, OR 97365**

**December 22, 2015**



## TOXICITY TEST REPORT

## TEST IDENTIFICATION

Test No.: 874-1Title: Toxicity of freshwater sediments using a 28-day Amphipod, *Hyalella azteca*, sediment bioassay as part of the Kuskokwim River Sediment Characterization.Protocol No.: NAS-XXX-HA4c, February 11, 2000. Revision 3 (4-26-05). Based on ASTM 2001 (Standard test methods for measuring the toxicity of sediment-associated contaminants with fresh water invertebrates, E1706-00), Am. Soc. Test. Mat., Phila., PA, and EPA Method 100.1 (Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates, EPA/600/R-99/064).

## STUDY MANAGEMENT

Study Sponsor: Test America, Inc., 5755 8th Street East, Tacoma, WA 98424Sponsor's Study Monitor: Ms. Kristine AllenTesting Laboratory: Northwestern Aquatic Sciences, P.O. Box 1437, Newport, OR 97365Test Location: Newport laboratoryLaboratory's Study Personnel: G.J. Irissarri, B.S., Proj. Man./Study Dir.; L.K. Nemeth, B.A., M.B.A., QA Officer; G.A. Buhler, B.S., Aq. Toxicologist; J. B. Brown, B.S., D.V.M., Assoc. Aq. Toxicol., Y. Nakahama, Sr.Tech.; L. Brady, B.S., Tech.Study Schedule:

Test Beginning: 9-25-15, 1030 hrs.

Test Ending: 10-23-15, 1100 hrs.

Disposition of Study Records: All raw data, reports and other study records are stored at Northwestern Aquatic Sciences, 3814 Yaquina Bay Rd., Newport, OR 97365.Statement of Quality Assurance: The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol and standard operating procedures. This report is an accurate reflection of the raw data.

## TEST MATERIAL

Test Sediments: Freshwater test sediments collected as part of the Kuskokwim River Sediment Characterization. Details are as follows:

NAS Sample No.	5428G	5429G	5430G	5431G
Description	15KR082SD	15KR083SD	15KR084SD	15KR085SD
Collection Date	9/2/15	9/2/15	9/5/15	9/2/15
Receipt Date	9/22/15	9/22/15	9/22/15	9/22/15
NAS Sample No.	5432G	5433G	5434G	5435G
Description	15KR087SD	15KR088SD	15KR089SD	15KR090SD
Collection Date	9/2/15	9/2/15	9/6/15	9/3/15
Receipt Date	9/22/15	9/22/15	9/22/15	9/22/15
NAS Sample No.	5436G	5437G	5438G	5439G
Description	15KR091SD	15KR092SD	15KR093SD	15KR099SD
Collection Date	9/6/15	9/3/15	9/6/15	9/5/15
Receipt Date	9/22/15	9/22/15	9/22/15	9/22/15

Control Sediment: The negative control sediment (NAS#5427G) was collected on 9-21-15 from an area approximately one mile east of the Hwy. 101 bridge at Beaver Creek, approx. 8 miles south of Newport, OR.Treatments: Homogenized at test set up by mixing using stainless steel implements.Storage: All test and control sediments were stored at 4°C in the dark in sealed containers until used.

**TEST WATER**

Source: Dechlorinated municipal tap water.

Date of Preparation: 9-22-15 and 10-3-15

Water Quality: (water quality was not recorded for third batch)

pH: 7.0, 6.9

conductivity: 98, 102  $\mu$ mhos/cm

hardness: 17, 26 mg/L as CaCO<sub>3</sub>

alkalinity: 40, 40 mg/L as CaCO<sub>3</sub>.

total chlorine: < 0.02, <0.02 mg/L

Pretreatment: Dechlorinated and aerated  $\geq$ 24 hr.

**TEST ORGANISMS**

Species: *Hyalella azteca*, amphipod.

Age/Size: 7-8 days old

Source: Chesapeake Cultures, Hayes, VA; received 9-23-15

Acclimation: Holding conditions for the three days prior to testing averaged: Temperature, 21.3  $\pm$  1.0  $^{\circ}$ C; dissolved oxygen, 10.8  $\pm$  3.7 mg/L; pH, 7.3  $\pm$  0.2; conductivity, 329  $\pm$  235  $\mu$ mhos/cm; hardness, 74  $\pm$  40 mg/L as CaCO<sub>3</sub>; and alkalinity, 117  $\pm$  72 mg/L as CaCO<sub>3</sub>. Photoperiod, 16:8, L:D. Half of the water was replaced daily with dechlorinated municipal tap water during holding. Animals were fed YTC daily during holding.

**TEST PROCEDURES AND CONDITIONS**

The following is an abbreviated statement of the test procedures and a statement of the test conditions actually employed. See the test protocol (Appendix I) for a more detailed description of the test procedures used in this study.

Test Chambers: 300 ml high-form glass beakers

Test Volumes: 100 ml sediment layer; 175 ml test water.

Replicates/Treatment: 8 (plus two additional WQ beakers)

Organisms/Treatment: 80

Water Volume Changes: 2 water volumes per day

Aeration: None.

Feeding: Animals are fed 1.0 ml of YTC suspension per beaker daily.

Effects Criteria: 1) survival after 28 days, and 2) average individual dry weight after 28 days. Death is defined as no visible movement or response to tactile stimulation. Missing organisms were considered to be dead.

Water Quality and Other Test Conditions: The temperature, dissolved oxygen, conductivity, pH, hardness, alkalinity, and ammonia-nitrogen were measured in the overlying water of one replicate test container per treatment on days 0 and 28 of the test. Temperature was measured daily, pH and dissolved oxygen three times per week, and conductivity weekly, in the overlying water of one replicate test container per treatment. Hardness and alkalinity were measured with titrimetric methods. Ammonia-N was measured using Hach reagents based on the salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric method; samples were not distilled prior to analysis. The photoperiod was 16:8, L:D.

**DATA ANALYSIS METHODS**

Survival, mortality and average individual dry weight were calculated for each replicate as follows:

percent survival = 100 x (number surviving/initial number tested)

percent mortality = 100 x (number dead/initial number tested)

average individual dry weight = (final wt. - tare wt.)/number weighed,  
where:

final wt. = tare wt. + dry weight of organisms recovered on day 28, in mg

Means and standard deviations for the biological endpoints described above, and for water quality data, were computed using Microsoft Excel 2010. Individual dry weight and proportion survived in each test sediment was compared against that in the control, each of the two references, and the pooled data of both references (using either a Nonparametric Two Sample Test or Parametric Two Sample Test at the 0.05 level of significance). The software used for most of the statistical comparisons was CETIS v1.8.7.4 (Tidepool Scientific Software). BioStat (version Feb 9, 2006 (EXCEL) bioassay software developed by the U.S. Army Corps of Engineers, Seattle District) was used in the statistical comparison of both proportion survived and dry weight between reference 15KR082SD and reference 15KR083SD and also for the comparison of proportion survived between reference 15KR082SD and the test sediments.

## PROTOCOL DEVIATIONS

None

## REFERENCE TOXICANT TEST

The reference toxicant test is a multi-concentration toxicity test using potassium chloride, to evaluate the performance of the test organisms used in the sediment toxicity test. The performance is evaluated by comparing the results of this test with historical results obtained at the laboratory. A summary of the reference toxicant test result is given below. The reference toxicant test raw data are found in Appendix III.

Test No.: 999-3476

Reference Toxicant and Source: Potassium Chloride (KCl), Fisher Lot #114689.

Test Date: 9-25-15

Dilution Water Used: Moderately hard synthetic water prepared from Milli-Q® deionized water.

Result: 96-hr LC50, 0.38 g/L. This result is within the laboratory's control chart warning limits (0.27 – 0.46 g/L).

## TEST RESULTS

Observations of water quality in the overlying water throughout the test are summarized in Table 1. A detailed tabulation of the water quality results by sample and test day can be found in Appendix II. The means and standard deviations of percent survival and average dry weight of *Hyalella* exposed for 28 days to sediments are summarized in Table 3. Detailed data organized by sample and replicate, and summary statistics for these observations, are given in Appendix II.

All water quality observations of overlying water temperature and dissolved oxygen were within the protocol specified ranges. Ammonia-N in the overlying water ranged between <0.1 and 0.3 mg/L for all day 0 and day 28 measurements. The test met the survival acceptability criteria specified in the test protocol with 93.8 % mean control survival ( $\geq 80\%$  mean survival required). The reference toxicant test results were within control chart limits.

Control survival and growth were not significantly different from that in either reference sediment. Reference sediment 15KR082SD survival was significantly less than reference sediment 15KR083SD, but reference sediment 15KR083SD survival was not significantly different from reference 15KR082SD. Two test sediments, 15KR089SD and 15KR091SD, exhibited statistically significantly lower survival ( $p < 0.05$ ) than that of the control, each of the two reference sediments (15KR082SD and 15KR083SD) and the pooled data from both references. The survival of sample 15KR093SD was statistically significantly lower ( $p < 0.05$ ) than that of the control, reference 15KR083SD, and the pooled reference. Additionally, the growth of 15KR093SD was statistically significantly lower ( $p < 0.05$ ) than that of the control, each of the two reference sediments, and the pooled reference. See Table 2.

**STUDY APPROVAL**

Muhammad Alkissawi 12-22-15  
Project Manager/Study Director      Date

Julie R. Fione 12-22-15  
Quality Assurance Unit      Date

[Signature] for Linda Nemeth 12-22-15  
Assistant Laboratory Director      Date

Table 1. Summary of water quality conditions during tests of the amphipod, *Hyaella azteca*, exposed to freshwater sediments.

Water Quality Parameter	Mean $\pm$ S.D.	Minimum	Maximum	N
Temperature ( $^{\circ}$ C)	23.2 $\pm$ 0.4	22.0	24.0	377
Dissolved oxygen (mg/L)	7.0 $\pm$ 0.6	5.4	8.3	169
Conductivity ( $\mu$ hos/cm)	108 $\pm$ 22	93	290	78
pH	6.8 $\pm$ 0.2	6.4	7.3	169
Hardness (mg/L as CaCO <sub>3</sub> )	30 $\pm$ 4	26	34	26
Alkalinity (mg/L as CaCO <sub>3</sub> )	44 $\pm$ 5	40	50	26
Total ammonia (mg/L)	---	<0.1	0.3	26

Table 2. Survival and growth results of *Hyaella azteca* 28-day sediment toxicity test.

NAS Sample No.	Sample Description	Percent survival (Mean $\pm$ SD)	Average dry wt/amphipod (mg) (Mean $\pm$ SD)
5427G	Control	93.8 $\pm$ 9.2	0.26 $\pm$ 0.05
5428G	15KR082SD	81.3 $\pm$ 15.5 <sup>§</sup>	0.26 $\pm$ 0.06
5429G	15KR083SD	96.3 $\pm$ 5.2	0.25 $\pm$ 0.04
5430G	15KR084SD	92.5 $\pm$ 10.4	0.24 $\pm$ 0.02
5431G	15KR085SD	92.5 $\pm$ 8.9	0.28 $\pm$ 0.04
5432G	15KR087SD	90.0 $\pm$ 14.1	0.23 $\pm$ 0.05
5433G	15KR088SD	88.8 $\pm$ 12.5	0.28 $\pm$ 0.03
5434G	15KR089SD	61.3 $\pm$ 17.3 <sup>*‡§†</sup>	0.23 $\pm$ 0.03
5435G	15KR090SD	92.5 $\pm$ 17.5	0.22 $\pm$ 0.04
5436G	15KR091SD	61.3 $\pm$ 12.5 <sup>*‡§†</sup>	0.24 $\pm$ 0.04
5437G	15KR092SD	90.0 $\pm$ 12.0	0.23 $\pm$ 0.02
5438G	15KR093SD	70.0 $\pm$ 26.2 <sup>*§†</sup>	0.20 $\pm$ 0.03 <sup>*‡§†</sup>
5439G	15KR099SD	90.0 $\pm$ 10.7	0.28 $\pm$ 0.04

\*Significant difference from the control sediment (p<0.05).  
<sup>‡</sup>Significant difference from the reference sediment 15KR082SD (p<0.05).  
<sup>§</sup>Significant difference from the reference sediment 15KR083SD (p<0.05).  
<sup>†</sup>Significant difference from the pooled data of references of 15KR082SD & 15KR083SD (p<0.05).

**APPENDIX I**  
**PROTOCOL**

TEST PROTOCOL

FRESHWATER AMPHIPOD, *HYALELLA AZTECA*,  
28-DAY SEDIMENT SURVIVAL AND GROWTH TEST

1. INTRODUCTION

1.1 Purpose of Study: The purpose of this study is to characterize the chronic toxicity of freshwater sediments using a 28-day exposure and survival and growth endpoints with the amphipod, *Hyaella azteca*.

1.2 Referenced Method: This protocol is based on ASTM Method E 1706-00 (ASTM 2001) and EPA Method 100.1 (EPA/600/R-99/064)

1.3 Summary of Method: A summary of test conditions for the amphipod 28-day sediment survival and growth test is tabulated below. The test with *Hyaella azteca* is conducted at  $23 \pm 1^\circ\text{C}$  with a 16L:8D photoperiod at an illuminance of about 100-1000 lux. Test chambers are 300-mL high-form lipless beakers containing 100 mL of sediment and 175 mL of overlying water. Ten 7-8day old amphipods are used in each replicate. The number of replicates/treatment depends on the objective of the test. Eight replicates are recommended for routine testing. Amphipods in each test chamber are fed 1.0 mL of YCT food daily. Each chamber receives two volume additions per day of overlying water. Test endpoints include survival and growth.

2. STUDY MANAGEMENT

2.1 Sponsor's Name and Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2.2 Sponsor's Study Monitor:

\_\_\_\_\_

2.3 Name of Testing Laboratory:

Northwestern Aquatic Sciences  
3814 Yaquina Bay Road, P.O. Box 1437  
Newport, OR 97365.

2.4 Test Location:

\_\_\_\_\_

2.5 Laboratory's Personnel to be Assigned to the Study:

Study Director: \_\_\_\_\_  
Quality Assurance Unit: \_\_\_\_\_  
Aquatic Toxicologist: \_\_\_\_\_  
Aquatic Toxicologist: \_\_\_\_\_

2.6 Proposed Testing Schedule: Tests are normally begun within 14 days of sample collection. Reference toxicant test to be run concurrently.

2.7 Good Laboratory Practices: The test is conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).

### 3. TEST MATERIAL

The test materials are freshwater sediments. The control, reference, and test sediments are placed in solvent cleaned 1 L glass jars fitted with PTFE-lined screw caps. At the laboratory the samples are stored at 4°C in the dark. The original sealed containers may be stored for up to 8 weeks prior to testing, depending on the testing requirements. If jars are not full when received or if sediment is removed for testing, headspaces should be filled with nitrogen to retard deterioration. A negative control sediment is collected from a clean site. In addition, a reference sediment, a clean sediment with physical characteristics similar to the test sediments, may be employed as a comparison station.

### 4. TEST WATER

Test water (overlying water) at NAS is normally dechlorinated tap water or moderately hard synthetic water. Synthetic dilution water is prepared from Milli-Q reagent grade water and reagent grade chemicals. Test water may also be well water, surface water, site water, or other water depending on the study design. The hardness or other water quality parameters of the dilution water may need to be adjusted to meet the study design.

### 5. TEST ORGANISMS

5.1 Species: amphipod, *Hyalella azteca*.

5.2 Source: Cultured at NAS. Alternatively, animals may be purchased from a reputable commercial supplier.

5.3 Age: 7-8 days old at start of test

5.4 Acclimation and Pretest Observation: Cultures are maintained at  $23 \pm 1^\circ\text{C}$  under a 16:8 L:D photoperiod. Cultured amphipods are fed dried maple leaves with YTC. Rabbit chow, Tetramin® or TetraFin-® flakes may also be used. Acclimation of test organisms to the test water may be desirable, depending on culture water, but it is not required. If test organisms are to be acclimated, fifty percent of the holding water is changed daily with the addition of test water.

### 6. DESCRIPTION OF TEST SYSTEM

6.1 Test Chambers and Environmental Control: Test chambers used in the toxicity test are 300-mL high-form lipless glass beakers. Test chambers are maintained at constant temperature by partial immersion in a temperature-controlled water bath or by placement in a temperature-controlled room. Aeration is not employed unless dissolved oxygen drops below 2.5 mg/L. The test is conducted under an illuminance of 100-1000 lux with a 16L:8D photoperiod.

6.2 Cleaning: All laboratory glassware, including test chambers, is cleaned as described in EPA/600/4-90/027F. New glassware and test systems are soaked 15 minutes in tap water and scrubbed with detergent (or cleaned in automatic dishwasher); rinsed twice with tap water; carefully rinsed once with fresh, dilute (10%, V:V) hydrochloric or nitric acid to remove scale, metals, and bases; rinsed twice with deionized water; rinsed once with acetone to remove organic compounds (using a fume hood or canopy); and rinsed three times with deionized water. Test systems and chambers are rinsed again with dilution water just before use.



7. EXPERIMENTAL DESIGN AND TEST PROCEDURES

7.1 Experimental Design: The test involves exposure of amphipods to test, control, and reference sediments. The sediments are placed on the bottom of the test containers and are overlain with test water. The test exposure is for 28 days. The renewal of overlying water consists of two volume additions per day, either continuous or intermittent. Each treatment consists of eight replicate test containers, each containing 10 organisms. Test chamber positions are completely randomized. Test organisms are randomly distributed to the test chambers. Blind testing is normally used.

7.2 Setup of Test Containers: Sediments are homogenized and placed in test chambers on the day before addition of test organisms. Sediment (100 ml) is placed into each of eight replicate beakers. After addition of the sediment, 175 ml of test water is gently added to each beaker in a manner to prevent resuspension. The overlying water is replaced twice daily. The test begins when amphipods are introduced to the test chambers. Initial water quality measurements are taken prior to the addition of test organisms.

7.3 Effect Criterion: The effect criteria used in the 28-day amphipod bioassay are mortality and growth. Death is defined as the lack of movement of body or appendages on response to tactile stimulation. Growth is measured as change in dry weight.

7.4 Test Conditions: No aeration is employed unless dissolved oxygen falls below 2.5 mg/L. The test temperature employed is 23 ± 1°C. A 16:8, L:D photoperiod is used. Illumination is supplied by daylight fluorescent lamps at 100-1000lux. The overlying water is replaced twice daily.

7.5 Beginning the Test: On the day the test begins, amphipods are impartially counted into small containers of test water (10/container). The test is begun by rinsing test organisms into the equilibrated test containers. For the growth endpoint, time-zero weight data should be collected.

7.6 Feeding: Amphipods are fed 1.0 mL of YCT daily per test chamber. A feeding may be skipped if there is a build up of excess food. However, all beakers must be treated similarly.

7.7 Test Duration, Type and Frequency of Observations, and Methods: The duration of the toxicity test is 28 days. The type and frequency of observations to be made are summarized as follows:

TYPE OF OBSERVATION	TIMES OF OBSERVATION
<i>BIOLOGICAL DATA</i>	
Survival, growth	Day 28
<i>PHYSICAL AND CHEMICAL DATA</i>	
Hardness, alkalinity, conductivity, and ammonia-N	Beginning and end of test in overlying water of one replicate beaker from each treatment.
Temperature	Daily in overlying water of one replicate beaker from each treatment.
Conductivity	Weekly
Dissolved oxygen and pH	3X/week
Optional pore water ammonia and/or sulfide	In test sediments prior to initiating the tests. Optionally in sediments from sacrificial test chambers at test beginning and/or end.

Dissolved oxygen is measured using a polarographic oxygen probe calibrated according to the manufacturer's recommendations. The pH is measured using a pH probe and a properly calibrated meter with scale divisions of 0.1 pH units. Temperature is measured with a calibrated mercury thermometer or telethermometer. Conductivity is measured with a conductivity meter. Hardness and alkalinity are measured using titrimetric methods. Total soluble sulfide and total ammonia-N were

measured using Hach test kits based on the methylene blue (EPA Method 376.2) and salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric methods, respectively; samples were not distilled prior to analysis.

Overlying water should be sampled just before water renewal from about 1 to 2 cm above the sediment surface using a pipet. It may be necessary to pool water samples from individual replicates. The pipet should be checked to make sure no organisms are removed during sampling of overlying water.

7.8 Test Termination: At test termination, the contents of each test container are sieved through a #35 (500  $\mu$ m mesh) sieve to recover the amphipods. Amphipods from each replicate are put into a 30 mL plastic cup, rinsed with DI water, gently blotted and placed into the appropriate tared aluminum weighing pan. The number of survivors for each container is recorded on the datasheet.

7.9 Growth Measurement: Growth is measured as average dry weight of animals in a test replicate at the end of the test on day 28. Pooled animals from each test replicate are gently blotted and placed into tared aluminum weigh pans. The pans are dried at 60-90°C to constant weight. The dried amphipods are placed into a dessicator and weighed as soon as possible to the nearest 0.01 mg (desirable to use 0.001 mg). The total weight of the dried amphipods in each pan is divided by the number of amphipods weighed to obtain an average dry weight per surviving amphipod per replicate.

## 8. CRITERIA OF TEST ACCEPTANCE

The test results are acceptable if the minimum survival of organisms in the control treatment at the end of the test is at least 80%.

## 9. DATA ANALYSIS

The endpoints of the toxicity test are survival and growth. Survival is obtained as a direct count of living organisms in each test container at the end of the test. Average amphipod dry weight, also measured at the end of the test, may be used to compare growth between treatment sediments and the control or reference sediment. Ordinarily the following data analysis is performed. Due to special requirements, alternative methods may be used. The means and standard deviations are calculated for each treatment level. Identification of toxic sediments is established by statistical comparison of test endpoints between test and control or reference sediments. Between treatment comparisons may be made using a Student's t-test or Wilcoxon's Two-Sample test, where each treatment is compared to the control or the reference sediment. An arcsine-square root transformation of proportional data, and tests for normality and heterogeneity of variances, are performed prior to statistical comparisons.

## 10. REPORTING

The final report of the test results must include all of the following standard information at a minimum: name and identification of the test; the investigator and laboratory; date and time of test beginning and end; information on the test material; information on the source and quality of the overlying/test water; detailed information about the test organisms including acclimation conditions; a description of the experimental design and test chambers and other test conditions including feeding, if any, and water quality; definition of the effect criteria and other observations; responses, if any, in the control treatment; tabulation and statistical analysis of measured responses and a summary table of endpoints; a description of the statistical methods used; any unusual information about the test or deviations from procedures; reference toxicant testing information.

11. STUDY DESIGN ALTERATION

Amendments made to the protocol must be approved by the sponsor and study director and should include a description of the change, the reason for the change, the date the change took effect and the dated signatures of the study director and sponsor. Any deviations in the protocol must be described and recorded in the study raw data.

12. REFERENCE TOXICANT

The reference toxicant test is a standard multi-concentration toxicity test using a specified chemical toxicant to evaluate the performance of test organisms used in the study. Reference toxicant tests are 96-hour, water only exposures, not 28-day sediment exposures. The reference toxicant test is run concurrently. Performance is evaluated by comparing the results of the reference toxicant test with historical results (e.g., control charts) obtained at the laboratory.

13. REFERENCED GUIDELINES

ASTM. 2001. Standard Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Fresh Water Invertebrates. ASTM Standard Method No. E 1706-00. Am. Soc. Test. Mat., Philadelphia, PA.

U.S. EPA. 2000. Section 11, Test Method 100.1, *Hyalella azteca* 10-d Survival and Growth Test for Sediments, pp. 47-54 In: Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates (Second Edition). EPA/600/R-99/064.

Weber, C.I. (Ed.) 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (Fourth Edition). EPA/600/4-90/027F.

14. APPROVALS

\_\_\_\_\_ for \_\_\_\_\_  
Name Date

\_\_\_\_\_ for **Northwestern Aquatic Sciences**  
Name Date

**Appendix A**  
**Test Conditions Summary**

1. Test type	whole sediment toxicity test with renewal of overlying water
2. Test duration	28 days
3. Temperature	23 ± 1°C
4. Light quality	daylight fluorescent light
5. Illuminance	100-1000 lux
6. Photoperiod	16L:8D
7. Test chamber size	300-mL high-form lipless beakers, (Pyrex® 1040 or equivalent)
8. Sediment volume	100 mL
9. Overlying water volume	175 mL
10. Renewal overlying water	2 volume additions/day (continuous or intermittent)
11. Age of test organisms	7-8 days old at test initiation
12. Organisms per test chamber	10
13. Replicates per treatment	8 recommended for routine testing (depends on design)
14. Organisms per treatment	80
15. Feeding regime	YCT food, fed 1.0 mL daily/chamber
16. Cleaning	if screens are used, clean as needed
17. Aeration	None, unless DO falls below 2.5 mg/L
18. Overlying (test) water	Dechlorinated tap water, culture water, well water, surface water, site water or reconstituted water, depending on study design.
19. Water quality	Hardness, alkalinity, conductivity, ammonia-N beginning and end; temperature daily; conductivity weekly; DO & pH 3X/wk
20. Endpoints	Survival & growth (based on weight)
21. Test acceptability criteria	Minimum control survival of 80%
22. Sample holding	14 days at 4°C in the dark (recommended)
23. Sample volume required	1L (800 mL per sediment)
24. Reference toxicant	Concurrent testing required

**APPENDIX II**

**RAW DATA**

**TEST DESCRIPTION, MONITORING, AND RESULTS  
BENCHSHEETS**

Test No. 874-1 Client Test America Investigator \_\_\_\_\_

**STUDY MANAGEMENT**

Client: Test America, Inc., 5755 8th Street East, Tacoma, WA 98424  
 Client's Study Monitor: Ms. Kristine Allen  
 Testing Laboratory: Northwestern Aquatic Sciences  
 Test Location: Newport Laboratory  
 Laboratory's Study Personnel:  
 Proj. Man./Study Dir. G.J. Irissarri <sup>632</sup>  
 QA Officer L.K. Nemeth  
 1. GABbler <sup>08</sup> 2. Lauren Brady <sup>LB</sup>  
 3. J. P. W. W. J. B. 4. Yves Nakagawa  
 5. \_\_\_\_\_ 6. \_\_\_\_\_  
 7. \_\_\_\_\_ 8. \_\_\_\_\_

Study Schedule:  
 Test Beginning: 9-25-15 1030 Test Ending: 10-23-15 1100

**TEST MATERIAL**

General description (see sample logbook/chain-of-custody for details):

NAS Sample No.:	<u>5428G</u>	<u>5429G</u>	<u>5430G</u>	<u>5431G</u>	<u>5432G</u>
Description:	<u>15KR082SD</u>	<u>15KR083SD</u>	<u>15KR084SD</u>	<u>15KR085SD</u>	<u>15KR087SD</u>
Collection Date:	<u>9/2/15</u>	<u>9/2/15</u>	<u>9/5/15</u>	<u>9/2/15</u>	<u>9/2/15</u>
Receipt Date:	<u>9/22/15</u>	<u>9/22/15</u>	<u>9/22/15</u>	<u>9/22/15</u>	<u>9/22/15</u>
_____					
NAS Sample No.:	<u>5433G</u>	<u>5434G</u>	<u>5435G</u>	<u>5436G</u>	<u>5437G</u>
Description:	<u>15KR088SD</u>	<u>15KR089SD</u>	<u>15KR090SD</u>	<u>15KR091SD</u>	<u>15KR092SD</u>
Collection Date:	<u>9/2/15</u>	<u>9/6/15</u>	<u>9/3/15</u>	<u>9/6/15</u>	<u>9/3/15</u>
Receipt Date:	<u>9/22/15</u>	<u>9/22/15</u>	<u>9/22/15</u>	<u>9/22/15</u>	<u>9/22/15</u>
_____					
NAS Sample No.:	<u>5438G</u>	<u>5439G</u>			
Description:	<u>15KR093SD</u>	<u>15KR099SD</u>			
Collection Date:	<u>9/6/15</u>	<u>9/5/15</u>			
Receipt Date:	<u>9/22/15</u>	<u>9/22/15</u>			
_____					
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
_____					
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
_____					

Error codes: 1) correction of handwriting error  
 2) written in wrong location; entry deleted  
 3) wrong date deleted, replaced with correct date  
 4) error found in measurement; measurement repeated





Test No. 874-1 Client Test America Investigator \_\_\_\_\_

**TEST WATER**

Source: Dechlorinated Newport, OR tap water  
 Date of Collection/Preparation: 9-22-15, 10-3-15  
 pH 7.0, 6.9  
 Cond (umhos/cm<sup>2</sup>) 98, 102  
 Hardness (mg/La0) 17, 26  
 Alkalinity (mg/L) 40, 40  
 Total Chlorine (mg/l) <0.02, <0.02  
 Treatments: Aerated ≥ 24 hrs

**TEST ORGANISMS**

Species: Hyalella azteca Age: 7-8 DAYS Date received: 9-23-15  
 Source: Chesapeake Cultures, Hayes, VA

**Acclimation Data:**

Date	Temp. (deg.C)	pH	DO (mg/L)	Cond. umhos/cm	Hardness (mg/L)	Alkalinity (mg/L)	Feeding		Water changes
							Amount	description	
9-23-15	20.8	7.1	>15.0	600	120	200	10ml	YTC	YES
9-24-15	20.7	7.3	8.6	196	51	80	"	"	YES
9-25-15	22.7	7.4	8.7	190	51	70	-	-	
Mean	21.3	7.3	10.8	329	74	117			
S.D.	1.0	0.2	3.7	235	40	72			
(N)	3	3	3	3	3	3			

Photoperiod during acclimation: 16:8, L:D

**TEST PROCEDURES AND CONDITIONS**

Test chambers: 300 ml glass beakers  
 Test volumes: 100 ml of test sediment; 275 ml total volume  
 Replicates/treatment: (8) 8 Organisms/treatment: (80) 80 (10/REP)  
 Test water changes: Twice daily  
 Aeration: only if DO falls below 2.5 mg/L Beaker placement: Total randomization  
 Feeding: everyday beginning with day zero Photoperiod: 16:8, L:D  
 Test temperature (deg.C): 23

**Control Sediment:**

Source: From an area approximately one mile east of the Hwy. 101 bridge at Beaver Creek, approx. 8 miles south of Newport, OR.  
 Date collected: 9-21-15  
 Sieved through 0.5-mm screen  
 Storage: 4°C in the dark in closed containers. NAS# 54276

**MISCELLANEOUS NOTES**

Test No. 874-1 Client Test America Investigator \_\_\_\_\_

12/22/2015

Test conducted in (circle one): room 1 room 2 trailer water bath other: \_\_\_\_\_

Randomization chart: TOP SHELF

5									
4									104
3									103
2									102
1									101

Randomization chart: FRONT


Randomization chart:


Randomization chart:


Page 26 of 216

Test No. 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 0 (9/25/15) GAJ/LCS

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness* (mg/L)	Alkalinity* (mg/L)	NH3* (ppm)	Comments
15	23.5	8.0	113	6.6	34	50		Each beaker fed 1.0 ml
43	22.9	7.9	111	6.6	34	50		YTC suspension
44	22.9	7.8	113	6.6	34	50		Initials: <u>GAJ</u>
64	23.0	8.1	116	6.5	34	40		
66	22.9	8.0	104	6.5	34	50		
67	22.9	8.0	109	6.6	34	50		
72	22.7	7.7	290	6.8	34	40		
79	22.7	8.0	120	6.7	34	40		
83	22.9	7.9	114	6.6	34	40		Water changed in all
86	22.8	7.8	123	6.6	34	50		beakers.
89	22.9	8.1	117	6.6	34	50		Time: <u>0515</u>
97	22.9	8.0	113	6.7	26	40		Initials: <u>GAJ</u>
99	23.0	8.2	113	6.8	34	50		
								Water changed in all
								beakers.
								Time: <u>1630</u>
								Initials: <u>LCS</u>

\*Water quality measurements to be taken.

Day 1 (9/26/15) GAJ

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.5							Each beaker fed 1.0 ml
43	23.4							YTC suspension
44	23.4							Initials: <u>GAJ</u>
64	23.6							
66	23.7							
67	23.6							
72	23.5							
79	23.3							
83	23.5							Water changed in all
86	23.5							beakers.
89	23.8							Time: <u>0510</u>
97	23.8							Initials: <u>GAJ</u>
99	23.9							
								Water changed in all
								beakers.
								Time: <u>1625</u>
								Initials: <u>GAJ</u>

\*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 2 (9/27/15) LSJ

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.0							Each beaker fed 1.0 ml YTC suspension
43	22.4							
44	22.4							Initials: <u>LSJ</u>
64	22.5							
66	22.2							
67	22.1							
72	22.1							
79	22.3							
83	22.1							Water changed in all beakers.
86	22.3							
89	22.5							Time: <u>0510</u>
97	22.5							Initials: <u>LSJ</u>
99	22.7							
								Water changed in all beakers.
								Time: <u>1650</u>
								Initials: <u>LSJ</u>

\*Water quality measurements to be taken.

Day 3 (9/28/15) LSJ

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	22.5	7.9		6.7				Each beaker fed 1.0 ml YTC suspension
43	22.9	7.9		6.7				
44	22.1	7.9		6.7				Initials: <u>LSJ</u>
64	22.0	7.8		6.6				
66	23.0	7.8		6.7				
67	22.7	7.8		6.8				
72	22.6	7.4		6.9				
79	23.1	7.6		6.7				
83	22.7	7.4		6.7				Water changed in all beakers.
86	23.0	7.4		6.8				
89	23.3	7.4		6.9				Time: <u>0505</u>
97	23.3	7.7		6.9				Initials: <u>LSJ</u>
99	23.5	7.9		6.9				
								Water changed in all beakers.
								Time: <u>1630</u>
								Initials: <u>LSJ</u>

\*Water quality measurements to be taken.

2) 9-27-15 LSJ

Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 4 (9/29/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.8							Each beaker fed 1.0 ml
43	23.0							YTC suspension
44	23.3							Initials: <u>Y</u>
64	23.2							
66	23.0							
67	22.9							
72	22.8							
79	23.1							
83	22.9							Water changed in all
86	23.1							beakers.
89	23.3							Time: <u>0520</u>
97	23.4							Initials: <u>Y</u>
99	23.5							
								Water changed in all
								beakers.
								Time: <u>1250</u>
								Initials: <u>LS</u>

\*Water quality measurements to be taken.

Day 5 (9/30/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0	6.6	117	6.9				Each beaker fed 1.0 ml
43	23.5	6.7	113	6.9				YTC suspension
44	23.8	6.7	116	6.9				Initials: <u>LB</u>
64	23.7	6.4	112	6.8				
66	23.4	6.6	112	6.9				
67	23.4	6.6	111	7.0				
72	23.2	6.4	127	6.9				
79	23.6	6.5	117	7.0				
83	23.3	6.3	112	6.8				Water changed in all
86	23.5	6.4	115	6.8				beakers.
89	23.6	6.4	113	6.9				Time: <u>0510</u>
97	23.8	6.6	111	7.0				Initials: <u>LB</u>
99	23.9	6.8	111	7.0				
								Water changed in all
								beakers.
								Time: <u>1620</u>
								Initials: <u>Y</u>

\*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 6 (10/11/15) Y/LB

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.8							Each beaker fed 1.0 ml
43	23.2							YTC suspension
44	23.4							Initials: Y
64	23.3							
66	23.1							
67	22.9							
72	22.9							
79	23.2							
83	22.9							Water changed in all
86	23.1							beakers.
89	23.3							Time: 0515
97	23.4							Initials: Y
99	23.5							
								Water changed in all
								beakers.
								Time: 1610
								Initials: LB

\*Water quality measurements to be taken.

Day 7 (10/12/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.8	7.1		6.7				Each beaker fed 1.0 ml
43	23.2	6.8		6.6				YTC suspension
44	23.5	6.8		6.7				Initials: LB
64	23.5	6.7		6.6				
66	23.0	7.0		6.8				
67	23.0	7.0		6.7				
72	22.9	6.5		6.7				
79	23.3	6.4		6.8				
83	23.0	6.4		6.7				Water changed in all
86	23.2	6.6		6.7				beakers.
89	23.4	6.6		6.8				Time: 0505
97	23.4	6.8		6.9				Initials: LB
99	23.6	6.9		6.9				
								Water changed in all
								beakers.
								Time: 1625
								Initials: Y

\*Water quality measurements to be taken.

Test No. 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 8 (10/3/15) GS

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0							Each beaker fed 1.0 ml
43	23.4							YTC suspension
44	23.7							Initials: <u>GS</u>
64	23.8							
66	23.8							
67	23.7							
72	23.0							
79	23.6							
83	23.1							Water changed in all
86	23.4							beakers.
89	23.6							Time: <u>0505</u>
97	23.6							Initials: <u>GS</u>
99	23.8							
								Water changed in all
								beakers.
								Time: <u>1610</u>
								Initials: <u>GS</u>

\*Water quality measurements to be taken.

