

APPENDIX 2.3-19.1

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHMW-05D

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2650	SHMW-05D	Increment 1	S1	36.5	37	E	35.84	27.44	42.77	4372	6815	2.4	2.62	4.08
06-C2651	SHMW-05D	Increment 2	S2	37	38	E	43.82	19.01	33.84	4511	8029	3	2.22	3.95
06-C2652	SHMW-05D	Increment 3	S3 - S4	38	40	E	45.73	5.84	10.76	5855	10789	9.6	0.6	1.11
06-C2653	SHMW-05D	Increment 4	S5	152.5	153	D	36.95	19.91	31.58	5216	8273	3.1	1.82	2.89
06-C2654	SHMW-05D	Increment 5	S6	153	154	D	41.08	7.55	12.81	6246	10601	6.6	0.62	1.05
06-C2655	SHMW-05D	Increment 6	S7 - S9	154	157	D	41.02	10.37	17.58	5