Day 9 (10/14/15) GSJ

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.1							Each beaker fed 1.0 ml
43	22.3							YTC suspension
44	22.6							Initials: <u>GSJ</u>
64	22.6							
66	22.3							
67	22.1							
72	22.1							
79	22.4							
83	22.1							Water changed in all
86	22.3							beakers.
89	22.5							Time: <u>0515</u>
97	22.6							Initials: <u>GSJ</u>
99	22.8							
								Water changed in all
								beakers.
								Time: <u>1650</u>
								Initials: <u>GSJ</u>

\*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator                     

DAILY RECORD SHEET

Day 10 (10/5/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0	6.8		7.0				Each beaker fed 1.0 ml
43	23.5	6.8		6.9				YTC suspension
44	23.8	6.8		7.0				Initials: <u>GSJ</u>
64	23.7	6.8		6.9				
66	23.3	6.7		6.9				
67	23.2	6.9		7.0				
72	23.1	6.4		7.0				
79	23.6	6.5		7.1				
83	23.2	6.4		6.9				Water changed in all
86	23.4	6.8		6.9				beakers.
89	23.6	6.6		7.0				Time: <u>0510</u>
97	23.6	6.8		7.0				Initials: <u>GSJ</u>
99	23.8	6.9		7.0				
								Water changed in all
								beakers.
								Time: <u>1615</u>
								Initials: <u>Y</u>

\*Water quality measurements to be taken.

Day 11 (10/6/15) Y/LB

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0							Each beaker fed 1.0 ml
43	23.6							YTC suspension
44	24.0							Initials: <u>Y</u>
64	23.9							
66	23.6							
67	23.5							
72	23.5							
79	23.8							
83	23.5							Water changed in all
86	23.7							beakers.
89	23.9							Time: <u>0510</u>
97	24.0							Initials: <u>Y</u>
99	24.0							
								Water changed in all
								beakers.
								Time: <u>16:25</u>
								Initials: <u>GSJ</u>

\*Water quality measurements to be taken.



Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 12 (101715) YV

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0	7.3	108	7.0				Each beaker fed 1.0 ml
43	23.5	6.9	105	7.0				YTC suspension
44	23.8	7.1	110	7.0				Initials: <u>LS</u>
64	23.8	6.9	108	6.9				
66	23.6	7.1	108	7.0				
67	23.5	7.2	107	7.0				
72	23.4	6.9	113	7.1				
79	23.7	6.9	114	7.1				
83	23.4	6.9	108	6.9				Water changed in all
86	23.7	7.3	111	6.9				beakers.
89	23.7	6.9	110	7.1				Time: <u>0505</u>
97	24.0	7.1	110	7.2				Initials: <u>LS</u>
99	24.0	7.1	108	7.1				
								Water changed in all
								beakers.
								Time: <u>1620</u>
								Initials: <u>LS</u>

\*Water quality measurements to be taken.

Day 13 (101815) YV

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond.   (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0							Each beaker fed 1.0 ml
43	23.5							YTC suspension
44	23.8							Initials: <u>Y</u>
64	23.7							
66	23.4							
67	23.4							
72	23.3							
79	23.6							
83	23.3							Water changed in all
86	23.5							beakers.
89	23.7							Time: <u>0570</u>
97	23.7							Initials: <u>Y</u>
99	24.0							
								Water changed in all
								beakers.
								Time: <u>1625</u>
								Initials: <u>YB</u>

\*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 14 (10/9/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.9	6.8		7.3				Each beaker fed 1.0 ml
43	23.4	6.6		7.3				YTC suspension
44	23.7	6.6		7.2				Initials: <u>LS</u>
64	23.6	6.6		7.2				
66	23.5	6.6		7.2				
67	23.4	6.6		7.1				
72	23.3	6.1		7.3				
79	23.5	6.3		7.1				
83	23.3	6.1		7.0				Water changed in all
86	23.5	6.4		7.0				beakers.
89	23.6	6.3		7.1				Time: <u>0510</u>
97	23.7	6.5		7.1				Initials: <u>LS</u>
99	23.8	6.5		7.1				
								Water changed in all
								beakers.
								Time: <u>1610</u>
								Initials: <u>LS</u>

\*Water quality measurements to be taken.

Day 15 (10/12/15) LB

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.3							Each beaker fed 1.0 ml
43	23.2							YTC suspension
44	23.5							Initials: <u>LS</u>
64	23.4							
66	23.3							
67	23.2							
72	23.2							
79	23.3							
83	23.2							Water changed in all
86	23.3							beakers.
89	23.4							Time: <u>0520</u>
97	23.4							Initials: <u>LS</u>
99	23.6							
								Water changed in all
								beakers.
								Time: <u>1655</u>
								Initials: <u>LS</u>

\*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 16 (10/11/15) GL

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	22.9							Each beaker fed 1.0 ml YTC suspension
43	22.9							
44	23.2							Initials: <u>GL</u>
64	23.1							
66	23.0							
67	22.9							
72	22.9							
79	23.2							
83	23.0							Water changed in all beakers.
86	23.1							Time: <u>0510</u>
89	23.3							Initials: <u>GL</u>
97	23.3							
99	23.3							
								Water changed in all beakers.
								Time: <u>1:10</u>
								Initials: <u>LB</u>

\*Water quality measurements to be taken.

Day 17 (10/12/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.5	5.8		6.6				Each beaker fed 1.0 ml YTC suspension
43	23.0	6.0		6.5				
44	23.3	5.8		6.6				Initials: <u>GL</u>
64	23.2	5.7		6.6				
66	23.0	5.7		6.7				
67	22.9	5.7		6.7				
72	22.9	5.4		6.9				
79	23.1	5.6		6.8				
83	22.9	5.6		6.7				Water changed in all beakers.
86	23.1	5.5		6.6				Time: <u>0510</u>
89	23.3	5.6		6.7				Initials: <u>GL</u>
97	23.3	5.9		6.8				
99	23.4	6.0		6.8				
								Water changed in all beakers.
								Time: <u>1600</u>
								Initials: <u>LB</u>

\*Water quality measurements to be taken.

Test No 874-1 Client \_\_\_\_\_ Test America \_\_\_\_\_ Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 18 (10/13/15) ✓

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.5							Each beaker fed 1.0 ml
43	22.9							YTC suspension
44	23.1							Initials: <u>JK</u>
64	23.1							
66	22.9							
67	22.8							
72	22.7							
79	22.9							
83	22.8							Water changed in all
86	23.0							beakers.
89	23.0							Time: <u>0510</u>
97	23.1							Initials: <u>JK</u>
99	23.2							
								Water changed in all
								beakers.
								Time: <u>1620</u>
								Initials: <u>JK</u>

\*Water quality measurements to be taken.

Day 19 (10/14/15) ✓

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.6	6.9	98	6.7				Each beaker fed 1.0 ml
43	23.1	7.1	98	6.7				YTC suspension
44	23.3	6.9	101	6.7				Initials: <u>JK</u>
64	23.3	7.3	99	6.7				
66	23.1	7.3	100	6.8				
67	23.0	6.9	101	6.8				
72	23.0	6.9	105	7.1				
79	23.1	7.1	104	6.9				
83	22.9	6.9	100	6.8				Water changed in all
86	23.2	7.3	100	6.8				beakers.
89	23.2	7.3	101	6.8				Time: <u>0510</u>
97	23.4	7.3	101	6.9				Initials: <u>JK</u>
99	23.5	7.3	101	7.0				
								Water changed in all
								beakers.
								Time: <u>1610</u>
								Initials: <u>JK</u>

\*Water quality measurements to be taken.

Test No. 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 20 (10/15/15)

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.6							Each beaker fed 1.0 ml
43	23.2							YTC suspension
44	23.4							Initials: <u>JK</u>
64	23.3							
66	23.2							
67	23.0							
72	23.0							
79	23.2							
83	23.0							Water changed in all
86	23.1							beakers.
89	23.2							Time: <u>0515</u>
97	23.3							Initials: <u>JK</u>
99	23.3							
								Water changed in all
								beakers.
								Time: <u>1025</u>
								Initials: <u>JK</u>

\*Water quality measurements to be taken.

Day 21 (10/16/15) JK

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.8	7.0		7.0				Each beaker fed 1.0 ml
43	23.4	6.9		6.9				YTC suspension
44	23.3	6.8		6.9				Initials: <u>JK</u>
64	23.3	6.8		7.0				
66	23.2	6.9		6.9				
67	23.2	6.8		6.9				
72	23.1	6.6		7.2				
79	23.2	6.8		7.1				
83	23.2	7.0		7.0				Water changed in all
86	23.1	6.9		6.9				beakers.
89	23.2	6.9		6.9				Time: <u>0505</u>
97	23.4	6.7		6.9				Initials: <u>JK</u>
99	23.5	6.8		6.9				
								Water changed in all
								beakers.
								Time: <u>1610</u>
								Initials: <u>JK</u>

\*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 22 (10/17/15) OS

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.7							Each beaker fed 1.0 ml YTC suspension
43	23.6							
44	23.6							Initials: <u>OS</u>
64	23.2							
66	23.0							
67	23.0							
72	23.0							
79	22.8							
83	22.9							Water changed in all beakers.
86	22.8							
89	23.0							Time: <u>0545</u>
97	23.0							Initials: <u>OS</u>
99	23.3							
								Water changed in all beakers.
								Time: <u>1645</u>
								Initials: <u>OS</u>

\*Water quality measurements to be taken.

Day 23 (10/18/15) OS

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.5							Each beaker fed 1.0 ml YTC suspension
43	23.2							
44	23.4							Initials: <u>OS</u>
64	23.2							
66	23.2							
67	23.1							
72	23.1							
79	23.2							
83	23.2							Water changed in all beakers.
86	23.3							
89	23.4							Time: <u>0510</u>
97	23.4							Initials: <u>OS</u>
99	23.5							
								Water changed in all beakers.
								Time: <u>1640</u>
								Initials: <u>OS</u>

\*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 24 (10/19/15) 632

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.6	7.0		6.9				Each beaker fed 1.0 ml
43	23.2	7.1		6.8				YTC suspension
44	23.4	6.9		6.8				Initials: <u>631</u>
64	23.4	6.9		6.8				
66	23.3	7.1		6.9				
67	23.2	7.2		6.9				
72	23.2	7.1		7.2				
79	23.3	7.1		7.0				
83	23.2	7.2		6.9				Water changed in all
86	23.4	7.0		6.8				beakers.
89	23.5	7.0		6.9				Time: <u>0515</u>
97	23.5	7.2		7.0				Initials: <u>632</u>
99	23.6	7.3		7.0				
								Water changed in all
								beakers.
								Time: <u>1600</u>
								Initials: <u>Y</u>

\*Water quality measurements to be taken.

Day 25 (10/20/15) 632

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.4							Each beaker fed 1.0 ml
43	23.0							YTC suspension
44	23.2							Initials: <u>Y</u>
64	23.2							
66	23.0							
67	22.9							
72	22.8							
79	23.0							
83	22.9							Water changed in all
86	23.0							beakers.
89	23.1							Time: <u>0520</u>
97	23.2							Initials: <u>Y</u>
99	23.3							
								Water changed in all
								beakers.
								Time: <u>1615</u>
								Initials: <u>85</u>

\*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator \_\_\_\_\_

DAILY RECORD SHEET

Day 26 (10/4/15) ✓

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.4	7.1	102	6.4				Each beaker fed 1.0 ml
43	22.8	6.9	100	6.5				YTC suspension
44	23.1	6.3	103	6.5				Initials: <u>CS</u>
64	23.1	7.1	100	6.4				
66	22.8	7.1	100	6.5				
67	22.7	6.9	99	6.6				
72	22.6	6.7	107	6.8				
79	22.8	6.7	105	6.6				
83	22.6	6.7	100	6.6				Water changed in all
86	22.8	6.5	102	6.5				beakers.
89	22.9	7.0	101	6.6				Time: <u>0500</u>
97	22.9	7.2	102	6.7				Initials: <u>CS</u>
99	23.1	7.4	100	6.8				
								Water changed in all
								beakers.
								Time: <u>1615</u>
								Initials: <u>Y</u>

\*Water quality measurements to be taken.

Day 27 (10/22/15) ✓

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.1							Each beaker fed 1.0 ml
43	22.6							YTC suspension
44	22.9							Initials: <u>Y</u>
64	22.9							
66	22.6							
67	22.5							
72	22.4							
79	22.7							
83	22.5							Water changed in all
86	22.7							beakers.
89	22.8							Time: <u>0520</u>
97	22.8							Initials: <u>Y</u>
99	23.0							
								Water changed in all
								beakers.
								Time: <u>1620</u>
								Initials: <u>LS</u>

\*Water quality measurements to be taken.





Test No. 874-1 Client Test America Investigator                     

DAY 28 TEST TERMINATION SHEET

Beaker No.	Number of survivors	Initials
1	8	CB
2	10	CB
3	8	CB
4	9	CB
5	9	GL
6	10	GL
7	10	CB
8	10	CB
9	9	GL
10	9	GL
11	9	CB
12	7	CB
13	9	GL
14	10	GL
15	2	GL
16	10	GL
17	6	CB
18	10	CB
19	10	CB
20	8	CB
21	6	GL
22	6	GL
23	9	CB
24	5	CB
25	8	GL
26	8	GL
27	10	CB
28	9	CB
29	9	GL
30	10	GL
31	9	GL
32	9	GL
33	6	CB
34	9	CB
35	9	CB
36	7	CB
37	6	GL
38	9	GL
39	7	CB
40	7	CB
41	7	GL
42	10	GL
43	9	GL
44	5	GL
45	9	CB

Beaker No.	Number of survivors	Initials
46	10	CB
47	10	CB
48	10	CB
49	9	GL
50	9	GL
51	9	CB
52	8	CB
53	7	GL
54	7	GL
55	4	CB
56	7	CB
57	7	GL
58	8	GL
59	4	CB
60	10	CB
61	4	CB
62	10	CB
63	6	GL
64	10	GL
65	10	CB
66	10	CB
67	10	GL
68	10	GL
69	8	CB
70	6	CB
71	10	GL
72	10	GL
73	6	GL
74	9	GL
75	9	CB
76	8	CB
77	9	GL
78	10	GL
79	10	CB
80	10	CB
81	10	CB
82	6	CB
83	10	GL
84	7	GL
85	7	CB
86	5	CB
87	7	GL
88	10	GL
89	10	CB
90	10	CB



Test No. 874-1 Client Test America Investigator \_\_\_\_\_

ZERO-TIME WEIGHING DATA SHEET

Tare: Date 9.24.15 Oven temp (C.) 63 Drying time (hr.) 24 Initials JRF  
Standard Weights: 10 mg: 10.008 100mg: 100.017

Final: Date 9.28.15 Oven temp (C.) 59 Drying time (hr.) 24 Initials JRF  
Standard Weights: 10 mg: 10.007 100mg: 100.018

Equip. used: Oven: Blue-M H1 Balance: Sartorius N3P

(Dry overnight at 60-90 degrees C)

Pan #	Tare wt. (mg)	Total wt. (mg)	#weighed	Comments
1	30.473	31.162	10	
2	33.373	34.047	10	
3	29.728	30.451	10	
4	30.076	30.859	10	
5	28.458	29.046	10	

Test No. 874-1 Client Test America Investigator \_\_\_\_\_

WEIGHING DATA SHEET

Tare: Date 9-24-15 Oven temp (C.) 63 Drying time (hr.) 24 Initials JRF  
Standard Weights: 10 mg: 10.008 100mg: 100.017

Final #1: Date 10-26-15 Oven temp (C.) 59 Drying time (hr.) 24 Initials JRF  
Standard Weights: 10 mg: 10.006 100mg: 100.018

Final #2: Date 10-27-15 Oven temp (C.) 59 Drying time (hr.) 24 Initials JRF  
Standard Weights: 10 mg: 10.006 100mg: 100.018

Equip. used: Oven BLOEM #1 Balance Sartorius M3P  
(Dry overnight at 60-90 degrees C)

Bkr. #	Pan #	Tare wt. (mg)	Total wt. (mg)		no. weighed	put into pans-initials	Comments
			1	2			
1	1	29.458	31.831	31.805	8	LB	
2	2	32.232	33.977	33.962	10	LB	
3	3	29.740	32.387	32.360	8	LB	
4	4	30.242	31.626	31.615	9	LB	
5	5	31.353	34.147	34.120	9	LB	
6	6	30.001	32.604	32.576	10	LB	
7	7	29.254	31.406	31.390	10	LB	
8	8	28.918	30.674	30.650	10	LB	
9	9	31.817	33.842	33.815	9	LB	
10	10	31.856	33.477	33.955	9	LB	
11	11	28.757	30.519	30.492	9	LB	
12	12	30.397	31.994	31.971	7	LB	
13	13	30.155	32.558	32.525	9	LB	
14	14	30.895	32.862	32.826	10	LB	
15	15	30.806	31.260	31.246	2	LB	
16	16	30.261	32.683	32.639	10	LB	
17	17	30.090	31.612	31.579	6	LB	
18	18	29.890	31.993	31.952	16	LB	
19	19	32.748	34.777	34.740	10	LB	
20	20	30.391	32.057	32.022	8	LB	
21	21	31.133	32.404	32.392	6	LB	
22	22	30.087	31.186	31.173	6	LB	
23	23	29.740	31.887	31.857	9	LB	
24	24	32.711	33.938	33.917	5	LB	
25	25	29.192	30.971	30.944	8	LB	
26	26	30.688	32.915	32.882	8	LB	
27	27	30.739	33.121	33.091	10	LB	
28	28	28.453	30.319	30.292	9	LB	
29	29	31.283	33.471	33.446	9	LB	
30	30	28.711	31.106	31.080	10	LB	
31	31	29.894	32.426	32.398	9	LB	
32	32	31.704	34.205	34.180	9	LB	
33	33	31.186	32.457	32.441	5	LB	

12/22/2015

Page 45 of 216

Test No. 874-1 Client \_\_\_\_\_ Test America \_\_\_\_\_ Investigator \_\_\_\_\_

WEIGHING DATA SHEET

See page \_\_\_\_\_ for information on drying times and temperatures, standard weights, etc.

Bkr. #	Pan #	Tare wt. (mg)	Total wt. (mg)		no. weighed	put into pans-initials	Comments
			1	2			
34	34	29.387	31.544	31.517	9	LB	
35	35	29.770	32.042	32.010	9	LB	
36	36	31.214	33.728	33.706	7	LB	
37	37	29.902	31.615	31.606	6	LB	
38	38	30.550	32.593	32.574	9	LB	
39	39	32.352	34.432	34.413	7	LB	
40	40	30.289	32.595	32.570	7	LB	
41	41	31.927	33.795	33.770	7	LB	
42	42	30.656	33.265	33.235	10	LB	
43	43	31.821	33.088	33.078	9	LB	
44	44	33.721	34.950	34.934	5	LB	
45	45	30.512	32.184	32.181	9	YU	
46	46	28.739	30.708	30.702	10	YU	
47	47	30.884	32.629	32.612	10	YU	
48	48	28.889	31.266	31.244	10	YU	
49	49	30.774	32.891	32.884	9	YU	
50	50	30.432	32.882	32.872	9	YU	
51	51	30.429	32.037	32.041	9	YU	
52	52	30.590	32.198	32.197	8	YU	
53	53	30.286	31.993	31.995	7	YU	
54	54	30.308	31.979	31.978	7	YU	
55	55	32.523	33.598	33.598	4	YU	
56	56	32.549	34.996	33.992	7	YU	
57	57	29.365	30.979	30.968	7	YU	
58	58	32.207	34.071	34.064	8	YU	
59	59	30.597	31.588	31.579	4	YU	
60	60	30.768	32.618	32.606	10	YU	
61	61	31.207	32.470	32.463	4	YU	
62	62	31.787	34.336	34.320	10	YU	
63	63	30.432	32.043	32.036	6	YU	
64	64	31.168	33.837	33.819	10	YU	
65	65	30.795	33.042	33.032	10	YU	
66	66	30.748	33.827	33.804	10	YU	
67	67	31.008	33.364	33.350	10	YU	
68	68	30.167	32.733	32.718	10	YU	
69	69	28.785	30.887	30.875	8	YU	
70	70	30.655	31.955	31.944	6	YU	
71	71	32.441	35.546	35.525	10	YU	
72	72	31.402	34.374	34.352	10	YU	
73	73	29.383	30.991	30.970	6	LB	
74	74	28.507	30.580	30.550	9	LB	
75	75	31.171	33.467	33.433	9	LB	
76	76	29.555	32.199	32.159	8	LB	

12/22/2015

Page 46 of 216



# Chesapeake Cultures

P.O. Box 507 Hayes, VA 23072 (804)693-4046 (804)694-4704 fax  
www.c-cultures.com  
growfish@c-cultures.com

NAS  
Shipment Information

Rec 9-23-15  
LB

Species Hyalinobatrachium Date 9/22/15  
Age ~ 4-5 days on shipment P.O. No. Verbal  
~ 6.5 mm  
Quantity 1550+ Invoice No. 8831

Temperature 24°C Salinity — pH 7.85

Notes \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Biologist Sm

*Please inspect shipment and report any problem immediately*



**TEST DATA ANALYSIS RECORDS**

data entry verified against  
laboratory bench sheet 12.16.15 JRF

**Endpoints Data Entry and Calculations File**

TARE WT= ashed weight of pan used for that replicate at test termination (mg), or  
dry weight of pan if ash-free dry weight is not an endpoint  
WT COUNT= number of test organisms weighed at test end  
DRY WT= TARE WT + dry weight of test organisms recovered at test termination (mg)  
TWT=total biomass=DRY WT-TARE WT  
WT=average individual biomass=TWT/WT COUNT

BKR=beaker number  
INIT=initial number  
SURV=number survivors  
MORT=number dead=INIT-SURV  
PSURV=%survival=100(SURV/INIT)  
PMORT=%mortality=100(MORT/INIT)

pan #	INITIAL WEIGHT		wt. organism	avg. wt./organism
	tare wt. (mg)	final wt. (mg)		
1	30.473	31.162	10	0.069
2	33.373	34.047	10	0.067
3	29.728	30.451	10	0.072
4	30.076	30.859	10	0.078
5	28.458	29.046	10	0.059
			Mean	0.069

INDEX	BKR	SAMPL	DESCRIP	REPL	INIT SURV	MORT	PSURV	PMORT	TARE WT (mg)	WT COUNT	DRY WT (mg)	TWT WT (mg)	SURV	MORT	PSURV	PMORT	WT			
1	14	5427G	Control	1	10	10	0	100.0	0.0	30.895	10	32.828	1.93	0.19						
2	32	5427G	Control	2	10	8	1	90.0	10.0	31.704	9	34.180	2.48	0.28						
3	6	5427G	Control	3	10	10	0	100.0	0.0	30.001	10	32.578	2.58	0.26						
4	88	5427G	Control	4	10	10	0	100.0	0.0	29.296	10	32.093	2.80	0.28						
5	7	5427G	Control	5	10	10	0	100.0	0.0	29.254	10	31.390	2.14	0.21						
6	20	5427G	Control	6	10	8	2	80.0	20.0	30.391	8	32.022	1.63	0.20	9.4	0.6	93.8	8.3	0.26	
7	76	5427G	Control	7	10	8	2	80.0	20.0	29.555	8	32.159	2.60	0.33	0.9	0.9	9.2	9.2	0.05	
8	72	5427G	Control	8	10	10	0	100.0	0.0	31.402	10	34.352	2.95	0.30	8	8	8	8	8	
9	17	5428G	15KR082SD	1	10	6	4	60.0	40.0	30.090	6	31.579	1.49	0.25						
10	63	5428G	15KR082SD	2	10	6	4	60.0	40.0	30.432	6	32.036	1.60	0.27						
11	41	5428G	15KR082SD	3	10	7	3	70.0	30.0	31.927	7	33.770	1.84	0.26						
12	103	5428G	15KR082SD	4	10	10	0	100.0	0.0	32.341	10	35.049	2.71	0.27						
13	101	5428G	15KR082SD	5	10	9	1	90.0	10.0	30.212	9	33.361	3.15	0.35	Mean	8.1	1.9	81.3	18.8	0.26
14	94	5428G	15KR082SD	6	10	9	1	90.0	10.0	33.062	9	35.844	2.58	0.29	SD	1.6	1.6	15.5	15.5	0.08
15	29	5428G	15KR082SD	7	10	9	1	90.0	10.0	31.293	9	33.448	2.16	0.24	n	8	8	8	8	8
16	43	5428G	15KR082SD	8	10	9	1	90.0	10.0	31.821	9	33.078	1.28	0.14						
17	47	5429G	15KR083SD	1	10	10	0	100.0	0.0	30.884	10	32.812	1.73	0.17						
18	81	5429G	15KR083SD	2	10	10	0	100.0	0.0	29.802	10	32.344	2.54	0.25						
19	31	5429G	15KR083SD	3	10	9	1	90.0	10.0	29.894	9	32.398	2.50	0.28						
20	102	5429G	15KR083SD	4	10	10	0	100.0	0.0	29.117	10	32.036	2.92	0.29						
21	23	5429G	15KR083SD	5	10	8	1	80.0	20.0	29.740	8	31.857	2.12	0.24	Mean	9.6	0.4	96.3	3.8	0.25
22	9	5429G	15KR083SD	6	10	8	1	80.0	20.0	31.817	8	33.815	2.00	0.22	SD	0.5	0.5	5.2	5.2	0.04
23	95	5429G	15KR083SD	7	10	10	0	100.0	0.0	29.857	10	32.819	3.16	0.32	n	8	8	8	8	8
24	67	5429G	15KR083SD	8	10	10	0	100.0	0.0	31.008	10	33.350	2.34	0.23						
25	35	5430G	15KR084SD	1	10	9	1	90.0	10.0	29.770	9	32.010	2.24	0.25						
26	48	5430G	15KR084SD	2	10	10	0	100.0	0.0	28.889	10	31.244	2.36	0.24						
27	53	5430G	15KR084SD	3	10	7	3	70.0	30.0	30.286	7	31.995	1.71	0.24						
28	100	5430G	15KR084SD	4	10	10	0	100.0	0.0	30.957	10	33.528	2.57	0.26						
29	19	5430G	15KR084SD	5	10	10	0	100.0	0.0	32.748	10	34.740	1.99	0.20	Mean	9.3	0.8	92.5	7.5	0.24
30	48	5430G	15KR084SD	6	10	9	1	90.0	10.0	30.774	9	32.884	2.11	0.23	SD	1.0	1.0	10.4	10.4	0.02
31	74	5430G	15KR084SD	7	10	8	1	80.0	20.0	28.507	8	30.550	2.04	0.23	n	8	8	8	8	8
32	64	5430G	15KR084SD	8	10	10	0	100.0	0.0	31.168	10	33.819	2.85	0.27						

INDEX	BKR	SMPLE	CLIENT	REPL	INIT	SURV	MORT	PSURV	PMORT	TARE	WT	DRY	TWT	WT	SURV	MORT	PSURV	PMORT	WT
										WT	(mg)	WT	(mg)	(mg)					
33	96	5431G	15KR085SD	1	10	10	0	100.0	0.0	31.409	10	34.490	3.08	0.31					
34	5	5431G	15KR085SD	2	10	9	1	90.0	10.0	31.353	9	34.120	2.77	0.31					
35	68	5431G	15KR085SD	3	10	10	0	100.0	0.0	30.167	10	32.718	2.55	0.26					
36	82	5431G	15KR085SD	4	10	9	1	90.0	10.0	29.665	9	31.871	2.21	0.25					
37	80	5431G	15KR085SD	5	10	10	0	100.0	0.0	30.784	10	33.274	2.49	0.25					
38	1	5431G	15KR085SD	6	10	8	2	80.0	20.0	29.458	8	31.805	2.35	0.29	9.3	0.8	92.5	7.5	0.28
39	3	5431G	15KR085SD	7	10	8	2	80.0	20.0	29.740	8	32.360	2.62	0.33	0.9	0.9	8.9	8.9	0.04
40	97	5431G	15KR085SD	8	10	10	0	100.0	0.0	29.983	10	32.300	2.32	0.20	8	8	8	8	8
41	28	5432G	15KR087SD	1	10	8	1	90.0	10.0	28.453	9	30.292	1.84	0.20					
42	16	5432G	15KR087SD	2	10	10	0	100.0	0.0	30.261	10	32.639	2.38	0.24					
43	25	5432G	15KR087SD	3	10	8	2	80.0	20.0	29.192	8	30.944	1.75	0.22					
44	46	5432G	15KR087SD	4	10	10	0	100.0	0.0	28.739	10	30.702	1.96	0.20					
45	45	5432G	15KR087SD	5	10	9	1	90.0	10.0	30.512	9	32.181	1.87	0.19					
46	37	5432G	15KR087SD	6	10	6	4	60.0	40.0	29.902	6	31.608	1.70	0.28	9.0	1.0	90.0	10.0	0.23
47	104	5432G	15KR087SD	7	10	10	0	100.0	0.0	32.573	10	35.769	3.20	0.32	1.4	1.4	14.1	14.1	0.05
48	79	5432G	15KR087SD	8	10	10	0	100.0	0.0	29.565	10	31.764	2.20	0.22	8	8	8	8	8
49	40	5433G	15KR088SD	1	10	7	3	70.0	30.0	30.289	7	32.570	2.28	0.33					
50	50	5433G	15KR088SD	2	10	8	1	90.0	10.0	30.432	9	32.872	2.44	0.27					
51	93	5433G	15KR088SD	3	10	10	0	100.0	0.0	30.020	10	32.724	2.70	0.27					
52	75	5433G	15KR088SD	4	10	9	1	90.0	10.0	31.171	9	33.433	2.28	0.25					
53	39	5433G	15KR088SD	5	10	7	3	70.0	30.0	32.352	7	34.413	2.06	0.29	8.9	1.1	88.8	11.3	0.28
54	10	5433G	15KR088SD	6	10	9	1	90.0	10.0	31.856	9	33.955	2.10	0.23	1.2	1.2	12.5	12.5	0.03
55	62	5433G	15KR088SD	7	10	10	0	100.0	0.0	31.487	10	34.320	2.83	0.28	8	8	8	8	8
56	68	5433G	15KR088SD	8	10	10	0	100.0	0.0	30.748	10	33.604	3.08	0.31					
57	91	5434G	15KR089SD	1	10	8	1	90.0	10.0	29.987	9	32.011	2.14	0.24					
58	55	5434G	15KR089SD	2	10	4	6	40.0	60.0	32.523	4	33.598	1.08	0.27					
59	87	5434G	15KR089SD	3	10	7	3	70.0	30.0	30.773	7	32.400	1.63	0.23					
60	22	5434G	15KR089SD	4	10	6	4	60.0	40.0	30.087	6	31.173	1.09	0.18					
61	59	5434G	15KR089SD	5	10	4	6	40.0	60.0	30.597	4	31.579	0.88	0.25	6.1	3.9	61.3	38.8	0.23
62	54	5434G	15KR089SD	6	10	7	3	70.0	30.0	30.308	7	31.978	1.67	0.24	1.7	1.7	17.3	17.3	0.03
63	85	5434G	15KR089SD	7	10	7	3	70.0	30.0	31.715	7	33.260	1.55	0.22	8	8	8	8	8
64	86	5434G	15KR089SD	8	10	5	5	50.0	50.0	29.302	5	30.234	0.93	0.19					
65	8	5435G	15KR090SD	1	10	10	0	100.0	0.0	28.918	10	30.650	1.73	0.17					
66	71	5435G	15KR090SD	2	10	10	0	100.0	0.0	32.441	10	35.525	3.08	0.31					
67	18	5435G	15KR090SD	3	10	10	0	100.0	0.0	29.890	10	31.952	2.06	0.21					
68	38	5435G	15KR090SD	4	10	9	1	90.0	10.0	30.550	9	32.574	2.02	0.22					
69	33	5435G	15KR090SD	5	10	5	5	50.0	50.0	31.188	5	32.441	1.26	0.25	9.3	0.8	92.5	7.5	0.22
70	65	5435G	15KR090SD	6	10	10	0	100.0	0.0	30.795	10	33.032	2.24	0.22	1.8	1.8	17.5	17.5	0.04
71	2	5435G	15KR090SD	7	10	10	0	100.0	0.0	32.232	10	33.962	1.73	0.17	8	8	8	8	8
72	89	5435G	15KR090SD	8	10	10	0	100.0	0.0	32.219	10	34.428	2.21	0.22					
73	61	5436G	15KR091SD	1	10	4	6	40.0	60.0	31.207	4	32.463	1.26	0.31					
74	98	5436G	15KR091SD	2	10	8	2	80.0	20.0	31.490	8	33.008	1.52	0.19					
75	57	5436G	15KR091SD	3	10	7	3	70.0	30.0	29.365	7	30.988	1.60	0.23					
76	82	5436G	15KR091SD	4	10	6	4	60.0	40.0	34.146	6	35.814	1.67	0.28					
77	84	5436G	15KR091SD	5	10	7	3	70.0	30.0	33.980	7	35.086	1.41	0.20					
78	73	5436G	15KR091SD	6	10	8	4	60.0	40.0	29.393	8	30.970	1.59	0.26	6.1	3.9	61.3	38.8	0.24
79	70	5436G	15KR091SD	7	10	6	4	60.0	40.0	30.655	6	31.944	1.29	0.21	1.2	1.2	12.5	12.5	0.04
80	44	5436G	15KR091SD	8	10	5	5	50.0	50.0	33.721	5	34.934	1.21	0.24	8	8	8	8	8

INDEX	BACKR	SAMPL	CLIENT	DESCRIP	REPL	INIT	SURV	MORT	PSURV	PMORT	TARE	WT	WT	DRY	TWT	WT	SURV	MORT	PSURV	PMORT	WT	WT	
											WT (mg)	COUNT	WT (mg)	WT (mg)	WT (mg)	WT (mg)							
81	30	5437G	15KR092SD		1	10	10	0	100.0	0.0	28.711	10	31.080	2.37	0.24								
82	90	5437G	15KR092SD		2	10	10	0	100.0	0.0	30.440	10	32.862	2.42	0.24								
83	78	5437G	15KR092SD		3	10	10	0	100.0	0.0	32.175	10	34.464	2.29	0.23								
84	58	5437G	15KR092SD		4	10	8	2	80.0	20.0	32.207	8	34.064	1.86	0.23								
85	51	5437G	15KR092SD		5	10	6	1	90.0	10.0	30.429	9	32.041	1.61	0.18	Mean	9.0	1.0	90.0	10.0	0.23		
86	69	5437G	15KR092SD		6	10	8	2	80.0	20.0	28.785	8	30.875	2.08	0.28	SD	1.2	1.2	12.0	12.0	0.02		
87	12	5437G	15KR092SD		7	10	7	3	70.0	30.0	30.397	7	31.971	1.57	0.22	n	8	8	8	8	8	8	
88	83	5437G	15KR092SD		8	10	10	0	100.0	0.0	30.943	10	33.075	2.13	0.21								
89	11	5438G	15KR093SD		1	10	9	1	90.0	10.0	28.757	9	30.492	1.74	0.19								
90	56	5438G	15KR093SD		2	10	7	3	70.0	30.0	32.549	7	33.992	1.44	0.21								
91	60	5438G	15KR093SD		3	10	10	0	100.0	0.0	30.768	10	32.806	1.84	0.18								
92	4	5438G	15KR093SD		4	10	9	1	90.0	10.0	30.242	9	31.815	1.37	0.15								
93	24	5438G	15KR093SD		5	10	5	5	50.0	50.0	32.711	5	33.917	1.21	0.24	Mean	7.0	3.0	70.0	30.0	0.20		
94	21	5438G	15KR093SD		6	10	6	4	60.0	40.0	31.133	6	32.392	1.28	0.21	SD	2.6	2.6	26.2	26.2	0.03		
95	52	5438G	15KR093SD		7	10	8	2	80.0	20.0	30.580	8	32.187	1.91	0.20	n	8	8	8	8	8	8	
96	15	5438G	15KR093SD		8	10	2	8	20.0	80.0	30.806	2	31.248	0.44	0.22								
97	77	5438G	15KR098SD		1	10	9	1	90.0	10.0	28.885	9	31.438	2.55	0.28								
98	36	5438G	15KR098SD		2	10	7	3	70.0	30.0	31.214	7	33.708	2.49	0.36								
99	34	5438G	15KR098SD		3	10	9	1	90.0	10.0	29.387	9	31.517	2.13	0.24								
100	13	5439G	15KR098SD		4	10	9	1	90.0	10.0	30.155	9	32.525	2.37	0.26								
101	27	5439G	15KR098SD		5	10	10	0	100.0	0.0	30.739	10	33.091	2.35	0.24	Mean	9.0	1.0	90.0	10.0	0.28		
102	26	5439G	15KR098SD		6	10	8	2	80.0	20.0	30.688	8	32.882	2.18	0.27	SD	1.1	1.1	10.7	10.7	0.04		
103	42	5439G	15KR098SD		7	10	10	0	100.0	0.0	30.658	10	33.235	2.58	0.26	n	8	8	8	8	8	8	
104	99	5439G	15KR098SD		8	10	10	0	100.0	0.0	32.690	10	35.853	2.98	0.30								

**Survival and Growth: Control vs. both Reference Sediments**

**CETIS Analytical Report**

Report Date: 30 Nov-15 09:00 (p 5 of 5)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	09-3566-5208		Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7			
Analyzed:	30 Nov-15 8:59		Analysis:	Nonparametric-Two Sample			Official Results:	Yes			
Batch ID:	10-5989-7118		Test Type:	Survival-Growth			Analyst:				
Start Date:	25 Sep-15 10:30		Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00		Species:	Hyalella azteca			Brine:				
Duration:	28d 1h		Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America						
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
Control 874-1	Sediment	Kuskokwim River Sediment Char									
15KR082SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C <> T	NA	NA	12.6%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)		
Control 874-1		15KR082SD	51.5	NA	2	14	0.0791	Exact	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.1142294	0.1142294	1	3.899	0.0684	Non-Significant Effect					
Error	0.4101465	0.02929618	14								
Total	0.5243759		15								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.976	8.885	0.3889	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8137	0.8408	0.0042	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%	
15KR082SD	8	0.8125	0.6827	0.9423	0.9	0.6	1	0.05489	19.11%	13.33%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%	
15KR082SD	8	1.146	0.9815	1.311	1.249	0.8861	1.412	0.06974	17.2%	12.85%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	1	0.9	1	1	1	0.8	0.8	1			
15KR082SD	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412			
15KR082SD	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249			

Page 54 of 216

30 of 137

**CETIS Analytical Report**

Report Date: 30 Nov-15 09:00 (p 4 of 5)

Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	20-3031-1280	Endpoint:	Proportion Survived		CETIS Version:	CETISv1.8.7				
Analyzed:	30 Nov-15 8:59	Analysis:	Nonparametric-Two Sample		Official Results:	Yes				
Batch ID:	10-5989-7118	Test Type:	Survival-Growth		Analyst:					
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)		Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca		Brine:					
Duration:	28d 1h	Source:	Chesapeake Cultures, VA		Age:					
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR083SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Angular (Corrected)	NA	C <> T	NA	NA	7.97%					
Wilcoxon Rank Sum Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	
Control 874-1		15KR083SD	65	NA	2	14	0.7650	Exact	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.005033694	0.005033694	1	0.3756	0.5498	Non-Significant Effect				
Error	0.1876122	0.01340087	14							
Total	0.1926459		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	2.767	8.885	0.2027	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.7881	0.8408	0.0019	Non-normal Distribution					
Proportion Survived Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR083SD	8	0.9625	0.9192	1	1	0.9	1	0.0183	5.38%	-2.67%
Angular (Corrected) Transformed Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR083SD	8	1.351	1.28	1.421	1.412	1.249	1.412	0.02982	6.24%	-2.7%
Proportion Survived Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1	0.9	1	1	1	0.8	0.8	1		
15KR083SD	1	1	0.9	1	0.9	0.9	1	1		
Angular (Corrected) Transformed Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412		
15KR083SD	1.412	1.412	1.249	1.412	1.249	1.249	1.412	1.412		

Page 55 of 216

31 of 137

**CETIS Analytical Report**

Report Date: 30 Nov-15 09:00 (p 1 of 5)  
 Test Code: 874-1 15-8552-1299

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** Northwestern Aquatic Sciences

Analysis ID: 03-5610-8963      Endpoint: Mean Dry Weight-mg      CETIS Version: CETISv1.8.7  
 Analyzed: 30 Nov-15 8:59      Analysis: Parametric-Two Sample      Official Results: Yes

Batch ID: 10-5989-7118      Test Type: Survival-Growth      Analyst:  
 Start Date: 25 Sep-15 10:30      Protocol: EPA/600/R-99/064 (2000)      Diluent: Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00      Species: Hyalella azteca      Brine:  
 Duration: 28d 1h      Source: Chesapeake Cultures, VA      Age:

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR082SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C <> T	NA	NA	22.4%	

**Equal Variance t Two-Sample Test**

Sample Code	vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1	15KR082SD	0.1079	2.145	0.057	14	0.9156	CDF	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.299832E-05	3.299832E-05	1	0.01163	0.9156	Non-Significant Effect
Error	0.0397169	0.002836922	14			
Total	0.0397499		15			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.522	8.885	0.5932	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9701	0.8408	0.8402	Normal Distribution

**Mean Dry Weight-mg Summary**

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR082SD	8	0.2583	0.2094	0.3072	0.2653	0.1397	0.3499	0.02069	22.65%	-1.12%

**Mean Dry Weight-mg Detail**

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR082SD	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397

Page 56 of 216

32 of 137



**CETIS Analytical Report**

Report Date: 30 Nov-15 09:00 (p 2 of 5)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	14-6871-0756	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	30 Nov-15 8:59	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR083SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C <> T	NA	NA	19.4%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Control 874-1		15KR083SD	0.209	2.145	0.05	14	0.8375	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	9.332348E-05	9.332348E-05	1	0.04368	0.8375	Non-Significant Effect				
Error	0.02991023	0.002136445	14							
Total	0.03000356		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.112	8.885	0.8921	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9706	0.8408	0.8490	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR083SD	8	0.2506	0.213	0.2882	0.2447	0.1728	0.3162	0.0159	17.95%	1.89%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295		
15KR083SD	0.1728	0.2542	0.2782	0.2919	0.2352	0.222	0.3162	0.2342		

Page 57 of 216

33 of 137

## **Survival and Growth: References Against Each Other**

Project Name: P874-1 Hyalella % Survival

Sample: x1  
 Samp ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: N/A  
 Trans SD: N/A

Ref Samp: x2  
 Ref ID: 15KR083SD  
 Alias: NAS# 5429G  
 Replicates: 8  
 Mean: 96.25  
 SD: 5.175  
 Tr Mean: N/A  
 Trans SD: N/A

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 9.949 SS: 1880.51 K: 8 b: 39.985  Alpha Level: 0.05 Calculated Value: 0.8502 Critical Value: $\leq 0.887$  Normally Distributed: No  Override Option: Not Invoked	Test Residual Mean: 10.536 Test Residual SD: 7.124 Ref. Residual Mean: 8.641 Ref. Residual SD: 2.385 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.7133 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Mann-Whitney Balanced Design: Yes Transformation: rank-order  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Mann-Whitney N1: 8 Mann-Whitney N2: 8 Degrees of Freedom: Experimental Alpha Level: 0.05 Calculated Value: 52.5 Critical Value: $\geq 49.000$ Accept Null Hypothesis: No  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	60	1.5	100	13.5	16.055	6.913	1.5		-16.055
2	60	1.5	100	13.5	16.055	6.913	1.5		-16.055
3	70	3	90	7	10.034	11.522	3		-11.522
4	100	13.5	100	13.5	23.177	6.913	7		-11.522
5	90	7	90	7	4.742	11.522	7		-11.522
6	90	7	90	7	4.742	11.522	7		-10.034
7	90	7	100	13.5	4.742	6.913	7		4.742
8	90	7	100	13.5	4.742	6.913	7		4.742
9							7		4.742
10							7		4.742
11							13.5		6.913
12							13.5		6.913
13							13.5		6.913
14							13.5		6.913
15							13.5		6.913
16							13.5		23.177

The percent survival in reference sediment 15KR082SD was significantly lower than that of the reference 15KR083SD at  $\alpha=0.05$ . -611

34 of 137

Sample: x1  
 Samp ID: 15KR083SD  
 Alias: NAS# 5429G  
 Replicates: 8  
 Mean: 96.25  
 SD: 5.175  
 Tr Mean: N/A  
 Trans SD: N/A

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: N/A  
 Trans SD: N/A

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 9.949 SS: 1880.51 K: 8 b: 39.985  Alpha Level: 0.05 Calculated Value: 0.8502 Critical Value: $\leq 0.887$  Normally Distributed: No  Override Option: Not Invoked	Test Residual Mean: 8.641 Test Residual SD: 2.385 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.7133 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Mann-Whitney Balanced Design: Yes Transformation: rank-order  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Mann-Whitney N1: 8 Mann-Whitney N2: 8 Degrees of Freedom: Experimental Alpha Level: 0.05 Calculated Value: 11.5 Critical Value: $\geq 49.000$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	100	13.5	60	1.5	6.913	16.055	1.5		-16.055
2	100	13.5	60	1.5	6.913	16.055	1.5		-16.055
3	90	7	70	3	11.522	10.034	3		-11.522
4	100	13.5	100	13.5	6.913	23.177	7		-11.522
5	90	7	90	7	11.522	4.742	7		-11.522
6	90	7	90	7	11.522	4.742	7		-10.034
7	100	13.5	90	7	6.913	4.742	7		4.742
8	100	13.5	90	7	6.913	4.742	7		4.742
9							7		4.742
10							7		4.742
11							13.5		6.913
12							13.5		6.913
13							13.5		6.913
14							13.5		6.913
15							13.5		6.913
16							13.5		23.177

The percent survival in reference sediment 15KR083SD was not significantly lower than that of the reference 15KR082SD at  $\alpha=0.05$ . -GJI

Project Name: P874-1 Hyalella Growth (dry wt)

Sample: x1  
 Samp ID: 15KR083SD  
 Alias: NAS# 5429G  
 Replicates: 8  
 Mean: 0.25  
 SD: 0.047  
 Tr Mean: 0.25  
 Trans SD: 0.047

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 0.259  
 SD: 0.059  
 Tr Mean: 0.259  
 Trans SD: 0.059

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 0.045 SS: 0.039 K: 8 b: 0.194  Alpha Level: 0.05 Calculated Value: 0.9531 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 0.035 Test Residual SD: 0.028 Ref. Residual Mean: 0.037 Ref. Residual SD: 0.044 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.0853 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: No Transformation  Experimental Hypothesis Null: $x_1 \geq x_2$ Alternate: $x_1 < x_2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: 0.3304 Critical Value: $\geq 1.761$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	0.17	0.17	0.25	0.25	0.08	0.009			-0.119
2	0.25	0.25	0.27	0.27	0	0.011			-0.08
3	0.28	0.28	0.26	0.26	0.03	0.001			-0.03
4	0.29	0.29	0.27	0.27	0.04	0.011			-0.02
5	0.24	0.24	0.35	0.35	0.01	0.091			-0.019
6	0.22	0.22	0.29	0.29	0.03	0.031			-0.01
7	0.32	0.32	0.24	0.24	0.07	0.019			-0.009
8	0.23	0.23	0.14	0.14	0.02	0.119			0
9									0.001
10									0.011
11									0.011
12									0.03
13									0.031
14									0.04
15									0.07
16									0.091

Average individual growth (dry wt) in reference sediment 15KR083SD is not significantly less than that in the reference 15KR082SD at  $\alpha=0.05$ . -621

Project Name: P874-1 Hyalella Growth (dry wt)

Sample: x1  
 Samp ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 0.259  
 SD: 0.059  
 Tr Mean: 0.259  
 Trans SD: 0.059

Ref Samp: x2  
 Ref ID: 15KR083SD  
 Alias: NAS# 5429G  
 Replicates: 8  
 Mean: 0.25  
 SD: 0.047  
 Tr Mean: 0.25  
 Trans SD: 0.047

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 0.045 SS: 0.039 K: 8 b: 0.194  Alpha Level: 0.05 Calculated Value: 0.9531 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 0.037 Test Residual SD: 0.044 Ref. Residual Mean: 0.035 Ref. Residual SD: 0.028 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.0853 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: No Transformation  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: -0.3304 Critical Value: $\geq 1.761$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	0.25	0.25	0.17	0.17	0.009	0.08			-0.119
2	0.27	0.27	0.25	0.25	0.011	0			-0.08
3	0.26	0.26	0.28	0.28	0.001	0.03			-0.03
4	0.27	0.27	0.29	0.29	0.011	0.04			-0.02
5	0.35	0.35	0.24	0.24	0.091	0.01			-0.019
6	0.29	0.29	0.22	0.22	0.031	0.03			-0.01
7	0.24	0.24	0.32	0.32	0.019	0.07			-0.009
8	0.14	0.14	0.23	0.23	0.119	0.02			0
9									0.001
10									0.011
11									0.011
12									0.03
13									0.031
14									0.04
15									0.07
16									0.091

Average individual growth (dry wt) in reference sediment 15KR082SD is not significantly less than that in the reference 15KR083SD at  $\alpha=0.05$ . -CSL

**Survival: Control vs. Test Sediments**

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 11 of 20)  
 Test Code: 874-1 | 15-8552-1299

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** **Northwestern Aquatic Sciences**

Analysis ID: 09-9707-4413 Endpoint: Proportion Survived CETIS Version: CETISv1.8.7  
 Analyzed: 25 Nov-15 14:11 Analysis: Nonparametric-Two Sample Official Results: Yes

Batch ID: 10-5989-7118 Test Type: Survival-Growth Analyst:  
 Start Date: 25 Sep-15 10:30 Protocol: EPA/600/R-99/064 (2000) Diluent: Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00 Species: Hyalella azteca Brine:  
 Duration: 28d 1h Source: Chesapeake Cultures, VA Age:

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.18%	

**Wilcoxon Rank Sum Two-Sample Test**

Sample Code vs Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1 vs 15KR084SD	65.5	NA	2	14	0.4119	Exact	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001174183	0.001174183	1	0.05646	0.8156	Non-Significant Effect
Error	0.2911539	0.02079671	14			
Total	0.2923281		15			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.113	8.885	0.8916	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7888	0.8408	0.0019	Non-normal Distribution

**Proportion Survived Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR084SD	8	0.925	0.8385	1	0.95	0.7	1	0.0366	11.19%	1.33%

**Angular (Corrected) Transformed Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR084SD	8	1.298	1.175	1.422	1.331	0.9912	1.412	0.05233	11.4%	1.3%

**Proportion Survived Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR084SD	0.9	1	0.7	1	1	0.9	0.9	1

**Angular (Corrected) Transformed Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR084SD	1.249	1.412	0.9912	1.412	1.412	1.249	1.249	1.412

**Proportion Survived Binomials**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR084SD	9/10	10/10	7/10	10/10	10/10	9/10	9/10	10/10

Page 64 of 216

38 of 137



**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 12 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences			
Analysis ID:	10-8038-1436	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7			
Analyzed:	25 Nov-15 14:11	Analysis:	Nonparametric-Two Sample			Official Results:	Yes			
Batch ID:	10-5989-7118	Test Type:	Survival-Growth			Analyst:				
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:				
Duration:	28d 1h	Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR085SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Angular (Corrected)	NA	C > T	NA	NA	7.79%					
Wilcoxon Rank Sum Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	
Control 874-1		15KR085SD	65	NA	3	14	0.4608	Exact	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.001659958	0.001659958	1	0.08691	0.7725	Non-Significant Effect				
Error	0.2673843	0.01909888	14							
Total	0.2690443		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.064	8.885	0.9373	Equal Variances					
Distribution	Shapiro-Wilk W	0.7701	0.8408	0.0011	Non-normal Distribution					
Proportion Survived Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR085SD	8	0.925	0.8509	0.9991	0.95	0.8	1	0.03134	9.58%	1.33%
Angular (Corrected) Transformed Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR085SD	8	1.295	1.181	1.409	1.331	1.107	1.412	0.0481	10.51%	1.55%
Proportion Survived Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1	0.9	1	1	1	0.8	0.8	1		
15KR085SD	1	0.9	1	0.9	1	0.8	0.8	1		
Angular (Corrected) Transformed Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412		
15KR085SD	1.412	1.249	1.412	1.249	1.412	1.107	1.107	1.412		
Proportion Survived Binomials										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10		
15KR085SD	10/10	9/10	10/10	9/10	10/10	8/10	8/10	10/10		

Page 65 of 216

39 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 13 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyaella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences			
Analysis ID:	20-9624-0766	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7			
Analyzed:	25 Nov-15 14:11	Analysis:	Nonparametric-Two Sample			Official Results:	Yes			
Batch ID:	10-5989-7118	Test Type:	Survival-Growth			Analyst:				
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00	Species:	Hyaella azteca			Brine:				
Duration:	28d 1h	Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR087SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Angular (Corrected)	NA	C > T	NA	NA	9.74%					
Wilcoxon Rank Sum Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision( $\alpha$ :5%)	
Control 874-1		15KR087SD	64	NA	3	14	0.3727	Exact	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)				
Between	0.009218013	0.009218013	1	0.3282	0.5758	Non-Significant Effect				
Error	0.3932301	0.02808786	14							
Total	0.4024481		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)					
Variances	Variance Ratio F	1.853	8.885	0.4343	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.8321	0.8408	0.0075	Non-normal Distribution					
Proportion Survived Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR087SD	8	0.9	0.7818	1	0.95	0.6	1	0.05	15.71%	4.0%
Angular (Corrected) Transformed Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR087SD	8	1.267	1.108	1.427	1.331	0.8861	1.412	0.06754	15.07%	3.65%
Proportion Survived Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1	0.9	1	1	1	0.8	0.8	1		
15KR087SD	0.9	1	0.8	1	0.9	0.6	1	1		
Angular (Corrected) Transformed Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412		
15KR087SD	1.249	1.412	1.107	1.412	1.249	0.8861	1.412	1.412		
Proportion Survived Binomials										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10		
15KR087SD	9/10	10/10	8/10	10/10	9/10	6/10	10/10	10/10		

Page 66 of 216

40 of 137  
 CETIS™ v1.8.7.4

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 14 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** Northwestern Aquatic Sciences

Analysis ID: 03-4369-0911 **Endpoint:** Proportion Survived **CETIS Version:** CETISv1.8.7  
 Analyzed: 25 Nov-15 14:11 **Analysis:** Parametric-Two Sample **Official Results:** Yes

**Batch ID:** 10-5989-7118 **Test Type:** Survival-Growth **Analyst:**  
**Start Date:** 25 Sep-15 10:30 **Protocol:** EPA/600/R-99/064 (2000) **Diluent:** Dechlorinated Tap Water  
**Ending Date:** 23 Oct-15 11:00 **Species:** Hyalella azteca **Brine:**  
**Duration:** 28d 1h **Source:** Chesapeake Cultures, VA **Age:**

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.11%	

**Equal Variance t Two-Sample Test**

Sample Code vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1 vs 15KR088SD	0.8816	1.761	0.139	14	0.1964	CDF	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01945502	0.01945502	1	0.7773	0.3929	Non-Significant Effect
Error	0.3504149	0.02502963	14			
Total	0.3698699		15			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.543	8.885	0.5814	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8479	0.8408	0.0127	Normal Distribution

**Proportion Survived Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR088SD	8	0.8875	0.7833	0.9917	0.9	0.7	1	0.04407	14.04%	5.33%

**Angular (Corrected) Transformed Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR088SD	8	1.246	1.1	1.391	1.249	0.9912	1.412	0.06162	13.99%	5.3%

**Proportion Survived Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR088SD	0.7	0.9	1	0.9	0.7	0.9	1	1

**Angular (Corrected) Transformed Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR088SD	0.9912	1.249	1.412	1.249	0.9912	1.249	1.412	1.412

**Proportion Survived Binomials**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR088SD	7/10	9/10	10/10	9/10	7/10	9/10	10/10	10/10

Page 67 of 216

41 of 137  
 CETIS™ v1.8.7.4

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 15 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	05-2630-0118		Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7			
Analyzed:	25 Nov-15 14:11		Analysis:	Parametric Two Sample			Official Results:	Yes			
Batch ID:	10-5989-7118		Test Type:	Survival-Growth			Analyst:				
Start Date:	25 Sep-15 10:30		Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00		Species:	Hyalella azteca			Brine:				
Duration:	28d 1h		Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America						
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
Control 874-1	Sediment	Kuskokwim River Sediment Char									
15KR089SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	NA	NA	9.69%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Control 874-1		15KR089SD	4.882	1.761	0.147	14	0.0001	CDF	Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.6642228	0.6642228	1	23.84	0.0002	Significant Effect					
Error	0.3900911	0.02786365	14								
Total	1.054314		15								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.831	8.885	0.4435	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8648	0.8408	0.0227	Normal Distribution						
Proportion Survived Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%	
15KR089SD	8	0.6125	0.4681	0.7569	0.65	0.4	0.9	0.06105	28.19%	34.67%	
Angular (Corrected) Transformed Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%	
15KR089SD	8	0.9079	0.7492	1.067	0.9386	0.6847	1.249	0.06712	20.91%	30.98%	
Proportion Survived Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	1	0.9	1	1	1	0.8	0.8	1			
15KR089SD	0.9	0.4	0.7	0.6	0.4	0.7	0.7	0.5			
Angular (Corrected) Transformed Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412			
15KR089SD	1.249	0.6847	0.9912	0.8861	0.6847	0.9912	0.9912	0.7854			
Proportion Survived Binomials											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10			
15KR089SD	9/10	4/10	7/10	6/10	4/10	7/10	7/10	5/10			

Page 68 of 216

42 of 137  
 CETIS™ v1.8.7.4

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 16 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID:	08-8982-7485	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7				
Analyzed:	25 Nov-15 14:11	Analysis:	Nonparametric-Two Sample			Official Results:	Yes				
Batch ID:	10-5989-7118	Test Type:	Survival-Growth			Analyst:					
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	28d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America						
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Control 874-1	Sediment	Kuskokwim River Sediment Char									
15KR090SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	NA	NA	10.9%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)		
Control 874-1		15KR090SD	71.5	NA	2	14	0.6795	Exact	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	1.781507E-05	1.781507E-05	1	0.000521	0.9821	Non-Significant Effect					
Error	0.4790916	0.03422083	14								
Total	0.4791094		15								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	2.476	8.885	0.2545	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.6336	0.8408	<0.0001	Non-normal Distribution						
Proportion Survived Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%	
15KR090SD	8	0.925	0.7785	1	1	0.5	1	0.06196	18.95%	1.33%	
Angular (Corrected) Transformed Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%	
15KR090SD	8	1.313	1.129	1.498	1.412	0.7854	1.412	0.07807	16.81%	0.16%	
Proportion Survived Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	1	0.9	1	1	1	0.8	0.8	1			
15KR090SD	1	1	1	0.9	0.5	1	1	1			
Angular (Corrected) Transformed Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412			
15KR090SD	1.412	1.412	1.412	1.249	0.7854	1.412	1.412	1.412			
Proportion Survived Binomials											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10			
15KR090SD	10/10	10/10	10/10	9/10	5/10	10/10	10/10	10/10			

Page 69 of 216

43 of 137  
 CETIS™ v1.8.7.4

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 17 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences			
Analysis ID:	04-5473-3253		Endpoint:	Proportion Survived		CETIS Version:	CETISv1.8.7			
Analyzed:	25 Nov-15 14:11		Analysis:	Parametric-Two Sample		Official Results:	Yes			
Batch ID:	10-5989-7118		Test Type:	Survival-Growth		Analyst:				
Start Date:	25 Sep-15 10:30		Protocol:	EPA/600/R-99/064 (2000)		Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00		Species:	Hyalella azteca		Brine:				
Duration:	28d 1h		Source:	Chesapeake Cultures, VA		Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR091SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Angular (Corrected)	NA	C > T	NA	NA	7.63%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision( $\alpha$ :5%)	
Control 874-1		15KR091SD	6.095	1.761	0.119	14	<0.0001	CDF	Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)				
Between	0.6829424	0.6829424	1	37.15	<0.0001	Significant Effect				
Error	0.2573644	0.01838317	14							
Total	0.9403068		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)					
Variances	Variance Ratio F	1.153	8.885	0.8560	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.8778	0.8408	0.0359	Normal Distribution					
Proportion Survived Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR091SD	8	0.6125	0.5083	0.7167	0.6	0.4	0.8	0.04407	20.35%	34.67%
Angular (Corrected) Transformed Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR091SD	8	0.9022	0.793	1.011	0.8861	0.6847	1.107	0.0462	14.48%	31.41%
Proportion Survived Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1	0.9	1	1	1	0.8	0.8	1		
15KR091SD	0.4	0.8	0.7	0.6	0.7	0.6	0.6	0.5		
Angular (Corrected) Transformed Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412		
15KR091SD	0.6847	1.107	0.9912	0.8861	0.9912	0.8861	0.8861	0.7854		
Proportion Survived Binomials										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10		
15KR091SD	4/10	8/10	7/10	6/10	7/10	6/10	6/10	5/10		

Page 70 of 216

44 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 18 of 20)  
 Test Code: 874-1 } 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences			
Analysis ID:	04-2948-0879	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7			
Analyzed:	25 Nov-15 14:12	Analysis:	Nonparametric-Two Sample			Official Results:	Yes			
Batch ID:	10-5989-7118	Test Type:	Survival-Growth			Analyst:				
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:				
Duration:	28d 1h	Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR092SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Angular (Corrected)	NA	C > T	NA	NA	9.09%					
Wilcoxon Rank Sum Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision( $\alpha$ :5%)	
Control 874-1		15KR092SD	62.5	NA	3	14	0.3238	Exact	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)				
Between	0.01107017	0.01107017	1	0.4437	0.5162	Non-Significant Effect				
Error	0.3493092	0.02495066	14							
Total	0.3603794		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)					
Variances	Variance Ratio F	1.535	8.885	0.5859	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.8318	0.8408	0.0074	Non-normal Distribution					
Proportion Survived Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR092SD	8	0.9	0.8001	0.9999	0.95	0.7	1	0.04226	13.28%	4.0%
Angular (Corrected) Transformed Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR092SD	8	1.263	1.118	1.408	1.331	0.9912	1.412	0.06145	13.76%	4.0%
Proportion Survived Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1	0.9	1	1	1	0.8	0.8	1		
15KR092SD	1	1	1	0.8	0.9	0.8	0.7	1		
Angular (Corrected) Transformed Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412		
15KR092SD	1.412	1.412	1.412	1.107	1.249	1.107	0.9912	1.412		
Proportion Survived Binomials										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10		
15KR092SD	10/10	10/10	10/10	8/10	9/10	8/10	7/10	10/10		

Page 71 of 216

45 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 19 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** Northwestern Aquatic Sciences

Analysis ID: 03-2748-8354      Endpoint: Proportion Survived      CETIS Version: CETISv1.8.7  
 Analyzed: 25 Nov-15 14:12      Analysis: Parametric Two Sample      Official Results: Yes

Batch ID: 10-5989-7118      Test Type: Survival-Growth      Analyst:  
 Start Date: 25 Sep-15 10:30      Protocol: EPA/600/R-99/064 (2000)      Diluent: Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00      Species: Hyalella azteca      Brine:  
 Duration: 28d 1h      Source: Chesapeake Cultures, VA      Age:

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR093SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	14.7%	

**Equal Variance t Two-Sample Test**

Sample Code vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1 vs 15KR093SD	2.509	1.761	0.209	14	0.0125	CDF	Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.3539917	0.3539917	1	6.295	0.0250	Significant Effect
Error	0.7873083	0.05623631	14			
Total	1.1413		15			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.713	8.885	0.0581	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9368	0.8408	0.3112	Normal Distribution

**Proportion Survived Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR093SD	8	0.7	0.4811	0.9189	0.75	0.2	1	0.09258	37.41%	25.33%

**Angular (Corrected) Transformed Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR093SD	8	1.018	0.7633	1.273	1.049	0.4636	1.412	0.1077	29.92%	22.62%

**Proportion Survived Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR093SD	0.9	0.7	1	0.9	0.5	0.6	0.8	0.2

**Angular (Corrected) Transformed Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR093SD	1.249	0.9912	1.412	1.249	0.7854	0.8861	1.107	0.4636

**Proportion Survived Binomials**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR093SD	9/10	7/10	10/10	9/10	5/10	6/10	8/10	2/10

46 of 137  
 CETIS™ v1.8.7.4



**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 20 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	05-7928-0575	Endpoint:	Proportion Survived		CETIS Version:	CETISv1 8.7				
Analyzed:	25 Nov-15 14:12	Analysis:	Parametric-Two Sample		Official Results:	Yes				
Batch ID:	10-5989-7118	Test Type:	Survival-Growth		Analyst:					
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)		Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca		Brine:					
Duration:	28d 1h	Source:	Chesapeake Cultures, VA		Age:					
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR099SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Angular (Corrected)	NA	C > T	NA	NA	8.37%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Control 874-1		15KR099SD	0.7508	1.761	0.13	14	0.2326	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.01220654	0.01220654	1	0.5637	0.4652	Non-Significant Effect				
Error	0.3031401	0.02165287	14							
Total	0.3153467		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.2	8.885	0.8164	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.8693	0.8408	0.0265	Normal Distribution					
Proportion Survived Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR099SD	8	0.9	0.8106	0.9894	0.9	0.7	1	0.0378	11.88%	4.0%
Angular (Corrected) Transformed Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR099SD	8	1.26	1.132	1.389	1.249	0.9912	1.412	0.05433	12.2%	4.2%
Proportion Survived Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1	0.9	1	1	1	0.8	0.8	1		
15KR099SD	0.9	0.7	0.9	0.9	1	0.8	1	1		
Angular (Corrected) Transformed Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412		
15KR099SD	1.249	0.9912	1.249	1.249	1.412	1.107	1.412	1.412		
Proportion Survived Binomials										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10		
15KR099SD	9/10	7/10	9/10	9/10	10/10	8/10	10/10	10/10		

Page 73 of 216

47 of 137  
 CETIS™ v1.8.7.4

**Growth: Control vs. Test Sediments**

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 1 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	14-2820-4449	Endpoint:	Mean Dry Weight-mg			CETIS Version:	CETISv1.8.7				
Analyzed:	25 Nov-15 14:13	Analysis:	Parametric Two Sample			Official Results:	Yes				
Batch ID:	10-5989-7118	Test Type:	Survival-Growth			Analyst:					
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	28d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America						
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Control 874-1	Sediment	Kuskokwim River Sediment Char									
15KR084SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	12.6%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Control 874-1		15KR084SD	0.9059	1.761	0.032	14	0.1902	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.001092465	0.001092465	1	0.8207	0.3803	Non-Significant Effect					
Error	0.01863579	0.001331128	14								
Total	0.01972826		15								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	5.455	8.885	0.0396	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9659	0.8408	0.7678	Normal Distribution						
Mean Dry Weight-mg Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%	
15KR084SD	8	0.2389	0.2219	0.2559	0.2398	0.1992	0.2651	0.00718	8.5%	6.47%	
Mean Dry Weight-mg Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295			
15KR084SD	0.2489	0.2355	0.2441	0.2569	0.1992	0.2344	0.227	0.2651			

Page 75 of 216

48 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 2 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	11-5515-7124	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	25 Nov-15 14:13	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h						
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude					
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR085SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	14.5%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Control 874-1		15KR085SD	-1.033	1.761	0.037	14	0.8405	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.001891037	0.001891037	1	1.068	0.3190	Non-Significant Effect				
Error	0.02479385	0.00177099	14							
Total	0.02668489		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.741	8.885	0.4816	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9449	0.8408	0.4135	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR085SD	8	0.2772	0.2471	0.3072	0.2742	0.2317	0.3275	0.01271	12.97%	-8.51%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295		
15KR085SD	0.3081	0.3074	0.2551	0.2451	0.249	0.2934	0.3275	0.2317		

Page 76 of 216

49 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 3 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	09-5476-6462	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	25 Nov-15 14:13	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h						
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude					
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR087SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	16.1%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Control 874-1		15KR087SD	0.9455	1.761	0.041	14	0.1802	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.001958239	0.001958239	1	0.8939	0.3605	Non-Significant Effect				
Error	0.03066966	0.00219069	14							
Total	0.0326279		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.056	8.885	0.9450	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9531	0.8408	0.5401	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR087SD	8	0.2333	0.1947	0.2719	0.2195	0.1854	0.3196	0.01632	19.79%	8.66%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295		
15KR087SD	0.2043	0.2378	0.219	0.1963	0.1854	0.284	0.3196	0.2199		

Page 77 of 216

50 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 4 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** **Northwestern Aquatic Sciences**

Analysis ID: 02-0620-5881 Endpoint: Mean Dry Weight-mg CETIS Version: CETISv1.8.7  
 Analyzed: 25 Nov-15 14:13 Analysis: Parametric-Two Sample Official Results: Yes

Batch ID: 10-5989-7118 Test Type: Survival-Growth Analyst:  
 Start Date: 25 Sep-15 10:30 Protocol: EPA/600/R-99/064 (2000) Diluent: Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00 Species: Hyalella azteca Brine:  
 Duration: 28d 1h Source: Chesapeake Cultures, VA Age:

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.6%	

**Equal Variance t Two-Sample Test**

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR088SD	-1.213	1.761	0.035	14	0.8773	CDF	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002300794	0.002300794	1	1.471	0.2453	Non-Significant Effect
Error	0.02190457	0.001564612	14			
Total	0.02420536		15			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.558	8.885	0.2384	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9714	0.8408	0.8605	Normal Distribution

**Mean Dry Weight-mg Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR088SD	8	0.2794	0.2546	0.3042	0.2772	0.2332	0.3259	0.01048	10.61%	-9.39%

**Mean Dry Weight-mg Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR088SD	0.3259	0.2711	0.2704	0.2513	0.2944	0.2332	0.2833	0.3056

Page 78 of 216

SI of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 5 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** **Northwestern Aquatic Sciences**

Analysis ID: 10-8788-2821 Endpoint: Mean Dry Weight-mg CETIS Version: CETISv1.8.7  
 Analyzed: 25 Nov-15 14:13 Analysis: Parametric-Two Sample Official Results: Yes

Batch ID: 10-5989-7118 Test Type: Survival-Growth Analyst:  
 Start Date: 25 Sep-15 10:30 Protocol: EPA/600/R-99/064 (2000) Diluent: Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00 Species: Hyalella azteca Brine:  
 Duration: 28d 1h Source: Chesapeake Cultures, VA Age:

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR089SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.6%	

**Equal Variance t Two-Sample Test**

Sample Code	vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1	15KR089SD	1.464	1.761	0.035	14	0.0826	CDF	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003358181	0.003358181	1	2.144	0.1652	Non-Significant Effect
Error	0.02192506	0.001566076	14			
Total	0.02528324		15			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.55	8.885	0.2400	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9446	0.8408	0.4093	Normal Distribution

**Mean Dry Weight-mg Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR089SD	8	0.2264	0.2016	0.2513	0.2353	0.181	0.2688	0.0105	13.12%	11.34%

**Mean Dry Weight-mg Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR089SD	0.2382	0.2688	0.2324	0.181	0.2455	0.2386	0.2207	0.1864

52 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 6 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	06-5272-5753	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	25 Nov-15 14:13	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h						
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude					
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR090SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	15.7%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision( $\alpha$ :5%)	
Control 874-1		15KR090SD	1.438	1.761	0.040	14	0.0862	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)				
Between	0.004299961	0.004299961	1	2.069	0.1723	Non-Significant Effect				
Error	0.02909668	0.002078334	14							
Total	0.03339664		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)					
Variances	Variance Ratio F	1.18	8.885	0.8328	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9463	0.8408	0.4337	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR090SD	8	0.2226	0.1861	0.2591	0.2222	0.173	0.3084	0.01544	19.61%	12.84%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295		
15KR090SD	0.1732	0.3084	0.2062	0.2249	0.251	0.2237	0.173	0.2207		

Page 80 of 216

53 of 137



**CETIS Analytical Report**

Report Date: 16 Dec-15 12:03 (p 1 of 1)  
 Test Code: 874-1 15-8552-1299

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** Northwestern Aquatic Sciences

Analysis ID: 19-9099-6134      Endpoint: Mean Dry Weight-mg      CETIS Version: CETISv1.8.7  
 Analyzed: 16 Dec-15 11:35      Analysis: Parametric-Two Sample      Official Results: Yes

Batch ID: 10-5989-7118      Test Type: Survival-Growth      Analyst:  
 Start Date: 25 Sep-15 10:30      Protocol: EPA/600/R-99/064 (2000)      Diluent: Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00      Species: Hyalella azteca      Brine:  
 Duration: 28d 1h      Source: Chesapeake Cultures, VA      Age:

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	15.4%	

**Equal Variance t Two-Sample Test**

Sample Code	vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1	15KR091SD	0.6145	1.761	0.039	14	0.2744	CDF	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007575717	0.0007575717	1	0.3776	0.5488	Non-Significant Effect
Error	0.0280907	0.002006479	14			
Total	0.02884827		15			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.276	8.885	0.7559	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9434	0.8408	0.3931	Normal Distribution

**Mean Dry Weight-mg Summary**

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR091SD	8	0.2417	0.2066	0.2768	0.2358	0.1895	0.314	0.01485	17.38%	5.39%

**Mean Dry Weight-mg Detail**

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR091SD	0.314	0.1895	0.229	0.278	0.2009	0.2645	0.2148	0.2426

Page 81 of 216

54 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 8 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID:	20-4211-0736	Endpoint:	Mean Dry Weight-mg			CETIS Version:	CETISv1.8.7				
Analyzed:	25 Nov-15 14:14	Analysis:	Parametric-Two Sample			Official Results:	Yes				
Batch ID:	10-5989-7118	Test Type:	Survival-Growth			Analyst:					
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	28d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America						
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Control 874-1	Sediment	Kuskokwim River Sediment Char									
15KR092SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	13.0%						
Equal Variance t Two-Sample Test											
Sample Code vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)				
Control 874-1 vs 15KR092SD	1.496	1.761	0.033	14	0.0784	GDF	Non-Significant Effect				
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.00315964	0.00315964	1	2.238	0.1569	Non-Significant Effect					
Error	0.01976853	0.001412038	14								
Total	0.02292817		15								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	3.918	8.885	0.0921	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9578	0.8408	0.6218	Normal Distribution						
Mean Dry Weight-mg Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%	
15KR092SD	8	0.2273	0.2073	0.2474	0.2305	0.1791	0.2613	0.008472	10.54%	11.0%	
Mean Dry Weight-mg Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8			
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295			
15KR092SD	0.2369	0.2422	0.2289	0.2321	0.1791	0.2613	0.2249	0.2132			

Page 82 of 216

55 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 9 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	15-7248-8842	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	25 Nov-15 14:14	Analysis:	Parametric Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h						
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude					
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR093SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	13.2%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Control 874-1		15KR093SD	2.847	1.761	0.034	14	0.0065	CDF	Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.01189197	0.01189197	1	8.105	0.0129	Significant Effect				
Error	0.02054077	0.001467198	14							
Total	0.03243274		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	3.287	8.885	0.1391	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9649	0.8408	0.7514	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR093SD	8	0.2009	0.179	0.2228	0.2035	0.1526	0.2412	0.00925	13.02%	21.35%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295		
15KR093SD	0.1928	0.2061	0.1838	0.1526	0.2412	0.2098	0.2009	0.22		

Page 83 of 216

56 of 137

**CETIS Analytical Report**

Report Date: 25 Nov-15 14:31 (p 10 of 20)

Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	04-9075-6975	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	25 Nov-15 14:14	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America					
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d						
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude					
Control 874-1	Sediment	Kuskokwim River Sediment Char								
15KR099SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	14.9%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Control 874-1		15KR099SD	-0.9209	1.761	0.038	14	0.8137	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.001594187	0.001594187	1	0.8481	0.3727	Non-Significant Effect				
Error	0.02631636	0.00187974	14							
Total	0.02791054		15							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.49	8.885	0.6116	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9599	0.8408	0.6606	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR099SD	8	0.2754	0.2429	0.3079	0.2688	0.2352	0.356	0.01374	14.11%	-7.82%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8		
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295		
15KR099SD	0.2834	0.356	0.2367	0.2633	0.2352	0.2743	0.2579	0.2963		

Page 84 of 216

57 of 137

**Survival: Reference 15KR082SD vs. Test Sediments**

Project Name: P874-1 Hyalella % Survival

Sample: x1  
 Samp ID: 15KR084SD  
 Alias: NAS# 5430G  
 Replicates: 8  
 Mean: 92.5  
 SD: 10.351  
 Tr Mean: 78.936  
 Trans SD: 12.779

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 11.207 SS: 2386.423 K: 8 b: 47.369  Alpha Level: 0.05 Calculated Value: 0.9402 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 11.064 Test Residual SD: 4.837 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.1736 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: -1.8554 Critical Value: $\geq 1.761$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	90	71.565	60	50.768	7.37	16.055			-22.146
2	100	90	60	50.768	11.064	16.055			-16.055
3	70	56.789	70	56.789	22.146	10.034			-16.055
4	100	90	100	90	11.064	23.177			-10.034
5	100	90	90	71.565	11.064	4.742			-7.37
6	90	71.565	90	71.565	7.37	4.742			-7.37
7	90	71.565	90	71.565	7.37	4.742			-7.37
8	100	90	90	71.565	11.064	4.742			4.742
9									4.742
10									4.742
11									4.742
12									11.064
13									11.064
14									11.064
15									11.064
16									23.177

The percent survival in reference sediment 15KR084SD was not significantly lower than that of the reference 15KR082SD at  $\alpha=0.05$ . -631

Project Name: P874-1 Hyalella % Survival

Sample: x1  
 Samp ID: 15KR085SD  
 Alias: NAS# 5431G  
 Replicates: 8  
 Mean: 92.5  
 SD: 8.864  
 Tr Mean: 78.75  
 Trans SD: 12.413

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 11.055 SS: 2321.895 K: 8 b: 45.652  Alpha Level: 0.05 Calculated Value: 0.8976 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 11.25 Test Residual SD: 3.073 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.2603 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: -1.8522 Critical Value: $\geq 1.761$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	100	90	60	50.768	11.25	16.055			-16.055
2	90	71.565	60	50.768	7.185	16.055			-16.055
3	100	90	70	56.789	11.25	10.034			-15.315
4	90	71.565	100	90	7.185	23.177			-15.315
5	100	90	90	71.565	11.25	4.742			-10.034
6	80	63.435	90	71.565	15.315	4.742			-7.185
7	80	63.435	90	71.565	15.315	4.742			-7.185
8	100	90	90	71.565	11.25	4.742			4.742
9									4.742
10									4.742
11									4.742
12									11.25
13									11.25
14									11.25
15	The percent survival in reference sediment 15KR085SD was not significantly lower than that of the reference 15KR082SD at $\alpha=0.05$ .								11.25
16									23.177

59 of 137

Sample: x1  
 Samp ID: 15KR087SD  
 Alias: NAS# 5432G  
 Replicates: 8  
 Mean: 90  
 SD: 14.142  
 Tr Mean: 77.167  
 Trans SD: 15.151

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 12.248 SS: 2850.254 K: 8 b: 51.965  Alpha Level: 0.05 Calculated Value: 0.9474 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 12.833 Test Residual SD: 6.43 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.6771 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: -1.4498 Critical Value: $\geq 1.761$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	90	71.565	60	50.768	5.602	16.055			-26.398
2	100	90	60	50.768	12.833	16.055			-16.055
3	80	63.435	70	56.789	13.732	10.034			-16.055
4	100	90	100	90	12.833	23.177			-13.732
5	90	71.565	90	71.565	5.602	4.742			-10.034
6	60	50.768	90	71.565	26.398	4.742			-5.602
7	100	90	90	71.565	12.833	4.742			-5.602
8	100	90	90	71.565	12.833	4.742			4.742
9									4.742
10									4.742
11									4.742
12									12.833
13									12.833
14									12.833
15	The percent survival in reference sediment 15KR087SD was not significantly lower than that of the reference 15KR082SD at $\alpha=0.05$ . <i>601</i>								12.833
16									23.177



Sample: x1  
 Samp ID: 15KR088SD  
 Alias: NAS# 5433G  
 Replicates: 8  
 Mean: 88.75  
 SD: 12.464  
 Tr Mean: 74.784  
 Trans SD: 14.007

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 11.735 SS: 2616.595 K: 8 b: 49.256  Alpha Level: 0.05 Calculated Value: 0.9272 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 11.412 Test Residual SD: 6.881 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.2501 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: -1.1646 Critical Value: $\geq 1.761$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	70	56.789	60	50.768	17.995	16.055			-17.995
2	90	71.565	60	50.768	3.219	16.055			-17.995
3	100	90	70	56.789	15.216	10.034			-16.055
4	90	71.565	100	90	3.219	23.177			-16.055
5	70	56.789	90	71.565	17.995	4.742			-10.034
6	90	71.565	90	71.565	3.219	4.742			-3.219
7	100	90	90	71.565	15.216	4.742			-3.219
8	100	90	90	71.565	15.216	4.742			-3.219
9									4.742
10									4.742
11									4.742
12									4.742
13									15.216
14									15.216
15	The percent survival in reference sediment 15KR088SD was not significantly lower than that of the reference 15KR082SD at $\alpha=0.05$ .								15.216
16									23.177

Project Name: P874-1 Hyalella % Survival

Sample: x1  
 Samp ID: 15KR089SD  
 Alias: NAS# 5434G  
 Replicates: 8  
 Mean: 61.25  
 SD: 17.269  
 Tr Mean: 52.02  
 Trans SD: 10.877

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 10.442 SS: 2071.475 K: 8 b: 43.058  Alpha Level: 0.05 Calculated Value: 0.895 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 8.463 Test Residual SD: 6.039 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.6279 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: 2.4339 Critical Value: $\geq 1.761$ <b>Accept Null Hypothesis: No</b>  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	90	71.565	60	50.768	19.545	16.055			-16.055
2	40	39.232	60	50.768	12.789	16.055			-16.055
3	70	56.789	70	56.789	4.769	10.034			-12.789
4	60	50.768	100	90	1.252	23.177			-12.789
5	40	39.232	90	71.565	12.789	4.742			-10.034
6	70	56.789	90	71.565	4.769	4.742			-7.02
7	70	56.789	90	71.565	4.769	4.742			-1.252
8	50	45	90	71.565	7.02	4.742			4.742
9									4.742
10									4.742
11									4.742
12									4.769
13									4.769
14									4.769
15	The percent survival in reference sediment 15KR089SD was significantly lower than that of the reference 15KR082SD at $\alpha=0.05$ .								19.545
16									23.177

62 & 137

Project Name: P874-1 Hyalella % Survival

Sample: x1  
 Samp ID: 15KR090SD  
 Alias: NAS# 5435G  
 Replicates: 8  
 Mean: 92.5  
 SD: 17.525  
 Tr Mean: N/A  
 Trans SD: N/A

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: N/A  
 Trans SD: N/A

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 12.784 SS: 3105.144 K: 8 b: 51.082  Alpha Level: 0.05 Calculated Value: 0.8403 Critical Value: $\leq 0.887$  Normally Distributed: No  Override Option: Not Invoked	Test Residual Mean: 11.894 Test Residual SD: 10.213 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.3085 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Mann-Whitney Balanced Design: Yes Transformation: rank-order  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Mann-Whitney N1: 8 Mann-Whitney N2: 8 Degrees of Freedom: Experimental Alpha Level: 0.05 Calculated Value: 14 Critical Value: $\geq 49.000$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	100	13	60	2.5	7.929	16.055	1		-37.071
2	100	13	60	2.5	7.929	16.055	2.5		-16.055
3	100	13	70	4	7.929	10.034	2.5		-16.055
4	90	7	100	13	10.506	23.177	4		-10.506
5	50	1	90	7	37.071	4.742	7		-10.034
6	100	13	90	7	7.929	4.742	7		4.742
7	100	13	90	7	7.929	4.742	7		4.742
8	100	13	90	7	7.929	4.742	7		4.742
9							7		4.742
10							13		7.929
11							13		7.929
12							13		7.929
13							13		7.929
14							13		7.929
15							13		7.929
16							13		23.177

The percent survival in reference sediment 15KR090SD was not significantly lower than that of the reference 15KR082SD at  $\alpha=0.05$ . -631

Project Name: P874-1 Hyaella % Survival

Sample: x1  
 Samp ID: 15KR091SD  
 Alias: NAS# 5436G  
 Replicates: 8  
 Mean: 61.25  
 SD: 12.464  
 Tr Mean: 51.694  
 Trans SD: 7.488

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 9.279 SS: 1635.759 K: 8 b: 39.012  Alpha Level: 0.05 Calculated Value: 0.9304 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 5.483 Test Residual SD: 4.659 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 1.679 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: 2.7994 Critical Value: $\geq 1.761$ <b>Accept Null Hypothesis: No</b>  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	40	39.232	60	50.768	12.462	16.055			-16.055
2	80	63.435	60	50.768	11.741	16.055			-16.055
3	70	56.789	70	56.789	5.095	10.034			-12.462
4	60	50.768	100	90	0.925	23.177			-10.034
5	70	56.789	90	71.565	5.095	4.742			-6.694
6	60	50.768	90	71.565	0.925	4.742			-0.925
7	60	50.768	90	71.565	0.925	4.742			-0.925
8	50	45	90	71.565	6.694	4.742			-0.925
9									4.742
10									4.742
11									4.742
12									4.742
13									5.095
14									5.095
15	The percent survival in reference sediment 15KR091SD was significantly lower than that of the reference 15KR082SD at $\alpha=0.05$ . -6J1								11.741
16									23.177

64 of 137

Sample: x1  
 Samp ID: 15KR092SD  
 Alias: NAS# 5437G  
 Replicates: 8  
 Mean: 90  
 SD: 11.952  
 Tr Mean: 76.903  
 Trans SD: 14.55

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 11.976 SS: 2725.262 K: 8 b: 49.905  Alpha Level: 0.05 Calculated Value: 0.9139 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 13.097 Test Residual SD: 3.959 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.8888 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x_1 \geq x_2$ Alternate: $x_1 < x_2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: -1.4449 Critical Value: $\geq 1.761$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	100	90	60	50.768	13.097	16.055			-20.114
2	100	90	60	50.768	13.097	16.055			-16.055
3	100	90	70	56.789	13.097	10.034			-16.055
4	80	63.435	100	90	13.468	23.177			-13.468
5	90	71.565	90	71.565	5.338	4.742			-13.468
6	80	63.435	90	71.565	13.468	4.742			-10.034
7	70	56.789	90	71.565	20.114	4.742			-5.338
8	100	90	90	71.565	13.097	4.742			4.742
9									4.742
10									4.742
11									4.742
12									13.097
13									13.097
14									13.097
15	The percent survival in reference sediment 15KR092SD was not significantly lower than that of the reference 15KR082SD at $\alpha=0.05$ .								13.097
16									23.177

Project Name: P874-1 Hyalella % Survival

Sample: x1  
 Samp ID: 15KR093SD  
 Alias: NAS# 5438G  
 Replicates: 8  
 Mean: 70  
 SD: 26.186  
 Tr Mean: 59.461  
 Trans SD: 19.329

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 14.251 SS: 3858.698 K: 8 b: 61.173  Alpha Level: 0.05 Calculated Value: 0.9698 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 14.68 Test Residual SD: 11.284 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.8784 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: 0.8869 Critical Value: $\geq 1.761$ <b>Accept Null Hypothesis: Yes</b>  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Shapiro-Wilk Residuals	
1	90	71.565	60	50.768	12.104	16.055		-32.896	
2	70	56.789	60	50.768	2.672	16.055		-16.055	
3	100	90	70	56.789	30.539	10.034		-16.055	
4	90	71.565	100	90	12.104	23.177		-14.461	
5	50	45	90	71.565	14.461	4.742		-10.034	
6	60	50.768	90	71.565	8.692	4.742		-8.692	
7	80	63.435	90	71.565	3.974	4.742		-2.672	
8	20	26.565	90	71.565	32.896	4.742		3.974	
9								4.742	
10								4.742	
11								4.742	
12								4.742	
13								12.104	
14								12.104	
15	The percent survival in reference sediment 15KR093SD was not significantly lower than that of the reference 15KR082SD at $\alpha=0.05$ .								23.177
16								30.539	

66 of 137

Sample: x1  
 Samp ID: 15KR099SD  
 Alias: NAS# 5439G  
 Replicates: 8  
 Mean: 90  
 SD: 10.69  
 Tr Mean: 75.615  
 Trans SD: 12.944

Ref Samp: x2  
 Ref ID: 15KR082SD  
 Alias: NAS# 5428G  
 Replicates: 8  
 Mean: 81.25  
 SD: 15.526  
 Tr Mean: 66.823  
 Trans SD: 13.327

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 11.277 SS: 2416.056 K: 8 b: 47.791  Alpha Level: 0.05 Calculated Value: 0.9453 Critical Value: $\leq 0.887$  Normally Distributed: Yes  Override Option: N/A	Test Residual Mean: 10.789 Test Residual SD: 5.875 Ref. Residual Mean: 10.536 Ref. Residual SD: 7.124 Deg. of Freedom: 14  Alpha Level: 0.1 Calculated Value: 0.0775 Critical Value: $\geq 1.761$  Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: ArcSin  Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$  Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: -1.3385 Critical Value: $\geq 1.761$ Accept Null Hypothesis: Yes  Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	90	71.565	60	50.768	4.05	16.055			-18.826
2	70	56.789	60	50.768	18.826	16.055			-16.055
3	90	71.565	70	56.789	4.05	10.034			-16.055
4	90	71.565	100	90	4.05	23.177			-12.18
5	100	90	90	71.565	14.385	4.742			-10.034
6	80	63.435	90	71.565	12.18	4.742			-4.05
7	100	90	90	71.565	14.385	4.742			-4.05
8	100	90	90	71.565	14.385	4.742			-4.05
9									4.742
10									4.742
11									4.742
12									4.742
13									14.385
14									14.385
15	The percent survival in reference sediment 15KR099SD was not significantly lower than that of the reference 15KR082SD at $\alpha=0.05$ . -GJI								14.385
16									23.177

**Growth: Reference 15KR082SD vs. Test Sediments**



**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 11 of 20)

Test Code: 874-1 | 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	21-3181-4823	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h						
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h						
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude					
15KR082SD	Sediment	Kuskokwim River Sediment Char								
15KR084SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	11.9%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR082SD		15KR084SD	0.892	1.697	0.030	30	0.1898	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.00151182	0.00151182	1	0.7956	0.3795	Non-Significant Effect				
Error	0.0570074	0.001900247	30							
Total	0.05851922		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	5.706	7.669	0.0242	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9767	0.9081	0.7007	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR084SD	8	0.2389	0.2219	0.2559	0.2398	0.1992	0.2651	0.00718	8.5%	6.23%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR084SD	0.2489	0.2355	0.2441	0.2569	0.1992	0.2344	0.227	0.2651		

Page 97 of 216

68 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 12 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	12-4245-7388	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7						
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results:	Yes						
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:							
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water						
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:							
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h							
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
15KR082SD	Sediment	Kuskokwim River Sediment Char									
15KR085SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	12.5%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
15KR082SD		15KR085SD	-1.196	1.697	0.032	30	0.8794	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.003009403	0.003009403	1	1.429	0.2412	Non-Significant Effect					
Error	0.06316546	0.002105515	30								
Total	0.06617486		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.821	7.669	0.4231	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9888	0.9081	0.9791	Normal Distribution						
Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%	
15KR085SD	8	0.2772	0.2471	0.3072	0.2742	0.2317	0.3275	0.01271	12.97%	-8.79%	
Mean Dry Weight-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673	
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919	
	0.2352	0.222	0.3162	0.2342							
15KR085SD	0.3081	0.3074	0.2551	0.2451	0.249	0.2934	0.3275	0.2317			

Page 98 of 216

69 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 13 of 20)  
 Test Code: 874-1 | 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 03-3195-4555		Endpoint: Mean Dry Weight-mg		CETIS Version: CETISv1.8.7							
Analyzed: 29 Nov-15 11:57		Analysis: Parametric-Two Sample		Official Results: Yes							
Batch ID: 10-5989-7118		Test Type: Survival-Growth		Analyst:							
Start Date: 25 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 28d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h							
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR082SD	Sediment	Kuskokwim River Sediment Char									
15KR087SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	13.0%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
15KR082SD		15KR087SD	1.096	1.697	0.033	30	0.1408	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.002766624	0.002766624	1	1.202	0.2816	Non-Significant Effect					
Error	0.06904127	0.002301376	30								
Total	0.07180789		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.104	7.669	0.9619	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9928	0.9081	0.9985	Normal Distribution						
Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%	
15KR087SD	8	0.2333	0.1947	0.2719	0.2195	0.1854	0.3196	0.01632	19.79%	8.43%	
Mean Dry Weight-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673	
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919	
	0.2352	0.222	0.3162	0.2342							
15KR087SD	0.2043	0.2378	0.219	0.1963	0.1854	0.284	0.3196	0.2199			

Page 99 of 216

70 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 14 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	11-0908-2226	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h						
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR082SD	Sediment	Kuskokwim River Sediment Char								
15KR088SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.2%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR082SD		15KR088SD	-1.346	1.697	0.031	30	0.9059	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.003641583	0.003641583	1	1.812	0.1883	Non-Significant Effect				
Error	0.06027618	0.002009206	30							
Total	0.06391776		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	2.676	7.669	0.1835	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9878	0.9081	0.9694	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR088SD	8	0.2794	0.2546	0.3042	0.2772	0.2332	0.3259	0.01048	10.61%	-9.67%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR088SD	0.3259	0.2711	0.2704	0.2513	0.2944	0.2332	0.2833	0.3056		

Page 100 of 216

71 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 15 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	11-0879-9258	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h						
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR082SD	Sediment	Kuskokwim River Sediment Char								
15KR089SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.2%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR082SD		15KR089SD	1.547	1.697	0.031	30	0.0661	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.004812896	0.004812896	1	2.395	0.1322	Non-Significant Effect				
Error	0.06029667	0.002009889	30							
Total	0.06510957		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	2.667	7.669	0.1849	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9818	0.9081	0.8497	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR089SD	8	0.2264	0.2016	0.2513	0.2353	0.181	0.2688	0.0105	13.12%	11.12%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR089SD	0.2382	0.2688	0.2324	0.181	0.2455	0.2386	0.2207	0.1864		

Page 101 of 216

72 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 16 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	08-8279-0332	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h						
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR082SD	Sediment	Kuskokwim River Sediment Char								
15KR090SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.9%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR082SD		15KR090SD	1.66	1.697	0.033	30	0.0537	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.00619571	0.00619571	1	2.755	0.1074	Non-Significant Effect				
Error	0.06746829	0.002248943	30							
Total	0.07366399		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.234	7.669	0.8245	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9869	0.9081	0.9571	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR090SD	8	0.2226	0.1861	0.2591	0.2222	0.173	0.3084	0.01544	19.61%	12.61%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR090SD	0.1732	0.3084	0.2062	0.2249	0.251	0.2237	0.173	0.2207		

Page 102 of 216

73 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 17 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	13-5995-3161	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h						
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR082SD	Sediment	Kuskokwim River Sediment Char								
15KR091SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.8%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR082SD		15KR091SD	0.6299	1.697	0.033	30	0.2668	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.0008737755	0.0008737755	1	0.3967	0.5336	Non-Significant Effect				
Error	0.06607594	0.002202532	30							
Total	0.06694972		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.378	7.669	0.6963	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9899	0.9081	0.9884	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR091SD	8	0.2427	0.2082	0.2773	0.2358	0.1895	0.314	0.01461	17.03%	4.74%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR091SD	0.314	0.1895	0.229	0.278	0.2009	0.2645	0.2232	0.2426		

Page 103 of 216

74 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 18 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 19-3902-1151		Endpoint: Mean Dry Weight-mg		CETIS Version: CETISv1.8.7							
Analyzed: 29 Nov-15 11:57		Analysis: Parametric-Two Sample		Official Results: Yes							
Batch ID: 10-5989-7118		Test Type: Survival-Growth		Analyst:							
Start Date: 25 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 28d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h							
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
15KR082SD	Sediment	Kuskokwim River Sediment Char									
15KR092SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	12.0%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
15KR082SD		15KR092SD	1.528	1.697	0.031	30	0.0686	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.004521895	0.004521895	1	2.333	0.1371	Non-Significant Effect					
Error	0.05814014	0.001938005	30								
Total	0.06266204		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	4.098	7.669	0.0618	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9776	0.9081	0.7276	Normal Distribution						
Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%	
15KR092SD	8	0.2273	0.2073	0.2474	0.2305	0.1791	0.2613	0.008472	10.54%	10.78%	
Mean Dry Weight-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673	
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919	
	0.2352	0.222	0.3162	0.2342							
15KR092SD	0.2369	0.2422	0.2289	0.2321	0.1791	0.2613	0.2249	0.2132			

Page 104 of 216

75 of 137



**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 19 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 01-4172-3465		Endpoint: Mean Dry Weight-mg		CETIS Version: CETISv1.8.7							
Analyzed: 29 Nov-15 11:58		Analysis: Parametric-Two Sample		Official Results: Yes							
Batch ID: 10-5989-7118		Test Type: Survival-Growth		Analyst:							
Start Date: 25 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 28d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h							
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
15KR082SD	Sediment	Kuskokwim River Sediment Char									
15KR093SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	12.1%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
15KR082SD		15KR093SD	2.978	1.697	0.031	30	0.0028	CDF	Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.01741347	0.01741347	1	8.867	0.0057	Significant Effect					
Error	0.05891238	0.001963746	30								
Total	0.07632585		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	3.437	7.669	0.0985	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9816	0.9081	0.8446	Normal Distribution						
Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%	
15KR093SD	8	0.2009	0.179	0.2228	0.2035	0.1526	0.2412	0.00925	13.02%	21.15%	
Mean Dry Weight-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673	
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919	
	0.2352	0.222	0.3162	0.2342							
15KR093SD	0.1928	0.2061	0.1838	0.1526	0.2412	0.2098	0.2009	0.22			

Page 105 of 216

76 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 20 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	07-4964-6356	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7						
Analyzed:	29 Nov-15 11:58	Analysis:	Parametric-Two Sample	Official Results:	Yes						
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:							
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water						
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:							
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h							
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR082SD	Sediment	Kuskokwim River Sediment Char									
15KR099SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	12.6%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
15KR082SD		15KR099SD	-1.088	1.697	0.032	30	0.8573	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.002550191	0.002550191	1	1.183	0.2855	Non-Significant Effect					
Error	0.06468797	0.002156266	30								
Total	0.06723816		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.559	7.669	0.5654	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.988	0.9081	0.9717	Normal Distribution						
Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%	
15KR099SD	8	0.2754	0.2429	0.3079	0.2688	0.2352	0.356	0.01374	14.11%	-8.09%	
Mean Dry Weight-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673	
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919	
	0.2352	0.222	0.3162	0.2342							
15KR099SD	0.2834	0.356	0.2367	0.2633	0.2352	0.2743	0.2579	0.2963			

Page 106 of 216

77 of 137

**Survival: Reference 15KR083SD vs. Test Sediments**

**CETIS Analytical Report**

Report Date: 30 Nov-15 14:55 (p 1 of 9)

Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 06-5934-0672		Endpoint: Proportion Survived		CETIS Version: CETISv1.8.7							
Analyzed: 30 Nov-15 14:48		Analysis: Nonparametric-Two Sample		Official Results: Yes							
Batch ID: 10-5989-7118		Test Type: Survival-Growth		Analyst:							
Start Date: 25 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 28d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR084SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1969083	7.24%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL	
15KR083SD		15KR084SD	139.5	NA	3	30	0.6670	M Carlo	Non-Significant Effect	0.6498 - 0.6842	
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.004495295	0.004495295	1	0.1677	0.6851	Non-Significant Effect					
Error	0.8042752	0.02680917	30								
Total	0.8087705		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.292	7.669	0.7700	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8076	0.9081	<0.0001	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR084SD	8	0.925	0.8385	1	0.95	0.7	1	0.0366	11.19%	-2.3%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR084SD	8	1.298	1.175	1.422	1.331	0.9912	1.412	0.05233	11.4%	-2.15%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR084SD	0.9	1	0.7	1	1	0.9	0.9	1			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR084SD	1.249	1.412	0.9912	1.412	1.412	1.249	1.249	1.412			

Page 108 of 216

78 of 137

**CETIS Analytical Report**

Report Date: 30 Nov-15 14:55 (p 2 of 9)

Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	04-2933-3822		Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7			
Analyzed:	30 Nov-15 14:49		Analysis:	Nonparametric-Two Sample			Official Results:	Yes			
Batch ID:	10-5989-7118		Test Type:	Survival-Growth			Analyst:				
Start Date:	25 Sep-15 10:30		Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00		Species:	Hyalella azteca			Brine:				
Duration:	28d 1h		Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR085SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1562837	7.11%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value	99% CL
15KR083SD		15KR085SD	136	NA	3	30	0.5822	M Carlo	Non-Significant Effect	0.5642	-0.6002
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.003494611	0.003494611	1	0.1343	0.7166	Non-Significant Effect					
Error	0.7805057	0.02601686	30								
Total	0.7840003		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.529	7.669	0.5848	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8208	0.9081	0.0001	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR085SD	8	0.925	0.8509	0.9991	0.95	0.8	1	0.03134	9.58%	-2.3%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR085SD	8	1.295	1.181	1.409	1.331	1.107	1.412	0.0481	10.51%	-1.9%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR085SD	1	0.9	1	0.9	1	0.8	0.8	1			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR085SD	1.412	1.249	1.412	1.249	1.412	1.107	1.107	1.412			

Page 109 of 216

79 of 137

**CETIS Analytical Report**

Report Date: 30 Nov-15 14:55 (p 3 of 9)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 19-6921-0350		Endpoint: Proportion Survived		CETIS Version: CETISv1.8.7		Analyzed: 30 Nov-15 14:49		Analysis: Nonparametric-Two Sample		Official Results: Yes	
Batch ID: 10-5989-7118		Test Type: Survival-Growth		Analyst:		Start Date: 25 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water	
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:		Duration: 28d 1h		Source: Chesapeake Cultures, VA		Age:	
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR087SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1562837	7.82%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL	
15KR083SD		15KR087SD	133	NA	4	30	0.5442	M Carlo	Non-Significant Effect	0.5261 - 0.5623	
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	7.351081E-05	7.351081E-05	1	0.002433	0.9610	Non-Significant Effect					
Error	0.9063514	0.03021172	30								
Total	0.9064249		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.289	4.047	0.5983	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.7837	0.9081	<0.0001	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR087SD	8	0.9	0.7818	1	0.95	0.6	1	0.05	15.71%	0.46%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR087SD	8	1.267	1.108	1.427	1.331	0.8861	1.412	0.06754	15.07%	0.28%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR087SD	0.9	1	0.8	1	0.9	0.6	1	1			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR087SD	1.249	1.412	1.107	1.412	1.249	0.8861	1.412	1.412			

Page 110 of 216

80 of 137

**CETIS Analytical Report**

Report Date: 30 Nov-15 14:55 (p 4 of 9)

Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	03-7194-8177	Endpoint:	Proportion Survived				CETIS Version:	CETISv1.8.7			
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample				Official Results:	Yes			
Batch ID:	10-5989-7118	Test Type:	Survival-Growth				Analyst:				
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)				Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca				Brine:				
Duration:	28d 1h	Source:	Chesapeake Cultures, VA				Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR088SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1562837	7.58%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value	99% CL
15KR083SD		15KR088SD	123.5	NA	3	30	0.3630	M Carlo	Non-Significant Effect	0.3455	- 0.3805
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.003821023	0.003821023	1	0.1327	0.7182	Non-Significant Effect					
Error	0.8635362	0.02878454	30								
Total	0.8673573		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.073	4.047	0.8229	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8306	0.9081	0.0002	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR088SD	8	0.8875	0.7833	0.9917	0.9	0.7	1	0.04407	14.04%	1.84%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR088SD	8	1.246	1.1	1.391	1.249	0.9912	1.412	0.06162	13.99%	1.99%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR088SD	0.7	0.9	1	0.9	0.7	0.9	1	1			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR088SD	0.9912	1.249	1.412	1.249	0.9912	1.249	1.412	1.412			

Page 111 of 216

81 of 137

**CETIS Analytical Report**

Report Date: 30 Nov-15 14:55 (p 5 of 9)

Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID:	01-4947-5286	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7				
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample			Official Results:	Yes				
Batch ID:	10-5989-7118	Test Type:	Survival-Growth			Analyst:					
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	28d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR089SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1562837	7.8%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision( $\alpha$ :5%)	P-Value 99% CL	
15KR083SD		15KR089SD	53.5	NA	3	30	<0.0001	M Carlo	Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)					
Between	0.7905893	0.7905893	1	26.26	<0.0001	Significant Effect					
Error	0.9032125	0.03010708	30								
Total	1.693802		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)						
Variances	Variance Ratio F	1.273	4.047	0.6128	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8997	0.9081	0.0061	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR089SD	8	0.6125	0.4681	0.7569	0.65	0.4	0.9	0.06105	28.19%	32.26%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR089SD	8	0.9079	0.7492	1.067	0.9386	0.6847	1.249	0.06712	20.91%	28.56%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR089SD	0.9	0.4	0.7	0.6	0.4	0.7	0.7	0.5			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR089SD	1.249	0.6847	0.9912	0.8861	0.6847	0.9912	0.9912	0.7854			

Page 112 of 216

82 of 137



**CETIS Analytical Report**

Report Date: 30 Nov-15 14:55 (p 6 of 9)

Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID:	18-1953-6228	Endpoint:	Proportion Survived	CETIS Version:	CETISv1.8.7	Official Results:	Yes				
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample								
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:							
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water						
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:							
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR090SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1562837	8.28%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision( $\alpha$ :5%)	P-Value 99% CL	
15KR083SD		15KR090SD	156	NA	2	30	0.8674	M Carlo	Non-Significant Effect	0.8550 - 0.8798	
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)					
Between	0.01078381	0.01078381	1	0.3261	0.5722	Non-Significant Effect					
Error	0.992213	0.03307377	30								
Total	1.002997										
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)						
Variances	Variance Ratio F	1.723	4.047	0.3063	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.7747	0.9081	<0.0001	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR090SD	8	0.925	0.7785	1	1	0.5	1	0.06196	18.95%	-2.3%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR090SD	8	1.313	1.129	1.498	1.412	0.7854	1.412	0.07807	16.81%	-3.34%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR090SD	1	1	1	0.9	0.5	1	1	1			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR090SD	1.412	1.412	1.412	1.249	0.7854	1.412	1.412	1.412			

Page 113 of 216

83 of 137

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 09-0337-1195		Endpoint: Proportion Survived		CETIS Version: CETISv1.8.7							
Analyzed: 30 Nov-15 14:50		Analysis: Nonparametric-Two Sample		Official Results: Yes							
Batch ID: 10-5989-7118		Test Type: Survival-Growth		Analyst:							
Start Date: 25 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 28d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR091SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1562837	7.05%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL	
15KR083SD		15KR091SD	48	NA	3	30	<0.0001	M Carlo	Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.8156233	0.8156233	1	31.76	<0.0001	Significant Effect					
Error	0.7704858	0.02568286	30								
Total	1.586109		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.657	7.669	0.5063	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8558	0.9081	0.0006	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR091SD	8	0.6125	0.5083	0.7167	0.6	0.4	0.8	0.04407	20.35%	32.26%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR091SD	8	0.9022	0.793	1.011	0.8861	0.6847	1.107	0.0462	14.48%	29.01%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR091SD	0.4	0.8	0.7	0.6	0.7	0.6	0.6	0.5			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR091SD	0.6847	1.107	0.9912	0.8861	0.9912	0.8861	0.8861	0.7854			

84 of 137

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	15-0362-1684	Endpoint:	Proportion Survived				CETIS Version:	CETISv1.8.7			
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample				Official Results:	Yes			
Batch ID:	10-5989-7118	Test Type:	Survival-Growth				Analyst:				
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)				Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca				Brine:				
Duration:	28d 1h	Source:	Chesapeake Cultures, VA				Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR092SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1562837	7.57%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL	
15KR083SD		15KR092SD	129.5	NA	4	30	0.4352	M Carlo	Non-Significant Effect	0.4171 - 0.4533	
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.0003938988	0.0003938988	1	0.0137	0.9076	Non-Significant Effect					
Error	0.8624306	0.02874769	30								
Total	0.8628245		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.068	4.047	0.8295	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8136	0.9081	<0.0001	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR092SD	8	0.9	0.8001	0.9999	0.95	0.7	1	0.04226	13.28%	0.46%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR092SD	8	1.263	1.118	1.408	1.331	0.9912	1.412	0.06145	13.76%	0.64%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR092SD	1	1	1	0.8	0.9	0.8	0.7	1			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR092SD	1.412	1.412	1.412	1.107	1.249	1.107	0.9912	1.412			

85 of 137

**CETIS Analytical Report**

Report Date: 14 Dec-15 07:41 (p 1 of 1)

Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 03-5726-6762		Endpoint: Proportion Survived		CETIS Version: CETISv1.8.7							
Analyzed: 14 Dec-15 7:41		Analysis: Parametric-Two Sample		Official Results: Yes							
Batch ID: 10-5989-7118		Test Type: Survival-Growth		Analyst:							
Start Date: 25 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 28d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR093SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	NA	NA	9.82%						
Equal Variance t Two-Sample Test											
Sample Code vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)				
15KR083SD vs 15KR093SD	2.976	1.697	0.144	30	0.0029	CDF	Significant Effect				
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.3839963	0.3839963	1	8.859	0.0057	Significant Effect					
Error	1.30043	0.04334766	30								
Total	1.684426		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	3.278	4.047	0.0289	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9104	0.9081	0.0115	Normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	MIn	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR093SD	8	0.7	0.4811	0.9189	0.75	0.2	1	0.09258	37.41%	22.58%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	MIn	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR093SD	8	1.018	0.7633	1.273	1.049	0.4636	1.412	0.1077	29.92%	19.91%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR093SD	0.9	0.7	1	0.9	0.5	0.6	0.8	0.2			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR093SD	1.249	0.9912	1.412	1.249	0.7854	0.8861	1.107	0.4636			

Page 116 of 216

86 of 137

**CETIS Analytical Report**

Report Date: 30 Nov-15 14:55 (p 9 of 9)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	06-1991-8329		Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7			
Analyzed:	30 Nov-15 14:50		Analysis:	Nonparametric-Two Sample			Official Results:	Yes			
Batch ID:	10-5989-7118		Test Type:	Survival-Growth			Analyst:				
Start Date:	25 Sep-15 10:30		Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00		Species:	Hyalella azteca			Brine:				
Duration:	28d 1h		Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d							
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude						
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR099SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	5000	1562837	7.31%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value	99% CL
15KR083SD		15KR099SD	125	NA	4	30	0.3734	M Carlo	Non-Significant Effect	0.3558	0.3910
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.0006916497	0.0006916497	1	0.02542	0.8744	Non-Significant Effect					
Error	0.8162615	0.02720872	30								
Total	0.8169532		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.198	7.669	0.8601	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.818	0.9081	<0.0001	Non-normal Distribution						
Proportion Survived Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%	
15KR099SD	8	0.9	0.8106	0.9894	0.9	0.7	1	0.0378	11.88%	0.46%	
Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%	
15KR099SD	8	1.26	1.132	1.389	1.249	0.9912	1.412	0.05433	12.2%	0.84%	
Proportion Survived Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6	
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1	
	0.9	0.9	1	1							
15KR099SD	0.9	0.7	0.9	0.9	1	0.8	1	1			
Angular (Corrected) Transformed Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861	
15KR099SD	1.249	0.9912	1.249	1.249	1.412	1.107	1.412	1.412			

Page 117 of 216

87 of 137

**Growth: Reference 15KR083SD vs. Test Sediments**

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 1 of 20)  
 Test Code: 874-1 | 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	18-9830-5681	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR084SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	11.9%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR084SD	0.892	1.697	0.030	30	0.1898	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.00151182	0.00151182	1	0.7956	0.3795	Non-Significant Effect				
Error	0.0570074	0.001900247	30							
Total	0.05851922		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	5.706	7.669	0.0242	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9767	0.9081	0.7007	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR084SD	8	0.2389	0.2219	0.2559	0.2398	0.1992	0.2651	0.00718	8.5%	6.23%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR084SD	0.2489	0.2355	0.2441	0.2569	0.1992	0.2344	0.227	0.2651		

Page 119 of 216

88 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 2 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	07-7666-6173	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR085SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.5%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR085SD	-1.196	1.697	0.032	30	0.8794	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.003009403	0.003009403	1	1.429	0.2412	Non-Significant Effect				
Error	0.06316546	0.002105515	30							
Total	0.06617486		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.821	7.669	0.4231	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9888	0.9081	0.9791	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR085SD	8	0.2772	0.2471	0.3072	0.2742	0.2317	0.3275	0.01271	12.97%	-8.79%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR085SD	0.3081	0.3074	0.2551	0.2451	0.249	0.2934	0.3275	0.2317		

Page 120 of 216

89 of 137



**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 3 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	19-9457-6275	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7						
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes						
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:							
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water						
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:							
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:							
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h							
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
15KR083SD	Sediment	Kuskokwim River Sediment Char									
15KR087SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	13.0%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
15KR083SD		15KR087SD	1.096	1.697	0.033	30	0.1408	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.002766624	0.002766624	1	1.202	0.2816	Non-Significant Effect					
Error	0.06904127	0.002301376	30								
Total	0.07180789		31								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.104	7.669	0.9619	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9928	0.9081	0.9985	Normal Distribution						
Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%	
15KR087SD	8	0.2333	0.1947	0.2719	0.2195	0.1854	0.3196	0.01632	19.79%	8.43%	
Mean Dry Weight-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673	
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919	
	0.2352	0.222	0.3162	0.2342							
15KR087SD	0.2043	0.2378	0.219	0.1963	0.1854	0.284	0.3196	0.2199			

Page 121 of 216

90 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 4 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	02-8741-2404	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR088SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.2%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR088SD	-1.346	1.697	0.031	30	0.9059	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.003641583	0.003641583	1	1.812	0.1883	Non-Significant Effect				
Error	0.06027618	0.002009206	30							
Total	0.06391776			31						
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	2.676	7.669	0.1835	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9878	0.9081	0.9694	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR088SD	8	0.2794	0.2546	0.3042	0.2772	0.2332	0.3259	0.01048	10.61%	-9.67%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR088SD	0.3259	0.2711	0.2704	0.2513	0.2944	0.2332	0.2833	0.3056		

Page 122 of 216

91 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 5 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	13-1870-2523	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR089SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.2%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR089SD	1.547	1.697	0.031	30	0.0661	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.004812896	0.004812896	1	2.395	0.1322	Non-Significant Effect				
Error	0.06029667	0.002009889	30							
Total	0.06510957		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Varlance Ratio F	2.667	7.669	0.1849	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9818	0.9081	0.8497	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR089SD	8	0.2264	0.2016	0.2513	0.2353	0.181	0.2688	0.0105	13.12%	11.12%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR089SD	0.2382	0.2688	0.2324	0.181	0.2455	0.2386	0.2207	0.1864		

Page 123 of 216

92 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 6 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	12-3782-5773	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR090SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.9%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR090SD	1.66	1.697	0.033	30	0.0537	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.00619571	0.00619571	1	2.755	0.1074	Non-Significant Effect				
Error	0.06746829	0.002248943	30							
Total	0.07366399		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.234	7.669	0.8245	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9869	0.9081	0.9571	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR090SD	8	0.2226	0.1861	0.2591	0.2222	0.173	0.3084	0.01544	19.61%	12.61%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR090SD	0.1732	0.3084	0.2062	0.2249	0.251	0.2237	0.173	0.2207		

Page 124 of 216

93 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 7 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	03-5819-8158	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR091SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.8%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR091SD	0.6299	1.697	0.033	30	0.2668	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.0008737755	0.0008737755	1	0.3967	0.5336	Non-Significant Effect				
Error	0.06607594	0.002202532	30							
Total	0.06694972		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.378	7.669	0.6963	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9899	0.9081	0.9884	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR091SD	8	0.2427	0.2082	0.2773	0.2358	0.1895	0.314	0.01461	17.03%	4.74%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR091SD	0.314	0.1895	0.229	0.278	0.2009	0.2645	0.2232	0.2426		

Page 125 of 216

94 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 8 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	15-8390-1031	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h						
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude					
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR092SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.0%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR092SD	1.528	1.697	0.031	30	0.0686	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.004521895	0.004521895	1	2.333	0.1371	Non-Significant Effect				
Error	0.05814014	0.001938005	30							
Total	0.06266204		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	4.098	7.669	0.0618	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9776	0.9081	0.7276	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR092SD	8	0.2273	0.2073	0.2474	0.2305	0.1791	0.2613	0.008472	10.54%	10.78%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR092SD	0.2369	0.2422	0.2289	0.2321	0.1791	0.2613	0.2249	0.2132		

Page 126 of 216

95 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 9 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	06-8889-6750	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR093SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.1%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR093SD	2.978	1.697	0.031	30	0.0028	CDF	Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.01741347	0.01741347	1	8.867	0.0057	Significant Effect				
Error	0.05891238	0.001963746	30							
Total	0.07632585		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	3.437	7.669	0.0985	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9816	0.9081	0.8446	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR093SD	8	0.2009	0.179	0.2228	0.2035	0.1526	0.2412	0.00925	13.02%	21.15%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR093SD	0.1928	0.2061	0.1838	0.1526	0.2412	0.2098	0.2009	0.22		

Page 127 of 216

96 of 137

**CETIS Analytical Report**

Report Date: 29 Nov-15 11:59 (p 10 of 20)  
 Test Code: 874-1 15-8552-1299

12/22/2015

Hyaella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	04-7505-0196	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:						
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyaella azteca	Brine:						
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h						
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
15KR083SD	Sediment	Kuskokwim River Sediment Char								
15KR099SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.6%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
15KR083SD		15KR099SD	-1.088	1.697	0.032	30	0.8573	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.002550191	0.002550191	1	1.183	0.2855	Non-Significant Effect				
Error	0.06468797	0.002156266	30							
Total	0.06723816		31							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.559	7.669	0.5654	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.988	0.9081	0.9717	Normal Distribution					
Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR099SD	8	0.2754	0.2429	0.3079	0.2688	0.2352	0.356	0.01374	14.11%	-8.09%
Mean Dry Weight-mg Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR099SD	0.2834	0.356	0.2367	0.2633	0.2352	0.2743	0.2579	0.2963		

Page 128 of 216

97 of 137



**CETIS Data Entry**

data entry verified  
against laboratory bench  
Sheet 12/16-15 JTR

**CETIS Test Data Worksheet**

Report Date: 25 Nov-15 12:23 (p 1 of 3)  
Test Code: 15-8552-1298/874-1

12/22/2015

<b>Hyaella 28-d Survival and Growth Sediment Test</b>						<b>Northwestern Aquatic Sciences</b>			
<b>Start Date:</b>	25 Sep-15 10:30	<b>Species:</b>	Hyaella azteca	<b>Sample Code:</b>	Control 874-1				
<b>End Date:</b>	23 Oct-15 11:00	<b>Protocol:</b>	EPA/600/R-99/064 (2000)	<b>Sample Source:</b>	Kuskokwim River Sediment Charact				
<b>Sample Date:</b>	21 Sep-15 06:30	<b>Material:</b>	Sediment	<b>Sample Station:</b>					

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
Control 874-1	1	26	10	10	32.826	30.895	10		0.069
Control 874-1	2	80	10	9	34.18	31.704	9		0.069
Control 874-1	3	30	10	10	32.576	30.001	10		0.069
Control 874-1	4	17	10	10	32.093	29.296	10		0.069
Control 874-1	5	65	10	10	31.39	29.254	10		0.069
Control 874-1	6	43	10	8	32.022	30.391	8		0.069
Control 874-1	7	46	10	8	32.159	29.555	8		0.069
Control 874-1	8	104	10	10	34.352	31.402	10		0.069
15KR082SD	1	59	10	6	31.579	30.09	6		0.069
15KR082SD	2	35	10	8	32.036	30.432	6		0.069
15KR082SD	3	100	10	7	33.77	31.927	7		0.069
15KR082SD	4	93	10	10	35.049	32.341	10		0.069
15KR082SD	5	67	10	9	33.361	30.212	9		0.069
15KR082SD	6	61	10	9	35.644	33.062	9		0.069
15KR082SD	7	45	10	9	33.446	31.283	9		0.069
15KR082SD	8	37	10	9	33.078	31.821	9		0.069
15KR083SD	1	27	10	10	32.612	30.884	10		0.069
15KR083SD	2	83	10	10	32.344	29.802	10		0.069
15KR083SD	3	33	10	9	32.398	29.894	9		0.069
15KR083SD	4	75	10	10	32.036	29.117	10		0.069
15KR083SD	5	9	10	9	31.857	29.74	9		0.069
15KR083SD	6	14	10	9	33.815	31.817	9		0.069
15KR083SD	7	60	10	10	32.819	29.857	10		0.069
15KR083SD	8	89	10	10	33.35	31.008	10		0.069
15KR084SD	1	47	10	9	32.01	29.77	9		0.069
15KR084SD	2	15	10	10	31.244	28.889	10		0.069
15KR084SD	3	7	10	7	31.995	30.286	7		0.069
15KR084SD	4	1	10	10	33.526	30.957	10		0.069
15KR084SD	5	98	10	10	34.74	32.748	10		0.069
15KR084SD	6	13	10	9	32.884	30.774	9		0.069
15KR084SD	7	19	10	9	30.55	28.507	9		0.069
15KR084SD	8	29	10	10	33.819	31.168	10		0.069
15KR085SD	1	36	10	10	34.49	31.409	10		0.069
15KR085SD	2	102	10	9	34.12	31.353	9		0.069
15KR085SD	3	6	10	10	32.718	30.167	10		0.069
15KR085SD	4	56	10	9	31.871	29.665	9		0.069
15KR085SD	5	31	10	10	33.274	30.784	10		0.069
15KR085SD	6	88	10	8	31.805	29.458	8		0.069
15KR085SD	7	82	10	8	32.36	29.74	8		0.069
15KR085SD	8	32	10	10	32.3	29.983	10		0.069
15KR087SD	1	97	10	9	30.292	28.453	9		0.069
15KR087SD	2	84	10	10	32.639	30.261	10		0.069
15KR087SD	3	70	10	8	30.944	29.192	8		0.069
15KR087SD	4	54	10	10	30.702	28.739	10		0.069
15KR087SD	5	74	10	9	32.181	30.512	9		0.069
15KR087SD	6	2	10	6	31.606	29.902	6		0.069
15KR087SD	7	94	10	10	35.769	32.573	10		0.069

Page 130 of 216

**CETIS Test Data Worksheet**

Report Date: 16 Dec-15 10:57 (p 2 of 3)  
 Test Code: 15-8552-1299/874-1

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR087SD	8	55	10	10	31.764	29.565	10		0.069
15KR088SD	1	21	10	7	32.57	30.289	7		0.089
15KR088SD	2	20	10	9	32.872	30.432	9		0.069
15KR088SD	3	53	10	10	32.724	30.02	10		0.069
15KR088SD	4	48	10	9	33.433	31.171	9		0.069
15KR088SD	5	57	10	7	34.413	32.352	7		0.069
15KR088SD	6	23	10	9	33.955	31.856	9		0.069
15KR088SD	7	68	10	10	34.32	31.487	10		0.069
15KR088SD	8	50	10	10	33.804	30.748	10		0.069
15KR089SD	1	62	10	9	32.011	29.867	9		0.069
15KR089SD	2	96	10	4	33.598	32.523	4		0.069
15KR089SD	3	3	10	7	32.4	30.773	7		0.069
15KR089SD	4	91	10	6	31.173	30.087	6		0.069
15KR089SD	5	22	10	4	31.579	30.597	4		0.069
15KR089SD	6	103	10	7	31.978	30.308	7		0.069
15KR089SD	7	38	10	7	33.26	31.715	7		0.069
15KR089SD	8	63	10	5	30.234	29.302	5		0.069
15KR090SD	1	64	10	10	30.65	28.918	10		0.069
15KR090SD	2	18	10	10	35.525	32.441	10		0.069
15KR090SD	3	72	10	10	31.952	29.89	10		0.069
15KR090SD	4	92	10	9	32.574	30.55	9		0.069
15KR090SD	5	85	10	5	32.441	31.186	5		0.069
15KR090SD	6	90	10	10	33.032	30.795	10		0.069
15KR090SD	7	41	10	10	33.962	32.232	10		0.069
15KR090SD	8	77	10	10	34.426	32.219	10		0.069
15KR091SD	1	81	10	4	32.463	31.207	4		0.069
15KR091SD	2	71	10	8	33.006	31.49	8		0.069
15KR091SD	3	40	10	7	30.968	29.365	7		0.069
15KR091SD	4	58	10	6	35.814	34.146	6		0.069
15KR091SD	5	42	10	7	35.086	33.68	7		0.069
15KR091SD	6	34	10	6	30.97	29.383	6		0.069
15KR091SD	7	44	10	6	31.944	30.855	6		0.069
15KR091SD	8	8	10	5	34.934	33.721	5		0.069
15KR092SD	1	95	10	10	31.08	28.711	10		0.069
15KR092SD	2	78	10	10	32.862	30.44	10		0.069
15KR092SD	3	66	10	10	34.464	32.175	10		0.069
15KR092SD	4	12	10	8	34.064	32.207	8		0.069
15KR092SD	5	87	10	9	32.041	30.429	9		0.069
15KR092SD	6	78	10	8	30.875	28.785	8		0.069
15KR092SD	7	73	10	7	31.971	30.397	7		0.069
15KR092SD	8	11	10	10	33.075	30.943	10		0.069
15KR093SD	1	99	10	9	30.492	28.757	9		0.069
15KR093SD	2	49	10	7	33.992	32.549	7		0.069
15KR093SD	3	5	10	10	32.606	30.768	10		0.069
15KR093SD	4	51	10	9	31.615	30.242	9		0.069
15KR093SD	5	28	10	5	33.917	32.711	5		0.069
15KR093SD	6	24	10	6	32.392	31.133	6		0.069
15KR093SD	7	101	10	8	32.197	30.59	8		0.069
15KR093SD	8	16	10	2	31.246	30.806	2		0.069
15KR099SD	1	25	10	9	31.436	29.885	9		0.069
15KR099SD	2	79	10	7	33.706	31.214	7		0.069
15KR099SD	3	69	10	9	31.517	29.387	9		0.069

12/22/2015

Page 131 of 216

CETIS Test Data Worksheet

Report Date: 25 Nov-15 12:23 (p 3 of 3)  
Test Code: 15-8552-1299/874-1

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR099SD	4	52	10	9	32.525	30.155	9		0.069
15KR099SD	5	39	10	10	33.091	30.739	10		0.069
15KR099SD	6	4	10	8	32.882	30.688	8		0.069
15KR099SD	7	10	10	10	33.235	30.656	10		0.069
15KR099SD	8	86	10	10	35.653	32.69	10		0.069

12/22/2015

Page 132 of 216

**Survival: Combined References vs. Test Sediments**

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 11 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** **Northwestern Aquatic Sciences**

Analysis ID: 15-1267-7590 **Endpoint:** Proportion Survived **CETIS Version:** CETISv1.8.7  
 Analyzed: 10 Dec-15 11:40 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Batch ID: 06-5161-8051 **Test Type:** Survival-Growth **Analyst:**  
 Start Date: 26 Sep-15 10:30 **Protocol:** EPA/600/R-99/064 (2000) **Diluent:** Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00 **Species:** Hyalella azteca **Brine:**  
 Duration: 27d 1h **Source:** Chesapeake Cultures, VA **Age:**

**Sample Code** **Sample Notes**  
 Combined Ref Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR084SD	10-3893-7565	05 Sep-15 16:16	22 Sep-15 11:15	20d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.57%	

**Wilcoxon Rank Sum Two-Sample Test**

Sample Code	vs Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref	15KR084SD	110	NA	3	22	0.7779	Exact	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01313371	0.01313371	1	0.4496	0.5095	Non-Significant Effect
Error	0.6426935	0.02921334	22			
Total	0.6558272		23			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.489	7.968	0.6131	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8225	0.884	0.0007	Non-normal Distribution

**Proportion Survived Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR084SD	8	0.925	0.8385	1	0.95	0.7	1	0.0366	11.19%	-4.23%

**Angular (Corrected) Transformed Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR084SD	8	1.298	1.175	1.422	1.331	0.9912	1.412	0.05233	11.4%	-3.97%

**Proportion Survived Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
15KR084SD	0.9	1	0.9	0.9	1	1	0.9	0.9	1	

**Angular (Corrected) Transformed Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR084SD	1.249	1.412	0.9912	1.412	1.412	1.249	1.249	1.412		

Page 134 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 12 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	13-2606-5748	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7				
Analyzed:	10 Dec-15 11:40	Analysis:	Nonparametric-Two Sample			Official Results:	Yes				
Batch ID:	06-5161-8051	Test Type:	Survival-Growth			Analyst:					
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	27d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample Notes										
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".										
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	23d 17h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR085SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	NA	NA	8.36%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR085SD	107	NA	2	22	0.7047	Exact	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.01147562	0.01147562	1	0.4079	0.5296	Non-Significant Effect					
Error	0.6189239	0.0281329	22								
Total	0.6303995		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.762	7.968	0.4575	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8487	0.884	0.0021	Non-normal Distribution						
Proportion Survived Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%	
15KR085SD	8	0.925	0.8509	0.9991	0.95	0.8	1	0.03134	9.58%	-4.23%	
Angular (Corrected) Transformed Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%	
15KR085SD	8	1.295	1.181	1.409	1.331	1.107	1.412	0.0481	10.51%	-3.72%	
Proportion Survived Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1	
	0.9	1	0.9	0.9	1	1					
15KR085SD	1	0.9	1	0.9	1	0.8	0.8	1			
Angular (Corrected) Transformed Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412	
15KR085SD	1.412	1.249	1.412	1.249	1.412	1.107	1.107	1.412			

Page 135 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 13 of 20)

Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID:	11-7975-2114	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7				
Analyzed:	10 Dec-15 11:41	Analysis:	Nonparametric-Two Sample			Official Results:	Yes				
Batch ID:	06-5161-8051	Test Type:	Survival-Growth			Analyst:					
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	27d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample Notes										
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".										
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR087SD	12-9078-6026	02 Sep-15 18:25	22 Sep-15 11:15	23d 16h							
Sample Code	Material Type	Sample Source	Station Location			Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR087SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	NA	NA	9.44%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR087SD	105	NA	3	22	0.6182	Exact	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.001875447	0.001875447	1	0.0554	0.8161	Non-Significant Effect					
Error	0.7447697	0.03385317	22								
Total	0.7466452		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.118	4.847	0.8031	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.8004	0.884	0.0003	Non-normal Distribution						
Proportion Survived Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%	
15KR087SD	8	0.9	0.7818	1	0.95	0.6	1	0.05	15.71%	-1.41%	
Angular (Corrected) Transformed Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%	
15KR087SD	8	1.267	1.108	1.427	1.331	0.8861	1.412	0.06754	15.07%	-1.5%	
Proportion Survived Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1	
15KR087SD	0.9	1	0.9	0.9	1	1	1	1	1	1	
Angular (Corrected) Transformed Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412	
15KR087SD	1.249	1.412	1.107	1.412	1.249	0.8861	1.412	1.412	1.412	1.412	

Page 136 of 216



**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 14 of 20)  
 Test Code: 874-1B | 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	04-8484-3054	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7				
Analyzed:	10 Dec-15 11:41	Analysis:	Nonparametric-Two Sample			Official Results:	Yes				
Batch ID:	06-5161-8051	Test Type:	Survival-Growth			Analyst:					
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	27d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample Notes										
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".										
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	23d 16h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR088SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	NA	NA	9.08%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision( $\alpha$ :5%)		
Combined Ref		15KR088SD	99.5	NA	3	22	0.4672	Exact	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)					
Between	4.746204E-05	4.746204E-05	1	0.001488	0.9696	Non-Significant Effect					
Error	0.7019545	0.03190702	22								
Total	0.7020019		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)						
Variances	Variance Ratio F	1.074	7.968	0.9777	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.7998	0.884	0.0003	Non-normal Distribution						
Proportion Survived Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%	
15KR088SD	8	0.8875	0.7833	0.9917	0.9	0.7	1	0.04407	14.04%	0.0%	
Angular (Corrected) Transformed Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%	
15KR088SD	8	1.246	1.1	1.391	1.249	0.9912	1.412	0.06162	13.99%	0.24%	
Proportion Survived Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1	
15KR088SD	0.9	1	0.9	0.9	1	1					
15KR088SD	0.7	0.9	1	0.9	0.7	0.9	1	1			
Angular (Corrected) Transformed Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412	
15KR088SD	0.9912	1.249	1.412	1.249	0.9912	1.249	1.412	1.412			

Page 137 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 15 of 20)

Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	00-5532-5186	Endpoint:	Proportion Survived	CETIS Version:	CETISv1.8.7					
Analyzed:	10 Dec-15 11:41	Analysis:	Parametric: Two Sample	Official Results:	Yes					
Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:						
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample Notes									
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h						
15KR089SD	09-2513-6691	06 Sep-15 13:30	22 Sep-15 11:15	19d 21h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char								
15KR089SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Angular (Corrected)	NA	C > T	NA	NA	9.41%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Combined Ref		15KR089SD	4.286	1.717	0.137	22	0.0002	CDF	Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.6192267	0.6192267	1	18.37	0.0003	Significant Effect				
Error	0.7416307	0.03371049	22							
Total	1.360857		23							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.105	4.847	0.8177	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9174	0.884	0.0512	Normal Distribution					
Proportion Survived Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR089SD	8	0.6125	0.4681	0.7569	0.65	0.4	0.9	0.06105	28.19%	30.99%
Angular (Corrected) Transformed Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR089SD	8	0.9079	0.7492	1.067	0.9386	0.6847	1.249	0.06712	20.91%	27.29%
Proportion Survived Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
15KR089SD	0.9	1	0.9	0.9	1	1				
15KR089SD	0.9	0.4	0.7	0.6	0.4	0.7	0.7	0.5		
Angular (Corrected) Transformed Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR089SD	1.249	0.6847	0.9912	0.8861	0.6847	0.9912	0.9912	0.7854		

Page 138 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 16 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	04-4825-0919		Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7			
Analyzed:	10 Dec-15 11:41		Analysis:	Nonparametric-Two Sample			Official Results:	Yes			
Batch ID:	06-5161-8051		Test Type:	Survival-Growth			Analyst:				
Start Date:	26 Sep-15 10:30		Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00		Species:	Hyalella azteca			Brine:				
Duration:	27d 1h		Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample Notes										
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".										
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	23d 1h							
Sample Code	Material Type	Sample Source	Station Location			Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR090SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	NA	NA	10.1%						
Wilcoxon Rank Sum Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR090SD	120.5	NA	2	22	0.9153	Exact	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.02228931	0.02228931	1	0.5904	0.4505	Non-Significant Effect					
Error	0.8306312	0.03775597	22								
Total	0.8529205		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.494	4.847	0.4849	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.7765	0.884	0.0001	Non-normal Distribution						
Proportion Survived Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%	
15KR090SD	8	0.925	0.7785	1	1	0.5	1	0.06196	18.95%	-4.23%	
Angular (Corrected) Transformed Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%	
15KR090SD	8	1.313	1.129	1.498	1.412	0.7854	1.412	0.07807	16.81%	-5.18%	
Proportion Survived Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1	
	0.9	1	0.9	0.9	1	1					
15KR090SD	1	1	1	0.9	0.5	1	1	1			
Angular (Corrected) Transformed Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412	
15KR090SD	1.412	1.412	1.412	1.249	0.7854	1.412	1.412	1.412			

Page 139 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 17 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** **Northwestern Aquatic Sciences**

Analysis ID: 19-1621-5006 Endpoint: Proportion Survived CETIS Version: CETISv1.8.7  
 Analyzed: 10 Dec-15 11:41 Analysis: Nonparametric-Two Sample Official Results: Yes

Batch ID: 06-5161-8051 Test Type: Survival-Growth Analyst:  
 Start Date: 26 Sep-15 10:30 Protocol: EPA/600/R-99/064 (2000) Diluent: Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00 Species: Hyalella azteca Brine:  
 Duration: 27d 1h Source: Chesapeake Cultures, VA Age:

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR091SD	17-1206-1859	06 Sep-15 17:30	22 Sep-15 11:15	19d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.27%	

**Wilcoxon Rank Sum Two-Sample Test**

Sample Code vs Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref vs 15KR091SD	47	NA	2	22	<0.0001	Exact	Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6401256	0.6401256	1	23.13	<0.0001	Significant Effect
Error	0.608904	0.02767745	22			
Total	1.24903		23			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.91	7.968	0.3931	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8629	0.884	0.0038	Non-normal Distribution

**Proportion Survived Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR091SD	8	0.6125	0.5083	0.7167	0.6	0.4	0.8	0.04407	20.35%	30.99%

**Angular (Corrected) Transformed Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR091SD	8	0.9022	0.793	1.011	0.8861	0.6847	1.107	0.0462	14.48%	27.75%

**Proportion Survived Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
15KR091SD	0.9	1	0.9	0.9	1	1				
15KR091SD	0.4	0.8	0.7	0.6	0.7	0.6	0.6	0.5		

**Angular (Corrected) Transformed Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR091SD	0.6847	1.107	0.9912	0.8861	0.9912	0.8861	0.8861	0.7854		

Page 140 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 18 of 20)

Test Code: 874-1B 10-4925-1185

12/22/2015

**Hyalella 28-d Survival and Growth Sediment Test** **Northwestern Aquatic Sciences**

Analysis ID: 03-8048-1886 Endpoint: Proportion Survived CETIS Version: CETISv1.8.7  
 Analyzed: 10 Dec-15 11:41 Analysis: Nonparametric-Two Sample Official Results: Yes

Batch ID: 06-5161-8051 Test Type: Survival-Growth Analyst:  
 Start Date: 26 Sep-15 10:30 Protocol: EPA/600/R-99/064 (2000) Diluent: Dechlorinated Tap Water  
 Ending Date: 23 Oct-15 11:00 Species: Hyalella azteca Brine:  
 Duration: 27d 1h Source: Chesapeake Cultures, VA Age:

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	22d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR092SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.07%	

**Wilcoxon Rank Sum Two-Sample Test**

Sample Code vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref	15KR092SD	103	NA	3	22	0.6076	Exact	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001067859	0.001067859	1	0.03352	0.8564	Non-Significant Effect
Error	0.7008488	0.03185676	22			
Total	0.7019167		23			

**Distributional Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.08	7.968	0.9715	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8273	0.884	0.0009	Non-normal Distribution

**Proportion Survived Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR092SD	8	0.9	0.8001	0.9999	0.95	0.7	1	0.04226	13.28%	-1.41%

**Angular (Corrected) Transformed Summary**

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR092SD	8	1.263	1.118	1.408	1.331	0.9912	1.412	0.06145	13.76%	-1.13%

**Proportion Survived Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
15KR092SD	0.9	1	0.9	0.9	1	1				
15KR092SD	1	1	1	0.8	0.9	0.8	0.7	1		

**Angular (Corrected) Transformed Detail**

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR092SD	1.412	1.412	1.412	1.107	1.249	1.107	0.9912	1.412		

Page 141 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 19 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID:	01-3200-9980	Endpoint:	Proportion Survived			CETIS Version:	CETISv1.8.7				
Analyzed:	10 Dec-15 11:41	Analysis:	Parametric-Two Sample			Official Results:	Yes				
Batch ID:	06-5161-8051	Test Type:	Survival-Growth			Analyst:					
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	27d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample Notes										
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".										
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	19d 15h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR093SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Angular (Corrected)	NA	C > T	NA	NA	12.4%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR093SD	2.342	1.717	0.169	22	0.0143	CDF	Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.2839234	0.2839234	1	5.485	0.0286	Significant Effect					
Error	1.138848	0.05176581	22								
Total	1.422771		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	2.844	4.847	0.0846	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9227	0.884	0.0672	Normal Distribution						
Proportion Survived Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%	
15KR093SD	8	0.7	0.4811	0.9189	0.75	0.2	1	0.09258	37.41%	21.13%	
Angular (Corrected) Transformed Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%	
15KR093SD	8	1.018	0.7633	1.273	1.049	0.4636	1.412	0.1077	29.92%	18.48%	
Proportion Survived Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1	
15KR093SD	0.9	1	0.9	0.9	1	1					
15KR093SD	0.9	0.7	1	0.9	0.5	0.6	0.8	0.2			
Angular (Corrected) Transformed Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412	
15KR093SD	1.249	0.9912	1.412	1.249	0.7854	0.8861	1.107	0.4636			

Page 142 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 20 of 20)

Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	00-7791-8848	Endpoint:	Proportion Survived	CETIS Version:	CETISv1.8.7					
Analyzed:	10 Dec-15 11:41	Analysis:	Nonparametric-Two Sample	Official Results:	Yes					
Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:						
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample Notes									
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h						
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	21d						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char								
15KR099SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Angular (Corrected)	NA	C > T	NA	NA	8.68%					
Wilcoxon Rank Sum Two-Sample Test										
Sample Code vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref	15KR099SD	100	NA	3	22	0.5015	Exact	Non-Significant Effect		
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.000707282	0.000707282	1	0.02377	0.8789	Non-Significant Effect				
Error	0.6546798	0.02975817	22							
Total	0.655387		23							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.381	7.968	0.6910	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.8186	0.884	0.0006	Non-normal Distribution					
Proportion Survived Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR099SD	8	0.9	0.8106	0.9894	0.9	0.7	1	0.0378	11.88%	-1.41%
Angular (Corrected) Transformed Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR099SD	8	1.26	1.132	1.389	1.249	0.9912	1.412	0.05433	12.2%	-0.92%
Proportion Survived Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
15KR099SD	0.9	1	0.9	0.9	1	1	1	1	1	1
15KR099SD	0.9	0.7	0.9	0.9	1	0.8	1	1	1	1
Angular (Corrected) Transformed Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR099SD	1.249	0.9912	1.249	1.249	1.412	1.107	1.412	1.412	1.412	1.412

Page 143 of 216

110 of 137

**Growth: Combined References vs. Test Sediments**



**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 1 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	20-9636-0899		Endpoint:	Mean Dry Weight-mg			CETIS Version:	CETISv1.8.7			
Analyzed:	10 Dec-15 11:41		Analysis:	Parametric-Two Sample			Official Results:	Yes			
Batch ID:	06-5161-8051		Test Type:	Survival-Growth			Analyst:				
Start Date:	26 Sep-15 10:30		Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00		Species:	Hyalella azteca			Brine:				
Duration:	27d 1h		Source:	Chesapeake Cultures, VA			Age:				
Sample Code	Sample Notes										
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".										
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR084SD	10-3893-7565	05 Sep-15 16:16	22 Sep-15 11:15	20d 18h							
Sample Code	Material Type	Sample Source	Station Location			Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR084SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	12.7%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR084SD	0.8292	1.717	0.032	22	0.2080	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.001289154	0.001289154	1	0.6875	0.4159	Non-Significant Effect					
Error	0.04125331	0.001875151	22								
Total	0.04254247		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	6.202	7.968	0.0211	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9402	0.884	0.1649	Normal Distribution						
Mean Dry Weight-mg Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%	
15KR084SD	8	0.2389	0.2219	0.2559	0.2398	0.1992	0.2651	0.00718	8.5%	6.11%	
Mean Dry Weight-mg Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	
15KR084SD	0.2489	0.2355	0.2441	0.2569	0.1992	0.2344	0.227	0.2651			

Page 145 of 216

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 2 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 09-5695-3814		Endpoint: Mean Dry Weight-mg		CETIS Version: CETISv1.8.7							
Analyzed: 10 Dec-15 11:42		Analysis: Parametric-Two Sample		Official Results: Yes							
Batch ID: 06-5161-8051		Test Type: Survival-Growth		Analyst:							
Start Date: 26 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 27d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code		Sample Notes									
Combined Ref		Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	23d 17h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR085SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	13.6%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR085SD	-1.13	1.717	0.035	22	0.8648	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.002753549	0.002753549	1	1.278	0.2705	Non-Significant Effect					
Error	0.04741137	0.002155063	22								
Total	0.05016492		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.98	7.968	0.3667	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9743	0.884	0.7729	Normal Distribution						
Mean Dry Weight-mg Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%	
15KR085SD	8	0.2772	0.2471	0.3072	0.2742	0.2317	0.3275	0.01271	12.97%	-8.93%	
Mean Dry Weight-mg Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	
15KR085SD	0.3081	0.3074	0.2551	0.2451	0.249	0.2934	0.3275	0.2317			

Page 146 of 216

112 of 137

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 3 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyaella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	13-8958-9850	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	10 Dec-15 11:42	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:						
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyaella azteca	Brine:						
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample Notes									
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h						
15KR087SD	12-9078-6026	02 Sep-15 18:25	22 Sep-15 11:15	23d 16h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char								
15KR087SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	14.4%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Combined Ref		15KR087SD	0.9923	1.717	0.037	22	0.1659	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.002385043	0.002385043	1	0.9847	0.3318	Non-Significant Effect				
Error	0.05328718	0.002422145	22							
Total	0.05567222	23								
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.2	7.968	0.8475	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.978	0.884	0.8555	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR087SD	8	0.2333	0.1947	0.2719	0.2195	0.1854	0.3196	0.01632	19.79%	8.31%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR087SD	0.2043	0.2378	0.219	0.1963	0.1854	0.284	0.3196	0.2199		

Page 147 of 216

113 of 137

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 4 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	17-9540-6842	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	10 Dec-15 11:42	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:						
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample Notes									
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h						
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	23d 16h						
Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude					
Combined Ref	Sediment	Kuskokwim River Sediment Char								
15KR088SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	13.1%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Combined Ref		15KR088SD	-1.281	1.717	0.033	22	0.8933	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.003323286	0.003323286	1	1.642	0.2134	Non-Significant Effect				
Error	0.04452209	0.002023731	22							
Total	0.04784538		23							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	2.909	7.968	0.1586	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9663	0.884	0.5767	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR088SD	8	0.2794	0.2546	0.3042	0.2772	0.2332	0.3259	0.01048	10.61%	-9.81%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
15KR088SD	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR088SD	0.3259	0.2711	0.2704	0.2513	0.2944	0.2332	0.2833	0.3056		

Page 148 of 216

114 of 137

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 5 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 04-8294-7655		Endpoint: Mean Dry Weight-mg		CETIS Version: CETISv1.8.7							
Analyzed: 10 Dec-15 11:42		Analysis: Parametric-Two Sample		Official Results: Yes							
Batch ID: 06-5161-8051		Test Type: Survival-Growth		Analyst:							
Start Date: 26 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 27d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code		Sample Notes									
Combined Ref		Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR089SD	09-2513-6691	06 Sep-15 13:30	22 Sep-15 11:15	19d 21h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR089SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	13.1%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR089SD	1.437	1.717	0.033	22	0.0824	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.004180111	0.004180111	1	2.065	0.1648	Non-Significant Effect					
Error	0.04454258	0.002024663	22								
Total	0.04872269		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	2.899	7.968	0.1599	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9617	0.884	0.4738	Normal Distribution						
Mean Dry Weight-mg Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%	
15KR089SD	8	0.2264	0.2016	0.2513	0.2353	0.181	0.2688	0.0105	13.12%	11.0%	
Mean Dry Weight-mg Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	
15KR089SD	0.2382	0.2688	0.2324	0.181	0.2455	0.2386	0.2207	0.1864			

Page 149 of 216

115 of 137

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 6 of 20)  
 Test Code: 874-1B | 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	09-0988-9663	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	10 Dec-15 11:42	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:						
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample Notes									
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h						
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	23d 1h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char								
15KR090SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	14.2%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Combined Ref		15KR090SD	1.515	1.717	0.036	22	0.0720	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.005396009	0.005396009	1	2.296	0.1440	Non-Significant Effect				
Error	0.0517142	0.002350645	22							
Total	0.05711021		23							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	1.341	7.968	0.7225	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9722	0.884	0.7211	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR090SD	8	0.2226	0.1861	0.2591	0.2222	0.173	0.3084	0.01544	19.61%	12.5%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR090SD	0.1732	0.3084	0.2062	0.2249	0.251	0.2237	0.173	0.2207		

Page 150 of 216

116 of 137

**CETIS Analytical Report**

Report Date: 16 Dec-15 11:34 (p 1 of 1)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID:	05-3566-2993	Endpoint:	Mean Dry Weight-mg			CETIS Version:	CETISv1.8.7				
Analyzed:	16 Dec-15 11:33	Analysis:	Parametric-Two Sample			Official Results:	Yes				
Batch ID:	06-5161-8051	Test Type:	Survival-Growth			Analyst:					
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)			Diluent:	Dechlorinated Tap Water				
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca			Brine:					
Duration:	27d 1h	Source:	Chesapeake Cultures, VA			Age:					
Sample Code	Sample Notes										
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".										
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR091SD	17-1206-1859	06 Sep-15 17:30	22 Sep-15 11:15	19d 17h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR091SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	14.0%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR091SD	0.6149	1.717	0.036	22	0.2725	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.0008714955	0.0008714955	1	0.3781	0.5449	Non-Significant Effect					
Error	0.05070822	0.002304919	22								
Total	0.05157971		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.451	7.968	0.6397	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9838	0.884	0.9548	Normal Distribution						
Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%	
15KR091SD	8	0.2417	0.2066	0.2768	0.2358	0.1895	0.314	0.01485	17.38%	5.02%	
Mean Dry Weight-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342					
15KR091SD	0.314	0.1895	0.229	0.278	0.2009	0.2645	0.2148	0.2426			

Page 151 of 216

117 of 137

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 8 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences				
Analysis ID:	04-5974-6207	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7					
Analyzed:	10 Dec-15 11:42	Analysis:	Parametric-Two Sample	Official Results:	Yes					
Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:						
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water					
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:						
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:						
Sample Code	Sample Notes									
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h						
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	22d 23h						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char								
15KR092SD	Sediment	Kuskokwim River Sediment Char								
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result				
Untransformed	NA	C > T	NA	NA	12.8%					
Equal Variance t Two-Sample Test										
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)	
Combined Ref		15KR092SD	1.427	1.717	0.033	22	0.0838	CDF	Non-Significant Effect	
ANOVA Table										
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)				
Between	0.003924471	0.003924471	1	2.037	0.1676	Non-Significant Effect				
Error	0.04238605	0.001926639	22							
Total	0.04631052		23							
Distributional Tests										
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Variance Ratio F	4.454	7.968	0.0535	Equal Variances					
Distribution	Shapiro-Wilk W Normality	0.9454	0.884	0.2144	Normal Distribution					
Mean Dry Weight-mg Summary										
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR092SD	8	0.2273	0.2073	0.2474	0.2305	0.1791	0.2613	0.008472	10.54%	10.66%
Mean Dry Weight-mg Detail										
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
15KR092SD	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR092SD	0.2369	0.2422	0.2289	0.2321	0.1791	0.2613	0.2249	0.2132		

Page 152 of 216

118 of 137



**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 9 of 20)  
 Test Code: 874-1B, 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test						Northwestern Aquatic Sciences					
Analysis ID: 08-2335-3477		Endpoint: Mean Dry Weight-mg		CETIS Version: CETISv1.8.7							
Analyzed: 10 Dec-15 11:42		Analysis: Parametric-Two Sample		Official Results: Yes							
Batch ID: 06-5161-8051		Test Type: Survival-Growth		Analyst:							
Start Date: 26 Sep-15 10:30		Protocol: EPA/600/R-99/064 (2000)		Diluent: Dechlorinated Tap Water							
Ending Date: 23 Oct-15 11:00		Species: Hyalella azteca		Brine:							
Duration: 27d 1h		Source: Chesapeake Cultures, VA		Age:							
Sample Code		Sample Notes									
Combined Ref		Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".									
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	19d 15h							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR093SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	12.9%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision( $\alpha$ :5%)		
Combined Ref		15KR093SD	2.792	1.717	0.033	22	0.0053	CDF	Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)					
Between	0.01529168	0.01529168	1	7.795	0.0106	Significant Effect					
Error	0.04315829	0.001961741	22								
Total	0.05844998		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)						
Variances	Variance Ratio F	3.736	7.968	0.0853	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9537	0.884	0.3258	Normal Distribution						
Mean Dry Weight-mg Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%	
15KR093SD	8	0.2009	0.179	0.2228	0.2035	0.1526	0.2412	0.00925	13.02%	21.04%	
Mean Dry Weight-mg Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	
15KR093SD	0.2782	0.2919	0.2352	0.222	0.3162	0.2342					
15KR093SD	0.1928	0.2061	0.1838	0.1526	0.2412	0.2098	0.2009	0.22			

Page 153 of 216

119 of 137

**CETIS Analytical Report**

Report Date: 10 Dec-15 11:43 (p 10 of 20)  
 Test Code: 874-1B 10-4925-1185

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test							Northwestern Aquatic Sciences				
Analysis ID:	12-0805-4796	Endpoint:	Mean Dry Weight-mg				CETIS Version:	CETISv1.8.7			
Analyzed:	10 Dec-15 11:42	Analysis:	Parametric Two Sample				Official Results:	Yes			
Batch ID:	06-5161-8051	Test Type:	Survival-Growth				Analyst:				
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)				Diluent:	Dechlorinated Tap Water			
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca				Brine:				
Duration:	27d 1h	Source:	Chesapeake Cultures, VA				Age:				
Sample Code	Sample Notes										
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".										
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h							
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	21d							
Sample Code	Material Type	Sample Source	Station Location			Latitude	Longitude				
Combined Ref	Sediment	Kuskokwim River Sediment Char									
15KR099SD	Sediment	Kuskokwim River Sediment Char									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result					
Untransformed	NA	C > T	NA	NA	13.8%						
Equal Variance t Two-Sample Test											
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Combined Ref		15KR099SD	-1.026	1.717	0.035	22	0.8419	CDF	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.002339167	0.002339167	1	1.052	0.3163	Non-Significant Effect					
Error	0.04893388	0.002224267	22								
Total	0.05127304		23								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.694	7.968	0.4915	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9676	0.884	0.6073	Normal Distribution						
Mean Dry Weight-mg Summary											
Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%	
15KR099SD	8	0.2754	0.2429	0.3079	0.2688	0.2352	0.356	0.01374	14.11%	-8.23%	
Mean Dry Weight-mg Detail											
Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342					
15KR099SD	0.2834	0.356	0.2367	0.2633	0.2352	0.2743	0.2579	0.2963			

Page 154 of 216

120 of 137

**CETIS Data Entry for Combined Reference Comparisons**

CETIS Test Data Worksheet

*data entry verified  
against laboratory  
bench sheets 12-14-15 JRC*

Report Date:  
Test Code:

10 Dec-15 11:36 (p 1 of 4)  
10-4925-1185-874-1B

12/22/2015

<b>Hyalella 28-d Survival and Growth Sediment Test</b>						<b>Northwestern Aquatic Sciences</b>			
<b>Start Date:</b>	26 Sep-15 10:30	<b>Species:</b>	Hyalella azteca			<b>Sample Code:</b>	Combined Ref		
<b>End Date:</b>	23 Oct-15 11:00	<b>Protocol:</b>	EPA/600/R-99/064 (2000)			<b>Sample Source:</b>	Kuskokwim River Sediment Charact		
<b>Sample Date:</b>	02 Sep-15	<b>Material:</b>	Sediment			<b>Sample Station:</b>			

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	Initial Wgt
Combined Ref	1	101	10	6	31.579	30.09	6		
Combined Ref	2	161	10	6	32.036	30.432	6		
Combined Ref	3	122	10	7	33.77	31.927	7		
Combined Ref	4	3	10	10	35.049	32.341	10		
Combined Ref	5	186	10	9	33.361	30.212	9		
Combined Ref	6	43	10	9	35.644	33.062	9		
Combined Ref	7	146	10	9	33.446	31.283	9		
Combined Ref	8	17	10	9	33.078	31.821	9		
Combined Ref	9	12	10	10	32.812	30.884	10		
Combined Ref	10	124	10	10	32.344	29.802	10		
Combined Ref	11	39	10	9	32.398	29.894	9		
Combined Ref	12	66	10	10	32.036	29.117	10		
Combined Ref	13	141	10	9	31.857	29.74	9		
Combined Ref	14	18	10	9	33.815	31.817	9		
Combined Ref	15	125	10	10	32.819	29.657	10		
Combined Ref	16	26	10	10	33.35	31.008	10		
15KR084SD	1	153	10	9	32.01	29.77	9		
15KR084SD	2	78	10	10	31.244	28.889	10		
15KR084SD	3	29	10	7	31.995	30.288	7		
15KR084SD	4	79	10	10	33.528	30.957	10		
15KR084SD	5	148	10	10	34.74	32.748	10		
15KR084SD	6	167	10	9	32.884	30.774	9		
15KR084SD	7	61	10	9	30.55	28.507	9		
15KR084SD	8	112	10	10	33.819	31.168	10		
15KR084SD	9	42							
15KR084SD	10	33							
15KR084SD	11	116							
15KR084SD	12	103							
15KR084SD	13	58							
15KR084SD	14	52							
15KR084SD	15	110							
15KR084SD	16	92							
15KR085SD	1	142	10	10	34.49	31.409	10		
15KR085SD	2	134	10	9	34.12	31.353	9		
15KR085SD	3	95	10	10	32.718	30.167	10		
15KR085SD	4	173	10	9	31.871	29.665	9		
15KR085SD	5	96	10	10	33.274	30.784	10		
15KR085SD	6	155	10	8	31.805	29.458	8		
15KR085SD	7	58	10	8	32.36	29.74	8		
15KR085SD	8	169	10	10	32.3	29.983	10		
15KR085SD	9	88							
15KR085SD	10	24							
15KR085SD	11	172							
15KR085SD	12	84							
15KR085SD	13	99							
15KR085SD	14	154							
15KR085SD	15	2							

Page 156 of 216

CETIS Test Data Worksheet

Report Date: 10 Dec-15 11:36 (p 2 of 4)  
 Test Code: 10-4925-1185(874-1B)

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR085SD	16	28							
15KR087SD	1	4	10	9	30.292	28.453	9		
15KR087SD	2	80	10	10	32.639	30.261	10		
15KR087SD	3	105	10	8	30.944	29.192	8		
15KR087SD	4	132	10	10	30.702	28.739	10		
15KR087SD	5	72	10	9	32.181	30.512	9		
15KR087SD	6	137	10	6	31.806	29.902	6		
15KR087SD	7	149	10	10	35.769	32.573	10		
15KR087SD	8	115	10	10	31.764	29.565	10		
15KR087SD	9	90							
15KR087SD	10	21							
15KR087SD	11	47							
15KR087SD	12	175							
15KR087SD	13	93							
15KR087SD	14	84							
15KR087SD	15	104							
15KR087SD	16	55							
15KR088SD	1	27	10	7	32.57	30.289	7		
15KR088SD	2	40	10	9	32.872	30.432	9		
15KR088SD	3	14	10	10	32.724	30.02	10		
15KR088SD	4	15	10	9	33.433	31.171	9		
15KR088SD	5	9	10	7	34.413	32.352	7		
15KR088SD	6	82	10	9	33.955	31.856	9		
15KR088SD	7	22	10	10	34.32	31.487	10		
15KR088SD	8	164	10	10	33.804	30.748	10		
15KR088SD	9	59							
15KR088SD	10	131							
15KR088SD	11	143							
15KR088SD	12	48							
15KR088SD	13	37							
15KR088SD	14	5							
15KR088SD	15	150							
15KR088SD	16	151							
15KR089SD	1	174	10	9	32.011	29.867	9		
15KR089SD	2	45	10	4	33.598	32.523	4		
15KR089SD	3	49	10	7	32.4	30.773	7		
15KR089SD	4	114	10	6	31.173	30.087	6		
15KR089SD	5	86	10	4	31.579	30.597	4		
15KR089SD	6	87	10	7	31.978	30.308	7		
15KR089SD	7	70	10	7	33.26	31.715	7		
15KR089SD	8	111	10	5	30.234	29.302	5		
15KR089SD	9	31							
15KR089SD	10	38							
15KR089SD	11	78							
15KR089SD	12	75							
15KR089SD	13	176							
15KR089SD	14	34							
15KR089SD	15	6							
15KR089SD	16	89							
15KR090SD	1	118	10	10	30.65	28.918	10		
15KR090SD	2	168	10	10	35.525	32.441	10		
15KR090SD	3	51	10	10	31.952	29.89	10		

12/22/2015

Page 157 of 216

122 of 137

**CETIS Test Data Worksheet**

Report Date:

16 Dec-15 11:01 (p 3 of 4)

Test Code:

10-4925-1185/874-1B

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR090SD	4	171	10	9	32.574	30.55	9		
15KR090SD	5	85	10	5	32.441	31.186	5		
15KR090SD	6	69	10	10	33.032	30.795	10		
15KR090SD	7	44	10	10	33.962	32.232	10		
15KR090SD	8	158	10	10	34.426	32.219	10		
15KR090SD	9	145							
15KR090SD	10	10							
15KR090SD	11	16							
15KR090SD	12	36							
15KR090SD	13	144							
15KR090SD	14	138							
15KR090SD	15	77							
15KR090SD	16	25							
15KR091SD	1	57	10	4	32.463	31.207	4		
15KR091SD	2	129	10	8	33.006	31.49	8		
15KR091SD	3	65	10	7	30.968	29.365	7		
15KR091SD	4	121	10	6	35.814	34.146	6		
15KR091SD	5	11	10	7	35.086	33.68	7		
15KR091SD	6	63	10	6	30.97	29.383	6		
15KR091SD	7	133	10	6	31.944	30.655	6		
15KR091SD	8	54	10	5	34.934	33.721	5		
15KR091SD	9	123							
15KR091SD	10	41							
15KR091SD	11	7							
15KR091SD	12	46							
15KR091SD	13	1							
15KR091SD	14	120							
15KR091SD	15	23							
15KR091SD	16	13							
15KR092SD	1	136	10	10	31.08	28.711	10		
15KR092SD	2	162	10	10	32.862	30.44	10		
15KR092SD	3	113	10	10	34.464	32.175	10		
15KR092SD	4	68	10	8	34.064	32.207	8		
15KR092SD	5	73	10	9	32.041	30.429	9		
15KR092SD	6	102	10	8	30.875	28.785	8		
15KR092SD	7	32	10	7	31.971	30.397	7		
15KR092SD	8	100	10	10	33.075	30.943	10		
15KR092SD	9	19							
15KR092SD	10	98							
15KR092SD	11	126							
15KR092SD	12	106							
15KR092SD	13	109							
15KR092SD	14	152							
15KR092SD	15	60							
15KR092SD	16	35							
15KR093SD	1	8	10	9	30.492	28.757	9		
15KR093SD	2	94	10	7	33.992	32.549	7		
15KR093SD	3	127	10	10	32.606	30.768	10		
15KR093SD	4	156	10	9	31.615	30.242	9		
15KR093SD	5	160	10	5	33.917	32.711	5		
15KR093SD	6	157	10	6	32.392	31.133	6		
15KR093SD	7	83	10	8	32.197	30.59	8		

12/22/2015

Page 158 of 216

123 of 137

**CETIS Test Data Worksheet**

Report Date: 10 Dec-15 11:36 (p 4 of 4)  
 Test Code: 10-4925-1188/874-1B

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR093SD	8	97	10	2	31.246	30.806	2		
15KR093SD	9	107							
15KR093SD	10	170							
15KR093SD	11	117							
15KR093SD	12	130							
15KR093SD	13	30							
15KR093SD	14	50							
15KR093SD	15	165							
15KR093SD	16	81							
15KR099SD	1	108	10	9	31.436	28.885	9		
15KR099SD	2	53	10	7	33.706	31.214	7		
15KR099SD	3	74	10	9	31.517	29.387	9		
15KR099SD	4	147	10	9	32.525	30.155	9		
15KR099SD	5	135	10	10	33.091	30.739	10		
15KR099SD	6	91	10	8	32.882	30.688	8		
15KR099SD	7	20	10	10	33.235	30.656	10		
15KR099SD	8	67	10	10	35.653	32.69	10		
15KR099SD	9	159							
15KR099SD	10	62							
15KR099SD	11	128							
15KR099SD	12	163							
15KR099SD	13	140							
15KR099SD	14	119							
15KR099SD	15	139							
15KR099SD	16	71							

12/22/2015

Page 159 of 216

124 of 137

**Water Quality Data**

BKR	NAS	CLIENT	DESCRIP	REPL	DAY	Overlying water					
						TEMP	DO	COND	pH	NH3	HARD
15	5438G	15KR093SD	8	0	23.5	8.0	113	6.6	<0.1	34	50
43	5428G	15KR082SD	8	0	22.9	7.9	111	6.6	<0.1	34	50
44	5436G	15KR091SD	8	0	22.9	7.8	113	6.6	<0.1	34	50
64	5430G	15KR084SD	8	0	23.0	8.1	116	6.5	<0.1	34	40
66	5433G	15KR088SD	8	0	22.9	8.0	104	6.5	0.3	34	50
67	5429G	15KR083SD	8	0	22.9	8.0	109	6.6	<0.1	34	50
72	5427G	Control	8	0	22.7	7.7	290	6.8	<0.1	34	40
79	5432G	15KR087SD	8	0	22.7	8.0	120	6.7	0.1	34	40
83	5437G	15KR092SD	8	0	22.9	7.9	114	6.6	0.1	34	40
86	5434G	15KR089SD	8	0	22.8	7.8	123	6.6	0.1	34	50
89	5435G	15KR090SD	8	0	22.9	8.1	117	6.6	<0.1	34	50
97	5431G	15KR085SD	8	0	22.9	8.0	113	6.7	0.1	26	40
99	5439G	15KR099SD	8	0	23.0	8.2	113	6.8	<0.1	34	50
15	5438G	15KR093SD	8	1	23.5						
43	5428G	15KR082SD	8	1	23.4						
44	5436G	15KR091SD	8	1	23.4						
64	5430G	15KR084SD	8	1	23.6						
66	5433G	15KR088SD	8	1	23.7						
67	5429G	15KR083SD	8	1	23.6						
72	5427G	Control	8	1	23.5						
79	5432G	15KR087SD	8	1	23.3						
83	5437G	15KR092SD	8	1	23.5						
86	5434G	15KR089SD	8	1	23.5						
89	5435G	15KR090SD	8	1	23.5						
97	5431G	15KR085SD	8	1	23.8						
99	5439G	15KR099SD	8	1	23.9						
15	5438G	15KR093SD	8	2	23.0						
43	5428G	15KR082SD	8	2	22.4						
44	5436G	15KR091SD	8	2	22.4						
64	5430G	15KR084SD	8	2	22.5						
66	5433G	15KR088SD	8	2	22.2						
67	5429G	15KR083SD	8	2	22.1						
72	5427G	Control	8	2	22.1						
79	5432G	15KR087SD	8	2	22.3						
83	5437G	15KR092SD	8	2	22.1						
86	5434G	15KR089SD	8	2	22.3						
89	5435G	15KR090SD	8	2	22.5						
97	5431G	15KR085SD	8	2	22.5						
99	5439G	15KR099SD	8	2	22.7						
15	5438G	15KR093SD	8	3	22.5	7.9		6.7			
43	5428G	15KR082SD	8	3	22.9	7.9		6.7			
44	5436G	15KR091SD	8	3	22.1	7.9		6.7			
64	5430G	15KR084SD	8	3	22.0	7.8		6.6			
66	5433G	15KR088SD	8	3	23.0	7.8		6.7			
67	5429G	15KR083SD	8	3	22.7	7.8		6.8			
72	5427G	Control	8	3	22.6	7.4		6.9			
79	5432G	15KR087SD	8	3	23.1	7.6		6.7			
83	5437G	15KR092SD	8	3	22.7	7.4		6.7			
86	5434G	15KR089SD	8	3	23.0	7.4		6.8			
89	5435G	15KR090SD	8	3	23.3	7.4		6.9			
97	5431G	15KR085SD	8	3	23.3	7.7		6.9			
99	5439G	15KR099SD	8	3	23.5	7.9		6.9			
15	5438G	15KR093SD	8	4	23.8						
43	5428G	15KR082SD	8	4	23.0						
44	5436G	15KR091SD	8	4	23.3						
64	5430G	15KR084SD	8	4	23.2						
66	5433G	15KR088SD	8	4	23.0						
67	5429G	15KR083SD	8	4	22.9						
72	5427G	Control	8	4	22.8						
79	5432G	15KR087SD	8	4	23.1						
83	5437G	15KR092SD	8	4	22.9						
86	5434G	15KR089SD	8	4	23.1						

data entry  
verified  
against  
laboratory bench  
Sheets 12-15-15  
JRF



89	5435G	15KR090SD	8	4	23.3				
97	5431G	15KR085SD	8	4	23.4				
99	5439G	15KR099SD	8	4	23.5				
15	5438G	15KR093SD	8	5	24.0	6.6	117	6.9	
43	5428G	15KR082SD	8	5	23.5	6.7	113	6.9	
44	5436G	15KR091SD	8	5	23.8	6.7	116	6.9	
64	5430G	15KR084SD	8	5	23.7	6.4	112	6.8	
66	5433G	15KR088SD	8	5	23.4	6.6	112	6.9	
67	5429G	15KR083SD	8	5	23.4	6.6	111	7.0	
72	5427G	Control	8	5	23.2	6.4	127	6.9	
79	5432G	15KR087SD	8	5	23.6	6.5	117	7.0	
83	5437G	15KR092SD	8	5	23.3	6.3	112	6.8	
86	5434G	15KR089SD	8	5	23.5	6.4	115	6.8	
89	5435G	15KR090SD	8	5	23.6	6.4	113	6.9	
97	5431G	15KR085SD	8	5	23.8	6.6	111	7.0	
99	5439G	15KR099SD	8	5	23.9	6.8	111	7.0	
15	5438G	15KR093SD	8	6	23.8				
43	5428G	15KR082SD	8	6	23.2				
44	5436G	15KR091SD	8	6	23.4				
64	5430G	15KR084SD	8	6	23.3				
66	5433G	15KR088SD	8	6	23.1				
67	5429G	15KR083SD	8	6	22.9				
72	5427G	Control	8	6	22.9				
79	5432G	15KR087SD	8	6	23.2				
83	5437G	15KR092SD	8	6	22.9				
86	5434G	15KR089SD	8	6	23.1				
89	5435G	15KR090SD	8	6	23.3				
97	5431G	15KR085SD	8	6	23.4				
99	5439G	15KR099SD	8	6	23.5				
15	5438G	15KR093SD	8	7	23.8	7.1		6.7	
43	5428G	15KR082SD	8	7	23.2	6.8		6.6	
44	5436G	15KR091SD	8	7	23.5	6.8		6.7	
64	5430G	15KR084SD	8	7	23.5	6.7		6.6	
66	5433G	15KR088SD	8	7	23.0	7.0		6.8	
67	5429G	15KR083SD	8	7	23.0	7.0		6.7	
72	5427G	Control	8	7	22.9	6.5		6.7	
79	5432G	15KR087SD	8	7	23.3	6.4		6.8	
83	5437G	15KR092SD	8	7	23.0	6.4		6.7	
86	5434G	15KR089SD	8	7	23.2	6.6		6.7	
89	5435G	15KR090SD	8	7	23.4	6.6		6.8	
97	5431G	15KR085SD	8	7	23.4	6.8		6.9	
99	5439G	15KR099SD	8	7	23.6	6.9		6.9	
15	5438G	15KR093SD	8	8	24.0				
43	5428G	15KR082SD	8	8	23.4				
44	5436G	15KR091SD	8	8	23.7				
64	5430G	15KR084SD	8	8	23.8				
66	5433G	15KR088SD	8	8	23.8				
67	5429G	15KR083SD	8	8	23.7				
72	5427G	Control	8	8	23.0				
79	5432G	15KR087SD	8	8	23.6				
83	5437G	15KR092SD	8	8	23.1				
86	5434G	15KR089SD	8	8	23.4				
89	5435G	15KR090SD	8	8	23.6				
97	5431G	15KR085SD	8	8	23.6				
99	5439G	15KR099SD	8	8	23.8				
15	5438G	15KR093SD	8	9	23.1				
43	5428G	15KR082SD	8	9	22.3				
44	5436G	15KR091SD	8	9	22.6				
64	5430G	15KR084SD	8	9	22.6				
66	5433G	15KR088SD	8	9	22.3				
67	5429G	15KR083SD	8	9	22.1				
72	5427G	Control	8	9	22.1				
79	5432G	15KR087SD	8	9	22.4				
83	5437G	15KR092SD	8	9	22.1				
86	5434G	15KR089SD	8	9	22.3				

89	5435G	15KR090SD	8	9	22.5			
97	5431G	15KR085SD	8	9	22.6			
99	5439G	15KR099SD	8	9	22.8			
15	5438G	15KR093SD	8	10	24.0	6.8		7.0
43	5428G	15KR082SD	8	10	23.3	6.8		6.9
44	5436G	15KR091SD	8	10	23.8	6.8		7.0
64	5430G	15KR084SD	8	10	23.7	6.8		6.9
66	5433G	15KR088SD	8	10	23.3	6.7		6.9
67	5429G	15KR083SD	8	10	23.2	6.9		7.0
72	5427G	Control	8	10	23.1	6.4		7.0
79	5432G	15KR087SD	8	10	23.6	6.5		7.1
83	5437G	15KR092SD	8	10	23.2	6.4		6.9
86	5434G	15KR089SD	8	10	23.4	6.8		6.9
89	5435G	15KR090SD	8	10	23.6	6.6		7.0
97	5431G	15KR085SD	8	10	23.6	6.8		7.0
99	5439G	15KR099SD	8	10	23.8	6.9		7.0
15	5438G	15KR093SD	8	11	24.0			
43	5428G	15KR082SD	8	11	23.6			
44	5436G	15KR091SD	8	11	24.0			
64	5430G	15KR084SD	8	11	23.9			
66	5433G	15KR088SD	8	11	23.6			
67	5429G	15KR083SD	8	11	23.5			
72	5427G	Control	8	11	23.5			
79	5432G	15KR087SD	8	11	23.8			
83	5437G	15KR092SD	8	11	23.5			
86	5434G	15KR089SD	8	11	23.7			
89	5435G	15KR090SD	8	11	23.9			
97	5431G	15KR085SD	8	11	24.0			
99	5439G	15KR099SD	8	11	24.0			
15	5438G	15KR093SD	8	12	24.0	7.3	108	7.0
43	5428G	15KR082SD	8	12	23.5	6.9	105	7.0
44	5436G	15KR091SD	8	12	23.8	7.1	110	7.0
64	5430G	15KR084SD	8	12	23.8	6.9	108	6.9
66	5433G	15KR088SD	8	12	23.6	7.1	108	7.0
67	5429G	15KR083SD	8	12	23.5	7.2	107	7.0
72	5427G	Control	8	12	23.4	6.9	113	7.1
79	5432G	15KR087SD	8	12	23.7	6.9	114	7.1
83	5437G	15KR092SD	8	12	23.4	6.9	108	6.9
86	5434G	15KR089SD	8	12	23.7	7.3	111	6.9
89	5435G	15KR090SD	8	12	23.7	6.9	110	7.1
97	5431G	15KR085SD	8	12	24.0	7.1	110	7.2
99	5439G	15KR099SD	8	12	24.0	7.1	108	7.1
15	5438G	15KR093SD	8	13	24.0			
43	5428G	15KR082SD	8	13	23.5			
44	5436G	15KR091SD	8	13	23.8			
64	5430G	15KR084SD	8	13	23.7			
66	5433G	15KR088SD	8	13	23.4			
67	5429G	15KR083SD	8	13	23.4			
72	5427G	Control	8	13	23.3			
79	5432G	15KR087SD	8	13	23.6			
83	5437G	15KR092SD	8	13	23.3			
86	5434G	15KR089SD	8	13	23.5			
89	5435G	15KR090SD	8	13	23.7			
97	5431G	15KR085SD	8	13	23.7			
99	5439G	15KR099SD	8	13	24.0			
15	5438G	15KR093SD	8	14	23.9	6.8		7.3
43	5428G	15KR082SD	8	14	23.4	6.6		7.3
44	5436G	15KR091SD	8	14	23.7	6.6		7.2
64	5430G	15KR084SD	8	14	23.6	6.6		7.2
66	5433G	15KR088SD	8	14	23.5	6.6		7.2
67	5429G	15KR083SD	8	14	23.4	6.6		7.1
72	5427G	Control	8	14	23.3	6.1		7.3
79	5432G	15KR087SD	8	14	23.5	6.3		7.1
83	5437G	15KR092SD	8	14	23.3	6.1		7.0
86	5434G	15KR089SD	8	14	23.5	6.4		7.0

89	5435G	15KR090SD	8	14	23.6	6.3	7.1	
97	5431G	15KR085SD	8	14	23.7	6.5	7.1	
99	5439G	15KR099SD	8	14	23.8	6.5	7.1	
15	5438G	15KR093SD	8	15	23.3			
43	5428G	15KR082SD	8	15	23.2			
44	5436G	15KR091SD	8	15	23.5			
64	5430G	15KR084SD	8	15	23.4			
66	5433G	15KR088SD	8	15	23.3			
67	5429G	15KR083SD	8	15	23.2			
72	5427G	Control	8	15	23.2			
79	5432G	15KR087SD	8	15	23.3			
83	5437G	15KR092SD	8	15	23.2			
86	5434G	15KR089SD	8	15	23.3			
89	5435G	15KR090SD	8	15	23.4			
97	5431G	15KR085SD	8	15	23.4			
99	5439G	15KR099SD	8	15	23.6			
15	5438G	15KR093SD	8	16	22.9			
43	5428G	15KR082SD	8	16	22.9			
44	5436G	15KR091SD	8	16	23.2			
64	5430G	15KR084SD	8	16	23.1			
66	5433G	15KR088SD	8	16	23.0			
67	5429G	15KR083SD	8	16	22.9			
72	5427G	Control	8	16	22.9			
79	5432G	15KR087SD	8	16	23.2			
83	5437G	15KR092SD	8	16	23.0			
86	5434G	15KR089SD	8	16	23.1			
89	5435G	15KR090SD	8	16	23.3			
97	5431G	15KR085SD	8	16	23.3			
99	5439G	15KR099SD	8	16	23.3			
15	5438G	15KR093SD	8	17	23.5	5.8	6.6	
43	5428G	15KR082SD	8	17	23.0	6.0	6.5	
44	5436G	15KR091SD	8	17	23.3	5.8	6.6	
64	5430G	15KR084SD	8	17	23.2	5.7	6.6	
66	5433G	15KR088SD	8	17	23.0	5.7	6.7	
67	5429G	15KR083SD	8	17	22.9	5.7	6.7	
72	5427G	Control	8	17	22.9	5.4	6.9	
79	5432G	15KR087SD	8	17	23.1	5.6	6.8	
83	5437G	15KR092SD	8	17	22.9	5.6	6.7	
86	5434G	15KR089SD	8	17	23.1	5.5	6.6	
89	5435G	15KR090SD	8	17	23.3	5.6	6.7	
97	5431G	15KR085SD	8	17	23.3	5.9	6.8	
99	5439G	15KR099SD	8	17	23.4	6.0	6.8	
15	5438G	15KR093SD	8	18	23.5			
43	5428G	15KR082SD	8	18	22.9			
44	5436G	15KR091SD	8	18	23.1			
64	5430G	15KR084SD	8	18	23.1			
66	5433G	15KR088SD	8	18	22.9			
67	5429G	15KR083SD	8	18	22.8			
72	5427G	Control	8	18	22.7			
79	5432G	15KR087SD	8	18	22.9			
83	5437G	15KR092SD	8	18	22.8			
86	5434G	15KR089SD	8	18	23.0			
89	5435G	15KR090SD	8	18	23.0			
97	5431G	15KR085SD	8	18	23.1			
99	5439G	15KR099SD	8	18	23.2			
15	5438G	15KR093SD	8	19	23.6	6.9	98	6.7
43	5428G	15KR082SD	8	19	23.1	7.1	98	6.7
44	5436G	15KR091SD	8	19	23.3	6.9	101	6.7
64	5430G	15KR084SD	8	19	23.3	7.3	99	6.7
66	5433G	15KR088SD	8	19	23.1	7.3	100	6.8
67	5429G	15KR083SD	8	19	23.0	6.9	101	6.8
72	5427G	Control	8	19	23.0	6.9	105	7.1
79	5432G	15KR087SD	8	19	23.1	7.1	104	6.9
83	5437G	15KR092SD	8	19	22.9	6.9	100	6.8
86	5434G	15KR089SD	8	19	23.2	7.3	100	6.8

89	5435G	15KR090SD	8	19	23.2	7.3	101	6.8
97	5431G	15KR085SD	8	19	23.4	7.3	101	6.9
99	5439G	15KR099SD	8	19	23.5	7.3	101	7.0
15	5438G	15KR093SD	8	20	23.6			
43	5428G	15KR082SD	8	20	23.2			
44	5436G	15KR091SD	8	20	23.4			
64	5430G	15KR084SD	8	20	23.3			
66	5433G	15KR088SD	8	20	23.2			
67	5429G	15KR083SD	8	20	23.0			
72	5427G	Control	8	20	23.0			
79	5432G	15KR087SD	8	20	23.2			
83	5437G	15KR092SD	8	20	23.0			
86	5434G	15KR089SD	8	20	23.1			
89	5435G	15KR090SD	8	20	23.2			
97	5431G	15KR085SD	8	20	23.3			
99	5439G	15KR099SD	8	20	23.3			
15	5438G	15KR093SD	8	21	23.8	7.0		7.0
43	5428G	15KR082SD	8	21	23.4	6.9		6.9
44	5436G	15KR091SD	8	21	23.3	6.8		6.9
64	5430G	15KR084SD	8	21	23.3	6.8		7.0
66	5433G	15KR088SD	8	21	23.2	6.9		6.9
67	5429G	15KR083SD	8	21	23.2	6.8		6.9
72	5427G	Control	8	21	23.1	6.6		7.2
79	5432G	15KR087SD	8	21	23.2	6.8		7.1
83	5437G	15KR092SD	8	21	23.2	7.0		7.0
86	5434G	15KR089SD	8	21	23.1	6.9		6.9
89	5435G	15KR090SD	8	21	23.2	6.9		6.9
97	5431G	15KR085SD	8	21	23.4	6.7		6.9
99	5439G	15KR099SD	8	21	23.5	6.8		6.9
15	5438G	15KR093SD	8	22	23.7			
43	5428G	15KR082SD	8	22	23.6			
44	5436G	15KR091SD	8	22	23.6			
64	5430G	15KR084SD	8	22	23.2			
66	5433G	15KR088SD	8	22	23.0			
67	5429G	15KR083SD	8	22	23.0			
72	5427G	Control	8	22	23.0			
79	5432G	15KR087SD	8	22	22.8			
83	5437G	15KR092SD	8	22	22.9			
86	5434G	15KR089SD	8	22	22.8			
89	5435G	15KR090SD	8	22	23.0			
97	5431G	15KR085SD	8	22	23.0			
99	5439G	15KR099SD	8	22	23.3			
15	5438G	15KR093SD	8	23	23.5			
43	5428G	15KR082SD	8	23	23.2			
44	5436G	15KR091SD	8	23	23.4			
64	5430G	15KR084SD	8	23	23.2			
66	5433G	15KR088SD	8	23	23.2			
67	5429G	15KR083SD	8	23	23.1			
72	5427G	Control	8	23	23.1			
79	5432G	15KR087SD	8	23	23.2			
83	5437G	15KR092SD	8	23	23.2			
86	5434G	15KR089SD	8	23	23.3			
89	5435G	15KR090SD	8	23	23.4			
97	5431G	15KR085SD	8	23	23.4			
99	5439G	15KR099SD	8	23	23.5			
15	5438G	15KR093SD	8	24	23.6	7.0		6.9
43	5428G	15KR082SD	8	24	23.2	7.1		6.8
44	5436G	15KR091SD	8	24	23.4	6.9		6.8
64	5430G	15KR084SD	8	24	23.4	6.9		6.8
66	5433G	15KR088SD	8	24	23.3	7.1		6.9
67	5429G	15KR083SD	8	24	23.2	7.2		6.9
72	5427G	Control	8	24	23.2	7.1		7.2
79	5432G	15KR087SD	8	24	23.3	7.1		7.0
83	5437G	15KR092SD	8	24	23.2	7.2		6.9
86	5434G	15KR089SD	8	24	23.4	7.0		6.8

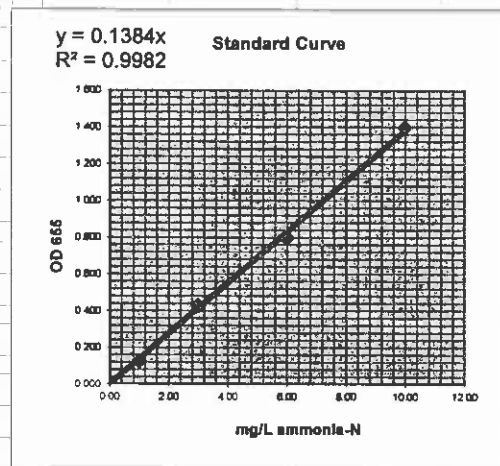


**AMMONIA EXPOSURE BENCHSHEETS AND ANALYSIS**

### Total Ammonia-N in Sediment Pore Water: Computation Worksheet Salicylate Method (SOP #5492)

**Result**

Sample description	Dilution factor	OD <sub>655</sub>	NH <sub>3</sub> -N (mg/L)	pH	Salinity (ppt)
Blank	----	----	----		
1.0 mg/L NH <sub>3</sub> -N Std.	----	0.125	1.00		
3.0 mg/L NH <sub>3</sub> -N Std.	----	0.429	3.00		
6.0 mg/L NH <sub>3</sub> -N Std.	----	0.799	6.00		
10.0 mg/L NH <sub>3</sub> -N Std.	----	1.400	10.00		
3.0 mg/L spike	----	0.435	3.14		
3.0 mg/L spike dupl.	-----	0.430	3.11		
5.0 mg/L 2nd source		0.590	4.26		
<b>Day 0 (9-25-15)</b>					
1. 15	1	0.000	ND		
2. 43	1	0.010	ND		
3. 44	1	0.009	ND		
4. 64	1	0.001	ND		
5. 66	1	0.039	0.28		
6. 67	1	0.000	ND		
7. 72	1	0.008	ND		
8. 79	1	0.014	0.10		
9. 83	1	0.019	0.14		
10. 86	1	0.019	0.14		
11. 89	1	0.001	ND		
12. 97	1	0.018	0.13		
13. 99	1	0.007	ND		
<b>Day 28 (10-23-15)</b>					
14. 15	1	0.001	ND		
15. 43	1	0.019	0.14		
16. 44	1	0.004	ND		
17. 64	1	0.000	ND		
18. 66	1	0.001	ND		
19. 67	1	0.000	ND		
20. 72	1	0.000	ND		
21. 79	1	0.003	ND		
22. 83	1	0.001	ND		
23. 86	1	0.002	ND		
24. 89	1	0.000	ND		
25. 97	1	0.000	ND		
26. 99	1	0.000	ND		
27.					
28.					
29.					
30.					
31.					
32.					
33.					
34.					
35.					
36.					



Reporting limit (mg/L) = 0.1  
 Recovery (%) = 104.1  
 Precision (RPD) = 1.16  
 2nd source (%) = 85.2  
 Sample volume (ml): 0.50  
 Dilution factor 1

**Sample Set Description:**

Proj. No.: 874-1  
 Test Day: 0 & 28  
 Species: *Hyalella*

**Sample Type (check)**

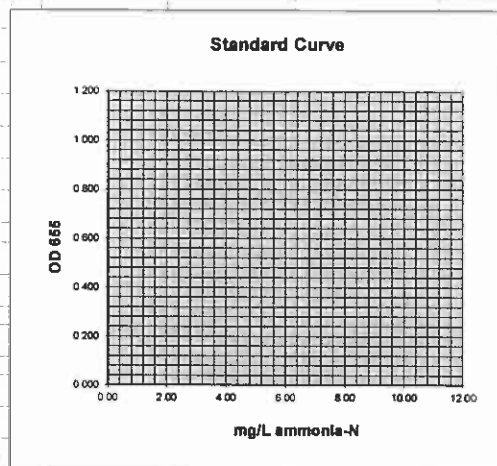
- Bulk Sediment Porewaters
- Test Beaker Porewaters
- Overlying Water

Analyst: JB  
 Date analysed: 10/29/2015

### Total Ammonia-N in Sediment Pore Water: Computation Worksheet Salicylate Method (SOP #5492)

**Result**

Sample description	Dilution factor	OD655	NH3-N (mg/L)	pH	Salinity (ppt)
Blank	---	---	---		
1.0 mg/L NH3-N Std.	----	0.125	1.00		
3.0 mg/L NH3-N Std.	----	0.429	3.00		
6.0 mg/L NH3-N Std.	----	0.799	6.00		
10.0 mg/L NH3-N Std.	----	1.400	10.00		
3.0 mg/L spike	----	0.435			
3.0 mg/L spike dupl.	----	0.430			
5.0 mg/L 2nd source		0.590			
<b>Day 0 (9-25-15)</b>					
1. 15	1	0.000			
2. 43	1	0.010			
3. 44	1	0.009			
4. 64	1	0.001			
5. 66	1	0.039			
6. 67	1	0.000			
7. 72	1	0.008			
8. 79	1	0.014			
9. 83	1	0.019			
10. 86	1	0.019			
11. 89	1	0.001			
12. 97	1	0.018			
13. 99	1	0.007			
<b>Day 28 (10-23-15)</b>					
14. 15	1	0.001			
15. 43	1	0.019			
16. 44	1	0.004			
17. 64	1	0.000			
18. 66	1	0.001			
19. 67	1	0.000			
20. 72	1	0.000			
21. 79	1	0.003			
22. 83	1	0.001			
23. 86	1	0.002			
24. 89	1	0.000			
25. 97	1	0.000			
26. 99	1	0.000			
27. 30					
28. 31					
29. 32					
30. 33					
31. 34					
32. 35					
33. 36					



Reporting limit (mg/L) = 0.1

Recovery (%) = #VALUE!

Precision (RPD) = #VALUE!

2nd source (%) = #VALUE!

Sample volume (ml): 0.50

Dilution factor 1

**Sample Set Description:**

Proj. No.: 874-1

Test Day: 0 & 28

Species: *Hyalella*

**Sample Type (check)**

Bulk Sediment Porewaters

Test Beaker Porewaters

Overlying Water

Analyst: JB

Date analysed: 10/29/2015



**CHAIN-OF-CUSTODY RECORDS**

Client Information (Sub Contract Lab)		Sampler		Lab PM		Carrier Tracking No(s)		COC No	
Shipping/Receiving		Phone		Allen, Kristine D				580-30367.1	
Company		E-Mail		kristine.allen@testamericainc.com				Page 1 of 2	
Address		Due Date Requested:		Analysis Requested		Job #		Preservation Codes:	
5755 8th Street East,		9/15/2015		SUB (Toxicity - EPA 100.4 - Northwest Aquatic Sciences)		580-53253-1		A - HCL B - NaOH C - Zn Acetate D - Niinc Acid E - NaHSO4 F - MeOH G - Anchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
City		TAT Requested (days):		Field Filtered Sample (Yes or No)		Total Number of Containers		Special Instructions/Note:	
Tacoma		1		X		1		. See Northwest Aquatic Sciences quote. We are surcharging 10%	
State, Zip:		PO #		Matrix					
WA, 98424		WO #		(W-solids, E-solids, O-solids)					
Phone		Project #		Sample Type (C=comp, G=grab)					
253-922-2310(Tel) 253-922-5047(Fax)		58008798		Solid					
Email:		SSOW#		Sample Time					
				11:11					
Project Name		Sample Date		Sample Date					
Red Devil Mine - 2014-2015		9/2/15		9/2/15					
Site		Sample ID (Lab ID)		Sample Date					
		15KR082SD (580-53253-43)		9/2/15					
		15KR083SD (580-53253-44)		9/2/15					
		15KR084SD (580-53253-45)		9/5/15					
		15KR085SD (580-53253-46)		9/2/15					
		15KR087SD (580-53253-48)		9/2/15					
		15KR088SD (580-53253-49)		9/2/15					
		15KR089SD (580-53253-50)		9/6/15					
		15KR090SD (580-53253-51)		9/3/15					
		15KR091SD (580-53253-52)		9/6/15					
		15KR092SD (580-53253-53)		9/3/15					
		15KR093SD (580-53253-54)		9/6/15					
Possible Hazard Identification									
Unconfirmed									
Deliverable Requested: I, II, III, IV, Other (specify)									
Empty Kit Relinquished by:									
Relinquished by: <i>LA Hy Caruba</i> Date: <i>9/15/15</i>									
Relinquished by: <i>LA Hy Caruba</i> Date: <i>11/8/15</i> 11:00									
Relinquished by: Date/Time									
Relinquished by: Date/Time									
Relinquished by: Date/Time									
Custody Seals Intact: Custody Seal No. <i>12/22/2015</i>									
Δ Yes Δ No									



ORIGIN: 11/11/15  
SAMPLE RECEIVING  
TESTAMERICA INC  
5755 8TH ST E

SHIP DATE: 12/22/15  
NO TAGS: 45  
CART: 888795

FILE # 1A 98424  
UNITED STATES OF

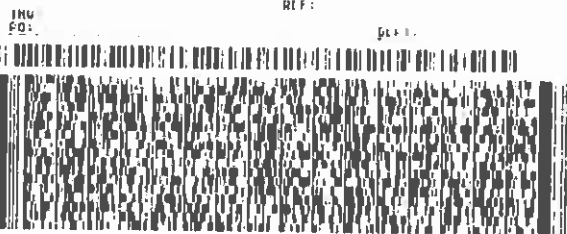
BILL NUMBER

Cooler lot 3

TO RECEIVING  
NORTHWESTER AQUATIC SCIENCES  
3814 YAQUENA BAY ROAD

Cooler Temp = 2°C

NEWPORT OR 97365



FedEx  
Express



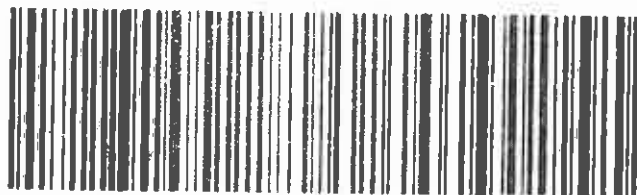
1 of 3  
TRK# 6496 7498 2526  
11201  
## MASTER ##

TUE - 22 SEP 12:00P  
PRIORITY OVERNIGHT

86 ONPA

97365  
OR-US PDX

P01 # 155148V-434 RIT2 04/15



TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING

Custody Seal

DATE  
SIGNATURE

9/22/15  
Cathy Gambel

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING  
239193

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING

Custody Seal

DATE  
SIGNATURE

9/22/15  
Cathy Gambel

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING  
239194

135 of 137

GRISTON INC. MA 01930 920 2510  
SAMPLE RECEIVING  
TESTAMERICA INC  
5755 BTH ST E

SHIP DATE: 09/15  
RETURN TO: 4100 LE MAN  
1000 989246 0000 2802

FIFE, WA 98424  
UNITED STATES US

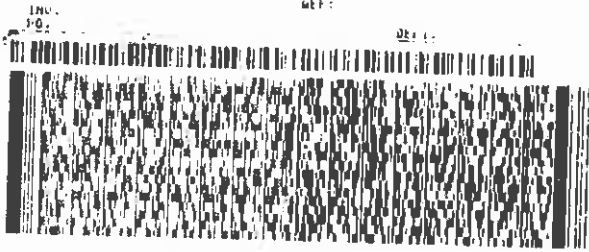
BILL TO: GRISTON

10 RECEIVING  
NORTHWESTER AQUATIC SCIENCES  
3814 YAQUENA BAY ROAD

NEWPORT OR 97365

Cooler 2 of 3

Cooler Temp = 2°C



FedEx  
Express



2 of 3  
MPS# 6496 7498 2537  
Mstr# 6496 7498 2526

TUE - 22 SEP 12:00P  
PRIORITY OVERNIGHT

86 ONPA

97365  
OR-US PDX



Part # 155148V-404 R172 04/15

239192  
THE LEADER IN ENVIRONMENTAL TESTING  
TestAmerica

Custody Seal

DATE

SIGNATURE

9/22/15  
Cathy Coakley

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING  
239192

239191  
THE LEADER IN ENVIRONMENTAL TESTING  
TestAmerica

Custody Seal

DATE

SIGNATURE

9/22/15  
Cathy Coakley

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING  
239191

136 of 137

ORIGIN ID:TCMA 259 922 731  
SAMPLE RECEIVING  
TESTAMERICA INC  
5755 BTH ST E

SHIP DATE: 21 SEP 15  
ACTIVITY: 40.0 LB MAN  
CADD: 989 746 1 AFF 2817

FILE NO: 38424  
UNITED STATES US

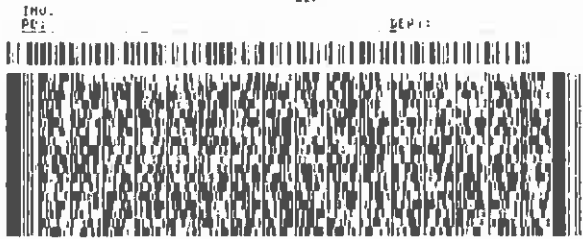
BILL NUMBER

10 RECEIVING  
NORTHWESTER AQUATIC SCIENCES  
3814 YAQUENA BAY ROAD

Cooler 3x3

Cooler Temp = 1°C

NEWPORT OR 97365

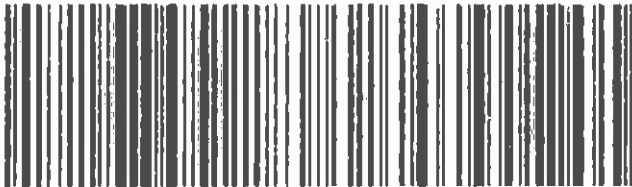


3 of 3  
MPS# 6496 7498 2548  
0263  
Mstr# 6496 7498 2526

TUE - 22 SEP 12:00P  
PRIORITY OVERNIGHT

86 ONPA

97365  
OR - US PDX



Printed 158148V-434 RIT2 0415



Custody Seal

9/21/15  
Cathy Campbell

DATE

SIGNATURE



Custody Seal

9/21/15  
Cathy Campbell

DATE

SIGNATURE



**APPENDIX III**

**RAW DATA – REFERENCE TOXICANT TEST**

Test No. 999-3476 Client: QC Test Investigator \_\_\_\_\_  
 Test Type (range-finding/definitive) \_\_\_\_\_ Test Length (hr) 96  
 Species Hyalella azteca

**STUDY MANAGEMENT**

Client: QC test  
 Client's Study Monitor: QC test  
 Testing Laboratory: Northwestern Aquatic Sciences  
 Test Location: Newport Laboratory  
 Laboratory's Study Personnel:  
 Proj. Man./Study Dir. G.J. Irissari<sup>632</sup>  
 QA Officer L. K. Nemeth  
 1. GA Baker et 2. \_\_\_\_\_  
 3. \_\_\_\_\_ 4. \_\_\_\_\_  
 Test Beginning: 9-25-15 1015 Test Ending: 9-29-15 1115

**TEST MATERIAL**

Description: Potassium Chloride Crystals - Lot No.: 117689<sup>Fisher</sup>  
 NAS Sample No. \_\_\_\_\_  
 Date of Collection: \_\_\_\_\_  
 Date of Receipt: \_\_\_\_\_  
 Temperature (deg C): \_\_\_\_\_  
 Dissolved oxygen (mg/L): \_\_\_\_\_  
 pH: \_\_\_\_\_  
 Conductivity (umhos/cm): \_\_\_\_\_  
 Hardness (mg/L): \_\_\_\_\_  
 Alkalinity (mg/L): \_\_\_\_\_  
 Salinity (ppt): \_\_\_\_\_  
 Total chlorine (mg/L): \_\_\_\_\_  
 Total ammonia-N (mg/L): \_\_\_\_\_

**DILUTION WATER**

Description: Moderately hard synthetic water  
 Date of Preparation/Collection: 9-22-15  
 Water Quality: Cond. (umhos/cm): 299 Salinity (ppt): \_\_\_\_\_ pH 7.9  
 Hardness (mg/L as CaCO<sub>3</sub>): 94 Alkalinity (mg/L as CaCO<sub>3</sub>): 70  
 Treatments: Aerated ≥ 24 hrs

**TEST LOCATION**

Test conducted in (circle one) room 1 room 2 trailer water bath other: \_\_\_\_\_

**Randomization chart:**

B	0.125	φ	0.063	0.5	1.0	0.25				
A	φ	1.0	0.25	0.125	0.5	0.063				

Error codes: 1) Correction of handwriting error  
 2) Written in wrong location; entry deleted  
 3) Wrong date deleted; replaced with correct date  
 4) Error found in measurement; measurement repeated



Test No. 999-3476 Client \_\_\_\_\_ QC Test \_\_\_\_\_ Investigator \_\_\_\_\_

**TEST ORGANISMS**

Species: Hyalella azteca Age: 7-8 DAYS Size: \_\_\_\_\_  
Source: Chesapeake Cultures, Hayes, VA Date received: 9-23-15

Acclimation Data:

Date	Temp. (deg.C)	pH	DO (mg/L)	Cond. umhos/cm	Hardness (mg/L)	Alkalinity (mg/L)	Feeding		Water changes
							Amount	description	
9-23-15	20.8	7.1	>15.0	600	120	200	10 ml	YTC	YES
9-24-15	20.7	7.3	8.6	196	51	80	"	"	YES
9-25-15	22.4	7.4	8.7	190	51	70	-	-	-
Mean	21.3	7.3	10.8	329	74	117			
S.D.	1.0	0.2	3.7	235	40	72			
(N)	3	3	3	3	3	3			

Photoperiod during acclimation: 16:8, L:D

**TEST PROCEDURES AND CONDITIONS**

Test concentrations (50% series recommended): 1, 0.5, 0.25, 0.125, 0.063 0 g/L

Test chamber: 250 ml glass beakers Test volume: 100 ml  
Replicates/treatment: 2 Organisms/treatment: 20 (10/rep)  
Test water changes: None Aeration during test: None  
Feeding: 0.5 ml YTC suspension per beaker on days 0 and 2

Duration: 24-hr, 48-hr, 96-hr Test temperature (deg.C): 23 ± 1 or 20 ± 1  
Beaker placement: Stratified randomization Photoperiod: 16:8, L:D

**MISCELLANEOUS NOTES**

Test solution preparation:

Working stock: Dissolve 0.5g KCl crystals in dilution water and dilute to 500 mL.  
Final conc.: 1.0 g/L.

Test concentration (g/L)	KCl working stock (ml/200ml)	Dilution water
1	200	Brought up to final volume of 200 ml with dilution water and distributed evenly between two replicates
0.5	100	
0.25	50	
0.125	25	
0.063	12.5	
0	0	

GS  
9-25-15

Test No. 999-3476 Client \_\_\_\_\_ QC Test \_\_\_\_\_

12/22/2015

DAILY RECORD SHEET

Day 0 (9/25/15) LB

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	23.5	7.9	1995	8.5	94	80	10	10
2. 0.5	23.5	7.8	1130	8.6			10	10
3. 0.25	23.5	7.8	766	8.7			10	10
4. 0.125	23.5	7.8	520	8.6			10	10
5. 0.063	23.5	7.8	415	8.5			10	10
6. 0	23.6	7.8	306	8.6	94	70		

Each beaker fed 0.5 ml YTC suspension. Initials: LB

Day 1 (9/26/15) LB

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	23.8	7.6	1979	8.3			3(70)	4(60)
2. 0.5	23.7	7.6	1128	8.3			8(20)	8(20)
3. 0.25	23.8	7.6	743	8.5			10	10
4. 0.125	23.8	7.6	505	8.3			10	10
5. 0.063	23.7	7.6	405	8.2			10	10
6. 0	23.8	7.7	302	8.4			10	10

Day 2 (9/27/15) LB

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	23.2	7.8	1950	7.9			0(30)	0(40)
2. 0.5	23.1	7.7	1176	7.9			3(50)	4(40)
3. 0.25	23.3	7.6	755	8.0			10	10
4. 0.125	23.2	7.6	523	8.0			10	10
5. 0.063	23.2	7.5	421	8.0			10	10
6. 0	23.3	7.5	324	8.1			10	10

Each beaker fed 0.5 ml YTC suspension. Initials: LB

Day 3 (9/28/15) LB/MS

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	—	—	—	—			0	0
2. 0.5	23.4	7.9	1164	8.0			2(15)	2(20)
3. 0.25	23.7	7.8	743	7.8			10	10
4. 0.125	23.6	7.7	509	7.8			10	10
5. 0.063	23.6	7.7	410	7.8			10	10
6. 0	23.7	7.8	308	7.8			10	10

Day 4 (9/29/15) LB/MS

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	—	—	—	—			0	0
2. 0.5	23.8	8.0	1247	7.8			2	2
3. 0.25	23.8	7.9	770	7.8			9(10)	10
4. 0.125	23.9	7.8	543	7.8			9(10)	10
5. 0.063	23.8	7.8	434	7.8			10	10
6. 0	23.5	7.8	340	7.9	103	90	10	10

Mean  
SD  
n

(SEE PAGE 4)

Hyaella azteca Acute Water Quality

Water Quality Data - test #999-3476 Hyaella KCl QC test							
Day	Concentration (g/L)	Temperature	pH	Conductivity	DO	Hardness	Alkalinity
0	1	23.5	7.9	1995	8.5	94	80
0	0.5	23.5	7.8	1130	8.6		
0	0.25	23.5	7.8	766	8.7		
0	0.125	23.5	7.8	520	5.6		
0	0.063	23.5	7.8	415	8.5		
0	0	23.6	7.8	306	8.6	94	70
1	1	23.8	7.6	1979	8.3		
1	0.5	23.7	7.6	1128	8.3		
1	0.25	23.8	7.6	743	8.5		
1	0.125	23.8	7.6	505	8.3		
1	0.063	23.7	7.6	405	8.2		
1	0	23.8	7.7	302	8.4		
2	1	23.2	7.8	1950	7.9		
2	0.5	23.1	7.7	1176	7.9		
2	0.25	23.3	7.6	755	8.0		
2	0.125	23.2	7.6	523	8.0		
2	0.063	23.2	7.5	421	8.0		
2	0	23.3	7.5	324	8.1		
3	1						
3	0.5	23.4	7.9	1164	8.0		
3	0.25	23.7	7.8	743	7.8		
3	0.125	23.6	7.7	509	7.8		
3	0.063	23.6	7.7	410	7.8		
3	0	23.7	7.5	308	7.8		
4	1						
4	0.5	23.8	8.0	1247	7.8		
4	0.25	23.8	7.9	770	7.8		
4	0.125	23.9	7.8	543	7.8		
4	0.063	23.8	7.8	434	7.8		
4	0	23.5	7.8	340	7.9	103	90
	MEAN	23.6	7.7		8.0	97	80
	SD	0.2	0.1		0.6	5	10
	N	28	28		28	3	3
	MIN	23.1	7.5		5.6	94	70
	MAX	23.9	8.0		8.7	103	90
		MEAN 1.0 g/L		1975			
		SD					
		N		3			
		MEAN 0 g/L		316			
		SD		16			
		N		5			

data entry verified  
against laboratory  
bench sheets  
12/22/2015  
12/22/2015

# Chesapeake Cultures

P.O. Box 507 Hayes, VA 23072 (804)693-4046 (804)694-4704 fax  
www.c-cultures.com  
growfish@c-cultures.com

NAS  
Shipment Information

Rec 9-23-15  
LB

Species Hyalinella azteca Date 9/22/15  
Age ~ 4-5 days on ship. ~ 1.5 mm P.O. No. verba C  
Quantity 1550+ Invoice No. 8831

Temperature 24°C Salinity — pH 7.85

Notes \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Biologist 

*Please inspect shipment and report any problem immediately*

**Acute 96-hr Toxicity Test-96 Hr Survival**

Start Date: 9/25/2015 10:15 Test ID: 999-3476 Sample ID: REF-Ref Toxicant  
 End Date: 9/29/2015 11:15 Lab ID: ORNAS-Northwestern Aquati Sample Type: KCL-Potassium chloride  
 Sample Date: Protocol: NASXXXHA1-Hyalella acute Test Species: HA-Hyalella azteca  
 Comments:

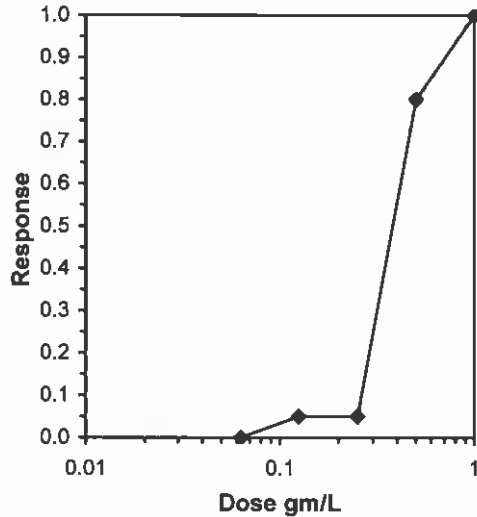
Conc-gm/L	1	2
D-Control	1.0000	1.0000
0.063	1.0000	1.0000
0.125	0.9000	1.0000
0.25	0.9000	1.0000
0.5	0.2000	0.2000
1	0.0000	0.0000

Conc-gm/L	Transform: Arcsin Square Root							Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
0.063	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
0.125	0.9500	0.9500	1.3305	1.2490	1.4120	8.661	2	1	20
0.25	0.9500	0.9500	1.3305	1.2490	1.4120	8.661	2	1	20
0.5	0.2000	0.2000	0.4636	0.4636	0.4636	0.000	2	16	20
1	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20

**Auxiliary Tests** Statistic Critical Skew Kurt  
 Normality of the data set cannot be confirmed  
 Equality of variance cannot be confirmed

Trimmed Spearman-Kärber

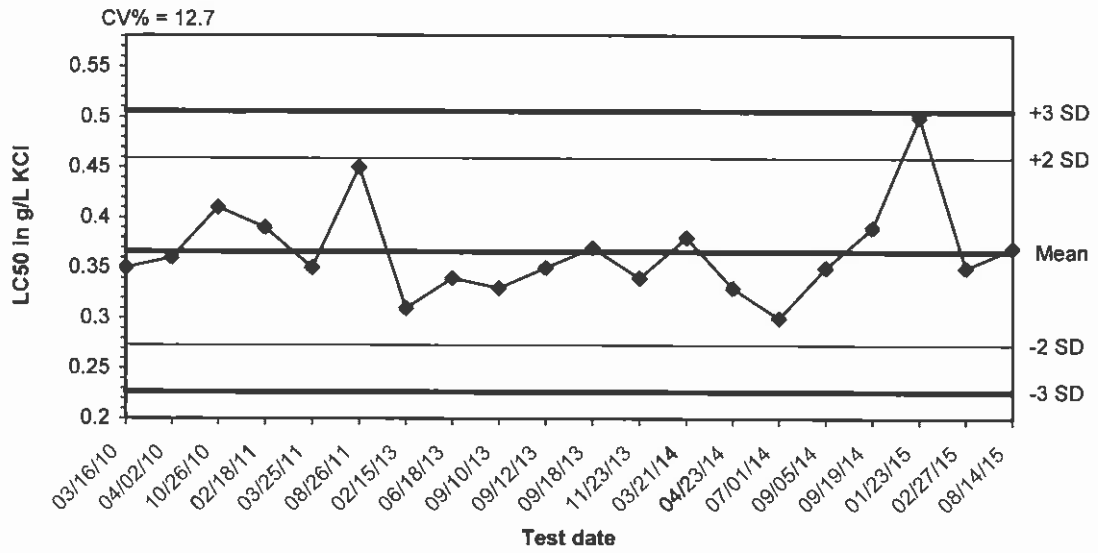
Trim Level	EC50	95% CL	
0.0%	0.3790	0.3241	0.4432
5.0%	0.3912	0.3405	0.4493
10.0%	0.3850	0.3344	0.4432
20.0%	0.3789	0.3410	0.4211
Auto-0.0%	0.3790	0.3241	0.4432



Test: AT-Acute 96-hr Toxicity Test					Test ID: 999-3476				
Species: HA-Hyalella azteca					Protocol: NASXXXHA1-Hyalella acute				
Sample ID: REF-Ref Toxicant					Sample Type: KCL-Potassium chloride				
Start Date: 9/25/2015 10:15			End Date: 9/29/2015 11:1			Lab ID: ORNAS-Northwestern Aquatic Sciences			
Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	D-Control	10				10	
	2	2	D-Control	10				10	
	3	1	0.063	10				10	
	4	2	0.063	10				10	
	5	1	0.125	10				9	
	6	2	0.125	10				10	
	7	1	0.250	10				9	
	8	2	0.250	10				10	
	9	1	0.500	10				2	
	10	2	0.500	10				2	
	11	1	1.000	10				0	
	12	2	1.000	10				0	

Comments: data entry verified against laboratory bench sheets 12-14-15\_jmf

**Amphipod, *Hyaella azteca*, acute reference toxicant test**



Dates	Values	Mean	-2 SD	-3 SD	+2 SD	+3 SD
03/16/10	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
04/02/10	0.3600	0.3660	0.2730	0.2265	0.4590	0.5055
10/26/10	0.4100	0.3660	0.2730	0.2265	0.4590	0.5055
02/18/11	0.3900	0.3660	0.2730	0.2265	0.4590	0.5055
03/25/11	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
08/26/11	0.4500	0.3660	0.2730	0.2265	0.4590	0.5055
02/15/13	0.3100	0.3660	0.2730	0.2265	0.4590	0.5055
06/18/13	0.3400	0.3660	0.2730	0.2265	0.4590	0.5055
09/10/13	0.3300	0.3660	0.2730	0.2265	0.4590	0.5055
09/12/13	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
09/18/13	0.3700	0.3660	0.2730	0.2265	0.4590	0.5055
11/23/13	0.3400	0.3660	0.2730	0.2265	0.4590	0.5055
03/21/14	0.3800	0.3660	0.2730	0.2265	0.4590	0.5055
04/23/14	0.3300	0.3660	0.2730	0.2265	0.4590	0.5055
07/01/14	0.3000	0.3660	0.2730	0.2265	0.4590	0.5055
09/05/14	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
09/19/14	0.3900	0.3660	0.2730	0.2265	0.4590	0.5055
01/23/15	0.5000	0.3660	0.2730	0.2265	0.4590	0.5055
02/27/15	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
08/14/15	0.3700	0.3660	0.2730	0.2265	0.4590	0.5055

# Shipping and Receiving Documents





Test America, Kris Allen  
5755 8th Street East  
Tacoma, WA 98424  
(253) 248-4970

580-53253 Chain of Custody

CHAIN OF CUSTODY RECORD  
Red Devil Mine 2015/AK  
1001095.0002

Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
E&E, Inc., Mark Longtine  
720 Third St, Suite 1700  
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915EB01	Methylmercury	water	9/10/2015	14:30	1	250ml FLPE	None		
	0915EB01	Total TAL Metals	water	9/10/2015	14:30	1	250ml HDPE	HNO3 pH<2	N	
	0915FB01	Total Low-Level Mercury	water	9/10/2015	18:00	1	250ml FLPE	None	N	
	0915FB02	Total Low-Level Mercury	water	9/10/2015	18:05	1	250ml FLPE	None	N	
	0915FB03	Total Low-Level Mercury	water	9/10/2015	18:10	1	250ml FLPE	None	N	
	0915MMW01GW	Total Low-Level Mercury	Ground Water	9/3/2015	20:25	1	250ml FLPE	None	N	
	0915MMW01GW	Nitrate Nitrite as N	Ground Water	9/3/2015	20:25	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW01GW	Total Suspended Solids	Ground Water	9/3/2015	20:25	1	500 mL HDPE	None	N	
	0915MMW01GW	Dissolved Low-Level Mercury	Ground Water	9/3/2015	20:25	1	250ml FLPE	None	N	
	0915MMW01GW	Total TAL Metals	Ground Water	9/3/2015	20:25	2	250 mL HDPE	HNO3 pH<2	N	
	0915MMW01GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/3/2015	20:25	1	250 mL HDPE	None	N	
	0915MMW06GW	Total Low-Level Mercury	Ground Water	9/8/2015	14:10	1	250ml FLPE	None	N	

Special Instructions: TAL metals includes Hg

All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	<i>[Signature]</i> E&E	9-11-15/1935	<i>[Signature]</i> T&AN	9/11/15 1935	
	<i>[Signature]</i>	9/11/15 200	<i>[Signature]</i> T&S&H	9/12/15 1110	

Temps: 3.2, 3.0, 1.7, 2.5, 3.1, 4.0, 2.8, 1.5, 1.8, 2.8, 4.1, 4.0, 2.1, 1.4, 2.2, 3.7, 3.9, 3.5, 2.8

**Test America, Kris Allen**  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

**CHAIN OF CUSTODY RECORD**  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

**No: 10-091115-121237-0007**  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW06GW	Total TAL Metals	Ground Water	9/8/2015	14:10	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW06GW	Nitrate Nitrite as N	Ground Water	9/8/2015	14:10	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW06GW	Total Suspended Solids	Ground Water	9/8/2015	14:10	1	500 mL HDPE	None	N	
	0915MMW06GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	14:10	1	250 mL HDPE	None	N	
	0915MMW06GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	14:10	1	250mL FLPE	None	N	
	0915MMW08GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	09:30	1	250 mL HDPE	None	N	
	0915MMW08GW	Nitrate Nitrite as N	Ground Water	9/8/2015	09:30	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW08GW	Total Suspended Solids	Ground Water	9/8/2015	09:30	1	500 mL HDPE	None	N	
	0915MMW08GW	Total TAL Metals	Ground Water	9/8/2015	09:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW08GW	Total Low-Level Mercury	Ground Water	9/8/2015	09:30	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> TA-SEA	9/12/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW08GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	09:30	1	250mL FLPE	None	N	
	0915MMW09GW	Dissolved Low-Level Mercury	Ground Water	9/9/2015	09:52	1	250mL FLPE	None	N	
	0915MMW09GW	Total Suspended Solids	Ground Water	9/9/2015	09:52	1	500 mL HDPE	None	N	
	0915MMW09GW	Total Low-Level Mercury	Ground Water	9/9/2015	09:52	1	250mL FLPE	None	N	
	0915MMW09GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/9/2015	09:52	1	250 mL HDPE	None	N	
	0915MMW09GW	Nitrate Nitrite as N	Ground Water	9/9/2015	09:52	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW09GW	Total TAL Metals	Ground Water	9/9/2015	09:52	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW10GW	Total Suspended Solids	Ground Water	9/5/2015	13:35	1	500 mL HDPE	None	N	
	0915MMW10GW	Nitrate Nitrite as N	Ground Water	9/5/2015	13:35	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW10GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/5/2015	13:35	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TIA-SEH	9/12/15 1110	

**Test America, Kris Allen**  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

**CHAIN OF CUSTODY RECORD**  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

**No: 10-091115-121237-0007**  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW10GW	Dissolved Low-Level Mercury	Ground Water	9/5/2015	13:35	1	250mL FLPE	None	N	
	0915MMW10GW	Total Low-Level Mercury	Ground Water	9/5/2015	13:35	1	250mL FLPE	None	N	
	0915MMW10GW	Total TAL Metals	Ground Water	9/5/2015	13:35	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW16GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/5/2015	18:20	1	250 mL HDPE	None	N	
	0915MMW16GW	Dissolved Low-Level Mercury	Ground Water	9/5/2015	18:20	1	250mL FLPE	None	N	
	0915MMW16GW	Total Low-Level Mercury	Ground Water	9/5/2015	18:20	1	250mL FLPE	None	N	
	0915MMW16GW	Total TAL Metals	Ground Water	9/5/2015	18:20	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW16GW	Nitrate Nitrite as N	Ground Water	9/5/2015	18:20	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW16GW	Total Suspended Solids	Ground Water	9/5/2015	18:20	1	500 mL HDPE	None	N	
	0915MMW17GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/5/2015	16:20	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg

All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.

All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TASHA	9/14/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW17GW	Dissolved Low-Level Mercury	Ground Water	9/5/2015	16:20	1	250mL FLPE	None	N	
	0915MMW17GW	Total Suspended Solids	Ground Water	9/5/2015	16:20	1	500 mL HDPE	None	N	
	0915MMW17GW	Total TAL Metals	Ground Water	9/5/2015	16:20	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW17GW	Nitrate Nitrite as N	Ground Water	9/5/2015	16:20	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW17GW	Total Low-Level Mercury	Ground Water	9/5/2015	16:20	1	250mL FLPE	None	N	
	0915MMW19GW	BTEX/GRO	Ground Water	9/8/2015	17:15	12	40 ml VOA	HCl	Y	MS/MSD
	0915MMW19GW	Total Suspended Solids	Ground Water	9/8/2015	17:15	2	500 mL HDPE	None	Y	lab duplicate
	0915MMW19GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	17:15	2	250 mL HDPE	None	Y	lab duplicate
	0915MMW19GW	Semi-Volatile Organic Compounds	Ground Water	9/8/2015	17:15	4	1 liter amber	None	Y	MS/MSD
	0915MMW19GW	Total TAL Metals	Ground Water	9/8/2015	17:15	2	250 mL HDPE	HNO3 pH<2	Y	MS/MSD

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / T.A.-SEK	9/12/15 1110	

**Test America, Kris Allen**  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

**CHAIN OF CUSTODY RECORD**  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

**No: 10-091115-121237-0007**  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW19GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	17:15	1	250mL FLPE	None	Y	MS/MSD
	0915MMW19GW	Diesel Range Organics	Ground Water	9/8/2015	17:15	5	250 mL glass	HCl	Y	MS/MSD
	0915MMW19GW	Total Low-Level Mercury	Ground Water	9/8/2015	17:15	1	250mL FLPE	None	Y	MS/MSD
	0915MMW19GW	Nitrate Nitrite as N	Ground Water	9/8/2015	17:15	2	250 mL HDPE	H2SO4 pH<2	Y	lab duplicate
	0915MMW22GW	Nitrate Nitrite as N	Ground Water	9/9/2015	10:20	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW22GW	Total Suspended Solids	Ground Water	9/9/2015	10:20	1	500 mL HDPE	None	Y	
	0915MMW22GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/9/2015	10:20	1	250 mL HDPE	None	N	
	0915MMW22GW	Total Low-Level Mercury	Ground Water	9/9/2015	10:20	1	250mL FLPE	None	N	
	0915MMW22GW	Dissolved Low-Level Mercury	Ground Water	9/9/2015	10:20	1	250mL FLPE	None	N	
	0915MMW22GW	Total TAL Metals	Ground Water	9/9/2015	10:20	1	250 mL HDPE	HNO3 pH<2	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM**  
**CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TASEH	9/2/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW22GW	Diesel Range Organics	Ground Water	9/9/2015	10:20	2	250 mL glass	HCl	N	
	0915MMW22GW	BTEX/GRO	Ground Water	9/9/2015	10:20	6	40 ml VOA	HCl	N	
	0915MMW22GW	Semi-Volatile Organic Compounds	Ground Water	9/9/2015	10:20	2	1 liter amber	None	N	
	0915MMW26GW	Total TAL Metals	Ground Water	9/4/2015	10:50	2	250 mL HDPE	HNO3 pH<2	N	
	0915MMW26GW	Dissolved Low-Level Mercury	Ground Water	9/4/2015	10:50	1	250mL FLPE	None	N	
	0915MMW26GW	Nitrate Nitrite as N	Ground Water	9/4/2015	10:50	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW26GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/4/2015	10:50	1	250 mL HDPE	None	N	
	0915MMW26GW	Total Low-Level Mercury	Ground Water	9/4/2015	10:50	1	250mL FLPE	None	N	
	0915MMW26GW	Total Suspended Solids	Ground Water	9/4/2015	10:50	1	500 mL HDPE	None	N	
	0915MMW27GW	Total TAL Metals	Ground Water	9/4/2015	20:55	2	250 mL HDPE	HNO3 pH<2	N	

Special Instructions: TAL metals includes Hg

All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.

All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM**

**CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TASEH	9/12/15 11:10	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW27GW	Nitrate Nitrite as N	Ground Water	9/4/2015	20:55	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW27GW	Total Suspended Solids	Ground Water	9/4/2015	20:55	1	500 mL HDPE	None	N	
	0915MMW27GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/4/2015	20:55	1	250 mL HDPE	None	N	
	0915MMW27GW	Dissolved Low-Level Mercury	Ground Water	9/4/2015	20:55	1	250mL FLPE	None	N	
	0915MMW27GW	Total Low-Level Mercury	Ground Water	9/4/2015	20:55	1	250mL FLPE	None	N	
	0915MMW28GW	Total Suspended Solids	Ground Water	9/4/2015	18:55	1	500 mL HDPE	None	N	
	0915MMW28GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/4/2015	18:55	1	250 mL HDPE	None	N	
	0915MMW28GW	Dissolved Low-Level Mercury	Ground Water	9/4/2015	18:55	1	250mL FLPE	None	N	
	0915MMW28GW	Total Low-Level Mercury	Ground Water	9/4/2015	18:55	1	250mL FLPE	None	N	
	0915MMW28GW	Total TAL Metals	Ground Water	9/4/2015	18:55	2	250 mL HDPE	HNO3 pH<2	N	

Special Instructions: TAL metals includes Hg

All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.

All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM**

**CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> TASEA	9/12/15 1110	



Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW28GW	Nitrate Nitrite as N	Ground Water	9/4/2015	18:55	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW29GW	Total Suspended Solids	Ground Water	9/7/2015	14:08	1	500 mL HDPE	None	N	
	0915MMW29GW	Total TAL Metals	Ground Water	9/7/2015	14:08	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW29GW	Nitrate Nitrite as N	Ground Water	9/7/2015	14:08	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW29GW	Total Low-Level Mercury	Ground Water	9/7/2015	14:08	1	250mL FLPE	None	N	
	0915MMW29GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/7/2015	14:08	1	250 mL HDPE	None	N	
	0915MMW29GW	Dissolved Low-Level Mercury	Ground Water	9/7/2015	14:08	1	250mL FLPE	None	N	
	0915MMW31GW	Total TAL Metals	Ground Water	9/6/2015	21:05	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW31GW	Nitrate Nitrite as N	Ground Water	9/6/2015	21:05	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW31GW	Total Suspended Solids	Ground Water	9/6/2015	21:05	1	500 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TH-SEH	9/12/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW31GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	21:05	1	250 mL HDPE	None	N	
	0915MMW31GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	21:05	1	250mL FLPE	None	N	
	0915MMW31GW	Total Low-Level Mercury	Ground Water	9/6/2015	21:05	1	250mL FLPE	None	N	
	0915MMW32GW	Nitrate Nitrite as N	Ground Water	9/8/2015	12:40	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW32GW	Total Suspended Solids	Ground Water	9/8/2015	12:40	1	500 mL HDPE	None	N	
	0915MMW32GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	12:40	1	250 mL HDPE	None	N	
	0915MMW32GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	12:40	1	250mL FLPE	None	N	
	0915MMW32GW	Total TAL Metals	Ground Water	9/8/2015	12:40	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW32GW	Total Low-Level Mercury	Ground Water	9/8/2015	12:40	1	250mL FLPE	None	N	
	0915MMW33GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	15:42	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg

All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.

All groundwater samples for TDS; dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM**

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TH-SEH	9/7/15 1110	

**Test America, Kris Allen**  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

**CHAIN OF CUSTODY RECORD**  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

**No: 10-091115-121237-0007**  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW33GW	Nitrate Nitrite as N	Ground Water	9/8/2015	15:42	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW33GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	15:42	1	250 mL HDPE	None	N	
	0915MMW33GW	Total Low-Level Mercury	Ground Water	9/8/2015	15:42	1	250mL FLPE	None	N	
	0915MMW33GW	Total TAL Metals	Ground Water	9/8/2015	15:42	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW33GW	Total Suspended Solids	Ground Water	9/8/2015	15:42	1	500 mL HDPE	None	N	
	0915MMW40GW	Nitrate Nitrite as N	Ground Water	9/6/2015	17:35	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW40GW	Total Suspended Solids	Ground Water	9/6/2015	17:35	1	500 mL HDPE	None	N	
	0915MMW40GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	17:35	1	250 mL HDPE	None	N	
	0915MMW40GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	17:35	1	250mL FLPE	None	N	
	0915MMW40GW	Total Low-Level Mercury	Ground Water	9/6/2015	17:35	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>TASEH</i>	9/12/15 0110	

**Test America, Kris Allen**  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

**CHAIN OF CUSTODY RECORD**  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

**No: 10-091115-121237-0007**  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW40GW	Total TAL Metals	Ground Water	9/6/2015	17:35	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW42GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	14:48	1	250 mL HDPE	None	N	
	0915MMW42GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	14:48	1	250mL FLPE	None	N	
	0915MMW42GW	Total Low-Level Mercury	Ground Water	9/6/2015	14:48	1	250mL FLPE	None	N	
	0915MMW42GW	Total TAL Metals	Ground Water	9/6/2015	14:48	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW42GW	Nitrate Nitrite as N	Ground Water	9/6/2015	14:48	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW42GW	Total Suspended Solids	Ground Water	9/6/2015	14:48	1	500 mL HDPE	None	N	
	0915MMW43GW	Total Suspended Solids	Ground Water	9/6/2015	10:55	1	500 mL HDPE	None	N	
	0915MMW43GW	Total TAL Metals	Ground Water	9/6/2015	10:55	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW43GW	Total Low-Level Mercury	Ground Water	9/6/2015	10:55	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM**  
**CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> ITH-SEH	9/12/15 1110	

Test America, Kris Allen  
 5755 8th Sreet East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW43GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	10:55	1	250 mL HDPE	None	N	
	0915MMW43GW	Nitrate Nitrite as N	Ground Water	9/6/2015	10:55	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW43GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	10:55	1	250mL FLPE	None	N	
	0915MMW50GW	Nitrate Nitrite as N	Ground Water	9/5/2015	13:55	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW50GW	Total Suspended Solids	Ground Water	9/5/2015	13:55	1	500 mL HDPE	None	N	
	0915MMW50GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/5/2015	13:55	1	250 mL HDPE	None	N	
	0915MMW50GW	Dissolved Low-Level Mercury	Ground Water	9/5/2015	13:55	1	250mL FLPE	None	N	
	0915MMW50GW	Total Low-Level Mercury	Ground Water	9/5/2015	13:55	1	250mL FLPE	None	N	
	0915MMW50GW	Total TAL Metals	Ground Water	9/5/2015	13:55	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW51GW	Total Low-Level Mercury	Ground Water	9/6/2015	11:30	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>THSEH</i>	9/12/15 1110	

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

**Test America, Kris Allen**  
 5755 8th Street East  
 Tacoma, WA 99424  
 (253) 248-4970

**CHAIN OF CUSTODY RECORD**  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

**No: 10-091115-121237-0007**  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MMW51GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	11:30	1	250mL FLPE	None	N	
	0915MMW51GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	11:30	1	250 mL HDPE	None	N	
	0915MMW51GW	Total Suspended Solids	Ground Water	9/6/2015	11:30	1	500 mL HDPE	None	N	
	0915MMW51GW	Nitrate Nitrite as N	Ground Water	9/6/2015	11:30	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MMW51GW	Total TAL Metals	Ground Water	9/6/2015	11:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915MMW52GW	Semi-Volatile Organic Compounds	Ground Water	9/9/2015	10:40	2	1 liter amber	None	N	
	0915MMW52GW	Diesel Range Organics	Ground Water	9/9/2015	10:40	2	250 mL glass	HCl	N	
	0915MMW52GW	BTEX/GRO	Ground Water	9/9/2015	10:40	6	40 ml VOA	HCl	N	
	0915RDD05SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	15:30	1	250mL FLPE	None	N	Field Filtered
	0915RDD05SW	Nitrate Nitrite as N	Surface Water	9/9/2015	15:30	1	250 mL HDPE	H2SO4 pH<2	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>THASEH</i>	9/12/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD05SW	Total Dissolved Solids	Surface Water	9/9/2015	15:30	1	500 mL HDPE	None	N	Field Filtered
	0915RD05SW	Total Suspended Solids	Surface Water	9/9/2015	15:30	1	500 mL HDPE	None	N	
	0915RD05SW	Total Organic Carbon	Surface Water	9/9/2015	15:30	1	250 mL glass	H2SO4 pH<2	N	
	0915RD05SW	Total TAL Metals	Surface Water	9/9/2015	15:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD05SW	Dissolved TAL Metals	Surface Water	9/9/2015	15:30	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD05SW	Total Low-Level Mercury	Surface Water	9/9/2015	15:30	1	250mL FLPE	None	N	
	0915RD05SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	15:30	1	250 mL HDPE	None	N	
	0915RD06SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	14:20	1	250mL FLPE	None	N	Field Filtered
	0915RD06SW	Total TAL Metals	Surface Water	9/9/2015	14:20	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD06SW	Nitrate Nitrite as N	Surface Water	9/9/2015	14:20	1	250 mL HDPE	H2SO4 pH<2	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>THSEH</i>	9/21/5 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD06SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	14:20	1	250 mL HDPE	None	N	
	0915RD06SW	Total Dissolved Solids	Surface Water	9/9/2015	14:20	1	500 mL HDPE	None	N	Field Filtered
	0915RD06SW	Total Organic Carbon	Surface Water	9/9/2015	14:20	1	250 mL glass	H2SO4 pH<2	N	
	0915RD06SW	Total Low-Level Mercury	Surface Water	9/9/2015	14:20	1	250mL FLPE	None	N	
	0915RD06SW	Dissolved TAL Metals	Surface Water	9/9/2015	14:20	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD06SW	Total Suspended Solids	Surface Water	9/9/2015	14:20	1	500 mL HDPE	None	N	
	0915RD08SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	13:32	1	250 mL HDPE	None	N	
	0915RD08SW	Nitrate Nitrite as N	Surface Water	9/9/2015	13:32	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD08SW	Dissolved TAL Metals	Surface Water	9/9/2015	13:32	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD08SW	Total Low-Level Mercury	Surface Water	9/9/2015	13:32	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>THASEH</i>	9/17/15 <i>111V</i>	



Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD08SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	13:32	1	250mL FLPE	None	N	Field Filtered
	0915RD08SW	Total Organic Carbon	Surface Water	9/9/2015	13:32	1	250 mL glass	H2SO4 pH<2	N	
	0915RD08SW	Total Suspended Solids	Surface Water	9/9/2015	13:32	1	500 mL HDPE	None	N	
	0915RD08SW	Total TAL Metals	Surface Water	9/9/2015	13:32	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD08SW	Total Dissolved Solids	Surface Water	9/9/2015	13:32	1	500 mL HDPE	None	N	Field Filtered
	0915RD09SW	Total Suspended Solids	Surface Water	9/9/2015	14:44	1	500 mL HDPE	None	N	
	0915RD09SW	Nitrate Nitrite as N	Surface Water	9/9/2015	14:44	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD09SW	Total Dissolved Solids	Surface Water	9/9/2015	14:44	1	500 mL HDPE	None	N	Field Filtered
	0915RD09SW	Total Organic Carbon	Surface Water	9/9/2015	14:44	1	250 mL glass	H2SO4 pH<2	N	
	0915RD09SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	14:44	1	250mL FLPE	None	N	Field Filtered

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> TASEH	9/12/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD09SW	Total Low-Level Mercury	Surface Water	9/9/2015	14:44	1	250mL FLPE	None	N	
	0915RD09SW	Dissolved TAL Metals	Surface Water	9/9/2015	14:44	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD09SW	Total TAL Metals	Surface Water	9/9/2015	14:44	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD09SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	14:44	1	250 mL HDPE	None	N	
	0915RD10SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	17:30	1	250mL FLPE	None	Y	Field Filtered, MS/MSD
	0915RD10SW	Nitrate Nitrite as N	Surface Water	9/9/2015	17:30	2	250 mL HDPE	H2SO4 pH<2	Y	Lab Duplicate
	0915RD10SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	17:30	2	250 mL HDPE	None	Y	Lab Duplicate
	0915RD10SW	Total Low-Level Mercury	Surface Water	9/9/2015	17:30	1	250mL FLPE	None	Y	MS/MSD
	0915RD10SW	Total TAL Metals	Surface Water	9/9/2015	17:30	2	250 mL HDPE	HNO3 pH<2	Y	MS/MSD
	0915RD10SW	Total Organic Carbon	Surface Water	9/9/2015	17:30	2	250 mL glass	H2SO4 pH<2	Y	Lab Duplicate

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TH-SEH	9/12/15 11:10	

**Test America, Kris Allen**  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

**CHAIN OF CUSTODY RECORD**  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

**No: 10-091115-121237-0007**  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD10SW	Total Suspended Solids	Surface Water	9/9/2015	17:30	2	500 mL HDPE	None	Y	Lab Duplicate
	0915RD10SW	Total Dissolved Solids	Surface Water	9/9/2015	17:30	2	500 mL HDPE	None	Y	Field Filtered, Lab Duplicate
	0915RD10SW	Dissolved TAL Metals	Surface Water	9/9/2015	17:30	2	250 mL HDPE	HNO3 pH<2	Y	Field Filtered, MS/MSD
	0915RD14SW	Total Organic Carbon	Surface Water	9/9/2015	16:30	1	250 mL glass	H2SO4 pH<2	N	
	0915RD14SW	Dissolved TAL Metals	Surface Water	9/9/2015	16:30	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD14SW	Nitrate Nitrite as N	Surface Water	9/9/2015	16:30	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD14SW	Total Low-Level Mercury	Surface Water	9/9/2015	16:30	1	250mL FLPE	None	N	
	0915RD14SW	Total Suspended Solids	Surface Water	9/9/2015	16:30	1	500 mL HDPE	None	N	
	0915RD14SW	Total Dissolved Solids	Surface Water	9/9/2015	16:30	1	500 mL HDPE	None	N	Field Filtered
	0915RD14SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	16:30	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TA SEH	9/21/15 1110	

**SAMPLES TRANSFERRED FROM**  
**CHAIN OF CUSTODY #**

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longhine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD14SW	Total TAL Metals	Surface Water	9/9/2015	16:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD14SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	16:30	1	250mL FLPE	None	N	Field Filtered
	0915RD15SW	Total TAL Metals	Surface Water	9/9/2015	16:00	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD15SW	Dissolved TAL Metals	Surface Water	9/9/2015	16:00	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD15SW	Total Low-Level Mercury	Surface Water	9/9/2015	16:00	1	250mL FLPE	None	N	
	0915RD15SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	16:00	1	250mL FLPE	None	N	Field Filtered
	0915RD15SW	Total Organic Carbon	Surface Water	9/9/2015	16:00	1	250 mL glass	H2SO4 pH<2	N	
	0915RD15SW	Total Suspended Solids	Surface Water	9/9/2015	16:00	1	500 mL HDPE	None	N	
	0915RD15SW	Total Dissolved Solids	Surface Water	9/9/2015	16:00	1	500 mL HDPE	None	N	Field Filtered
	0915RD15SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	16:00	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>TH-SEH</i>	9/12/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 99424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD15SW	Nitrate Nitrite as N	Surface Water	9/9/2015	16:00	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD16SW	Nitrate Nitrite as N	Surface Water	9/9/2015	15:08	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD16SW	Total TAL Metals	Surface Water	9/9/2015	15:08	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD16SW	Dissolved TAL Metals	Surface Water	9/9/2015	15:08	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD16SW	Total Low-Level Mercury	Surface Water	9/9/2015	15:08	1	250mL FLPE	None	N	
	0915RD16SW	Total Organic Carbon	Surface Water	9/9/2015	15:08	1	250 mL glass	H2SO4 pH<2	N	
	0915RD16SW	Total Suspended Solids	Surface Water	9/9/2015	15:08	1	500 mL HDPE	None	N	
	0915RD16SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	15:08	1	250mL FLPE	None	N	Field Filtered
	0915RD16SW	Total Dissolved Solids	Surface Water	9/9/2015	15:08	1	500 mL HDPE	None	N	Field Filtered
	0915RD16SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	15:08	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg

All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.

All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM**

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> TA-SEH	9/12/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD25SW	Total Organic Carbon	Surface Water	9/9/2015	16:50	1	250 mL glass	H2SO4 pH<2	N	
	0915RD25SW	Nitrate Nitrite as N	Surface Water	9/9/2015	16:50	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD25SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	16:50	1	250 mL HDPE	None	N	
	0915RD25SW	Total Suspended Solids	Surface Water	9/9/2015	16:50	1	500 mL HDPE	None	N	
	0915RD25SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	16:50	1	250mL FLPE	None	N	Field Filtered
	0915RD25SW	Total Low-Level Mercury	Surface Water	9/9/2015	16:50	1	250mL FLPE	None	N	
	0915RD25SW	Total TAL Metals	Surface Water	9/9/2015	16:50	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD25SW	Total Dissolved Solids	Surface Water	9/9/2015	16:50	1	500 mL HDPE	None	N	Field Filtered
	0915RD25SW	Dissolved TAL Metals	Surface Water	9/9/2015	16:50	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RS01GW	Dissolved Low-Level Mercury	Ground Water	9/7/2015	10:30	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / T.A. SEH	9/12/15 1110	

**Test America, Kris Allen**  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

**CHAIN OF CUSTODY RECORD**  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

**No: 10-091115-121237-0007**  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RS01GW	Nitrate Nitrite as N	Ground Water	9/7/2015	10:30	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RS01GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/7/2015	10:30	1	250 mL HDPE	None	N	
	0915RS01GW	Total Low-Level Mercury	Ground Water	9/7/2015	10:30	1	250mL FLPE	None	N	
	0915RS01GW	Total TAL Metals	Ground Water	9/7/2015	10:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915RS01GW	Total Suspended Solids	Ground Water	9/7/2015	10:30	1	500 mL HDPE	None	N	
	0915RS02GW	Nitrate Nitrite as N	Ground Water	9/7/2015	10:45	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RS02GW	Total Suspended Solids	Ground Water	9/7/2015	10:45	1	500 mL HDPE	None	N	
	0915RS02GW	Total TAL Metals	Ground Water	9/7/2015	10:45	1	250 mL HDPE	HNO3 pH<2	N	
	0915RS02GW	Total Low-Level Mercury	Ground Water	9/7/2015	10:45	1	250mL FLPE	None	N	
	0915RS02GW	Dissolved Low-Level Mercury	Ground Water	9/7/2015	10:45	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM**  
**CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> TASEH	9/7/15 11:10	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longfene  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RS02GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/7/2015	10:45	1	250 mL HDPE	None	N	
	0915RS03	Total TAL Metals	Sediment	9/7/2015	10:40	1	250mL HDPE	HNO3 pH<2	N	
	0915RS03	Methylmercury	Sediment	9/7/2015	10:40	1	250mL FLPE	None		
	0915RS04	Methylmercury	water	9/7/2015	10:50	1	250mL FLPE	None		
	0915RS04	Total TAL Metals	water	9/7/2015	10:50	1	250mL HDPE	HNO3 pH<2	N	
	0915RS05	Methylmercury	water	9/7/2015	10:55	1	250mL FLPE	None		
	0915RS05	Total TAL Metals	water	9/7/2015	10:55	1	250mL HDPE	HNO3 pH<2	N	
	0915TB01	Total Low-Level Mercury	water	9/10/2015		3	40 ml VOA	HCl	Y	BR-supplied TB
	0915TB02	Total Low-Level Mercury	water	9/10/2015		3	40 ml VOA	HCl	Y	
	15KR082SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	11:11	2	1L amber	None	N	
	15KR082SD	Total TAL Metals	Sediment	9/2/2015	11:11	1	4 oz glass jar	None	N	
	15KR082SD	Grain Size	Sediment	9/2/2015	11:11	1	16 oz glass	None	N	
	15KR082SD	Total Organic Carbon	Sediment	9/2/2015	11:11	1	4 oz glass jar	None	N	
	15KR083SD	Total Organic Carbon	Sediment	9/2/2015	13:20	1	4 oz glass jar	None	N	
	15KR083SD	Total TAL Metals	Sediment	9/2/2015	13:20	1	4 oz glass jar	None	N	
	15KR083SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	13:20	2	1L amber	None	N	

**SAMPLES TRANSFERRED FROM**

**CHAIN OF CUSTODY #**

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> TASEH	9/17/15 1110	



Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR083SD	Grain Size	Sediment	9/2/2015	13:20	1	16 oz glass jar	None	N	
	15KR084SD	Total Organic Carbon	Sediment	9/5/2015	16:16	1	4 oz glass jar	None	N	
	15KR084SD	Mercury SSE	Sediment	9/5/2015	16:16	1	8 oz HDPE jar	None	N	
	15KR084SD	Methylmercury	Sediment	9/5/2015	16:16	1	8 oz HDPE jar	None	N	
	15KR084SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/5/2015	16:16	2	1 gallon ziploc	None	N	
	15KR084SD	Total TAL Metals	Sediment	9/5/2015	16:16	1	4 oz glass jar	None	N	
	15KR084SD	Grain Size	Sediment	9/5/2015	16:16	1	16 oz glass jar	None	N	
	15KR085SD	Total Organic Carbon	Sediment	9/2/2015	17:00	1	4 oz glass jar	None	N	
	15KR085SD	Grain Size	Sediment	9/2/2015	17:00	1	16 oz glass jar	None	N	
	15KR085SD	Total TAL Metals	Sediment	9/2/2015	17:00	1	4 oz glass jar	None	N	
	15KR085SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	17:00	2	1L poly	None	N	
	15KR086SD	Total Organic Carbon	Sediment	9/6/2015	11:40	1	4 oz glass jar	None	N	
	15KR086SD	Total TAL Metals	Sediment	9/6/2015	11:40	1	4 oz glass jar	None	N	
	15KR086SD	Grain Size	Sediment	9/6/2015	11:40	1	16 oz glass jar	None	N	
	15KR087SD	Total TAL Metals	Sediment	9/2/2015	18:25	1	4 oz glass jar	None	N	
	15KR087SD	Grain Size	Sediment	9/2/2015	18:25	1	16 oz glass jar	None	N	
	15KR087SD	Total Organic Carbon	Sediment	9/2/2015	18:25	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

**SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #**

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / T.A.S.E.H	9/17/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
15KR087SD		Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	18:25	2	1L poly	None	N	
15KR088SD		Mercury SSE	Sediment	9/2/2015	19:00	1	8 oz HDPE jar	None	N	
15KR088SD		Methylmercury	Sediment	9/2/2015	19:00	1	8 oz HDPE jar	None	N	
15KR088SD		Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	19:00	2	1L poly	None	N	
15KR088SD		Total TAL Metals	Sediment	9/2/2015	19:00	1	4 oz glass jar	None	N	
15KR088SD		Total Organic Carbon	Sediment	9/2/2015	19:00	1	4 oz glass jar	None	N	
15KR088SD		Grain Size	Sediment	9/2/2015	19:00	1	16 oz glass	None	N	
15KR088SD		Total TAL Metals	Sediment	9/6/2015	13:30	2	4 oz glass jar	None	Y	MS/MSD
15KR088SD		Methylmercury	Sediment	9/6/2015	13:30	1	8 oz HDPE jar	None	N	
15KR088SD		Toxicity - Hyalella Azteca (28 day)	Sediment	9/6/2015	13:30	1	1 gallon ziploc	None	N	
15KR089SD		Total Organic Carbon	Sediment	9/6/2015	13:30	2	4 oz glass jar	None	Y	MS/MSD
15KR089SD		Grain Size	Sediment	9/6/2015	13:30	1	16 oz glass	None	N	
15KR089SD		Mercury SSE	Sediment	9/6/2015	13:30	2	8 oz HDPE jar	None	Y	MS/MSD
15KR090SD		Total Organic Carbon	Sediment	9/3/2015	09:44	1	4 oz glass jar	None	N	
15KR090SD		Grain Size	Sediment	9/3/2015	09:44	1	16 oz glass	None	N	
15KR090SD		Total TAL Metals	Sediment	9/3/2015	09:44	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>THSEH</i>	9/12/15 11:10	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR090SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/3/2015	09:44	2	1L poly	None	N	
	15KR091SD	Mercury SSE	Sediment	9/6/2015	17:30	1	8 oz HDPE jar	None	N	
	15KR091SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/6/2015	17:30	1	1 gallon ziploc	None	N	
	15KR091SD	Total TAL Metals	Sediment	9/6/2015	17:30	1	4 oz glass jar	None	N	
	15KR091SD	Methylmercury	Sediment	9/6/2015	17:30	1	8 oz HDPE jar	None	N	
	15KR091SD	Total Organic Carbon	Sediment	9/6/2015	17:30	1	4 oz glass jar	None	N	
	15KR091SD	Grain Size	Sediment	9/6/2015	17:30	1	16 oz glass	None	N	
	15KR092SD	Grain Size	Sediment	9/3/2015	11:40	1	16 oz glass	None	N	
	15KR092SD	Mercury SSE	Sediment	9/3/2015	11:40	1	8 oz HDPE jar	None	N	
	15KR092SD	Methylmercury	Sediment	9/3/2015	11:40	1	8 oz HDPE jar	None	N	
	15KR092SD	Total Organic Carbon	Sediment	9/3/2015	11:40	1	4 oz glass jar	None	N	
	15KR092SD	Total TAL Metals	Sediment	9/3/2015	11:40	1	4 oz glass jar	None	N	
	15KR092SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/3/2015	11:40	3	32oz wide mouth poly	None	N	
	15KR093SD	Grain Size	Sediment	9/6/2015	19:30	1	16 oz glass	None	N	
	15KR093SD	Mercury SSE	Sediment	9/6/2015	19:30	1	8 oz HDPE jar	None	N	
	15KR093SD	Total Organic Carbon	Sediment	9/6/2015	19:30	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg

All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.

All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> / TH-SEH	9/12/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR093SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/6/2015	19:30	1	1 gallon ziploc	None	N	
	15KR093SD	Methylmercury	Sediment	9/6/2015	19:30	1	8 oz HDPE jar	None	N	
	15KR093SD	Total TAL Metals	Sediment	9/6/2015	19:30	1	4 oz glass jar	None	N	
	15KR094SD	Total TAL Metals	Sediment	9/3/2015	11:00	1	4 oz glass jar	None	N	
	15KR094SD	Grain Size	Sediment	9/3/2015	11:00	1	16 oz glass jar	None	N	
	15KR094SD	Total Organic Carbon	Sediment	9/3/2015	11:00	1	4 oz glass jar	None	N	
	15KR095SD	Total TAL Metals	Sediment	9/3/2015	16:56	1	4 oz glass jar	None	N	
	15KR095SD	Grain Size	Sediment	9/3/2015	16:56	1	16 oz glass jar	None	N	
	15KR095SD	Total Organic Carbon	Sediment	9/3/2015	16:56	1	4 oz glass jar	None	N	
	15KR096SD	Methylmercury	Sediment	9/3/2015	17:40	1	8 oz HDPE jar	None	N	
	15KR096SD	Grain Size	Sediment	9/3/2015	17:40	1	16 oz glass jar	None	N	
	15KR096SD	Total Organic Carbon	Sediment	9/3/2015	17:40	1	4 oz glass jar	None	N	
	15KR096SD	Total TAL Metals	Sediment	9/3/2015	17:40	1	4 oz glass jar	None	N	
	15KR097SD	Methylmercury	Sediment	9/4/2015	14:35	3	8 oz HDPE jar	None	Y	MS/MSD
	15KR097SD	Total Organic Carbon	Sediment	9/4/2015	14:35	3	4 oz glass jar	None	Y	MS/MSD
	15KR097SD	Grain Size	Sediment	9/4/2015	14:35	1	16 oz glass jar	None	Y	
	15KR097SD	Total TAL Metals	Sediment	9/4/2015	14:35	3	4 oz glass jar	None	Y	MS/MSD
	15KR098SD	Methylmercury	Sediment	9/4/2015	10:40	1	8 oz HDPE jar	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>[Signature]</i> TASEH	9/12/15 04:11:00	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longtine  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR098SD	Total Organic Carbon	Sediment	9/4/2015	10:40	1	4 oz glass jar	None	N	
	15KR098SD	Grain Size	Sediment	9/4/2015	10:40	1	16 oz glass	None	N	
	15KR098SD	Total TAL Metals	Sediment	9/4/2015	10:40	1	4 oz glass jar	None	N	
	15KR099SD	Total TAL Metals	Sediment	9/5/2015	10:50	1	4 oz glass jar	None	N	
	15KR099SD	Grain Size	Sediment	9/5/2015	10:50	1	16 oz glass	None	N	
	15KR099SD	Total Organic Carbon	Sediment	9/5/2015	10:50	1	4 oz glass jar	None	N	
	15KR099SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/5/2015	10:50	2	1 gallon ziploc	None	N	
	15KR100SD	Total TAL Metals	Sediment	9/4/2015	16:55	1	4 oz glass jar	None	N	
	15KR100SD	Methylmercury	Sediment	9/4/2015	16:55	1	8 oz HDPE jar	None	N	
	15KR100SD	Total Organic Carbon	Sediment	9/4/2015	16:55	1	4 oz glass jar	None	N	
	15KR100SD	Grain Size	Sediment	9/4/2015	16:55	1	16 oz glass	None	N	
	15KR101SD	Methylmercury	Sediment	9/4/2015	16:10	1	8 oz HDPE jar	None	N	
	15KR101SD	Total Organic Carbon	Sediment	9/4/2015	16:10	1	4 oz glass jar	None	N	
	15KR101SD	Total TAL Metals	Sediment	9/4/2015	16:10	1	4 oz glass jar	None	N	
	15KR101SD	Grain Size	Sediment	9/4/2015	16:10	1	16 oz glass	None	N	
	15KR102SD	Methylmercury	Sediment	9/5/2015	12:25	1	8 oz HDPE jar	None	N	
	15KR102SD	Grain Size	Sediment	9/5/2015	12:25	1	16 oz glass	None	N	
	15KR102SD	Total TAL Metals	Sediment	9/5/2015	12:25	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg  
 All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.  
 All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>THASEL</i>	9/4/15 1110	

Test America, Kris Allen  
 5755 8th Street East  
 Tacoma, WA 98424  
 (253) 248-4970

CHAIN OF CUSTODY RECORD  
 Red Devil Mine 2015/AK  
 1001095.0002  
 Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007  
 E&E, Inc., Mark Longline  
 720 Third St, Suite 1700  
 Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR102SD	Total Organic Carbon	Sediment*	9/5/2015	12:25	1	4 oz glass jar	None	N	
	15KR103SD	Total Organic Carbon	Sediment	9/5/2015	12:50	1	4 oz glass jar	None	N	
	15KR103SD	Total TAL Metals	Sediment	9/5/2015	12:50	1	4 oz glass jar	None	N	
	15KR103SD	Grain Size	Sediment	9/5/2015	12:50	1	16 oz glass	None	N	
	15KR104SD	Grain Size	Sediment	9/5/2015	12:10	1	16 oz glass	None	N	
	15KR104SD	Total Organic Carbon	Sediment	9/5/2015	12:10	1	4 oz glass jar	None	N	
	15KR104SD	Methylmercury	Sediment	9/5/2015	12:10	1	8 oz HDPE jar	None	N	
	15KR104SD	Total TAL Metals	Sediment	9/5/2015	12:10	1	4 oz glass jar	None	N	
	15KR105SD	Methylmercury	Sediment	9/5/2015	11:30	1	8 oz HDPE jar	None	N	
	15KR105SD	Total TAL Metals	Sediment	9/5/2015	11:30	1	4 oz glass jar	None	N	
	15KR105SD	Total Organic Carbon	Sediment	9/5/2015	11:30	1	4 oz glass jar	None	N	
	15KR105SD	Grain Size	Sediment	9/5/2015	11:30	1	16 oz glass	None	N	
	15KR106SD	Total TAL Metals	Sediment	9/4/2015	11:11	1	4 oz glass jar	None	N	
	15KR107SD	Total TAL Metals	Sediment	9/4/2015	11:25	1	4 oz glass jar	None	N	
	15KR108SD	Total TAL Metals	Sediment	9/4/2015	11:40	1	4 oz glass jar	None	N	
	15KR109SD	Total TAL Metals	Sediment	9/4/2015	12:00	1	4 oz glass jar	None	N	
	15KR200SD	Methylmercury	Sediment	9/4/2015	10:50	1	8 oz HDPE jar	None	N	
	15KR200SD	Total Organic Carbon	Sediment	9/4/2015	10:50	1	4 oz glass jar	None	N	
	15KR200SD	Total TAL Metals	Sediment	9/4/2015	10:50	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg

All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.

All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM  
 CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			<i>TH-SEH</i>	9/12/15 1110	



# Login Sample Receipt Checklist

Client: Ecology and Environment, Inc.

Job Number: 580-53253-3

**Login Number: 53253**  
**List Number: 1**  
**Creator: Pilch, Andrew C**

**List Source: TestAmerica Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	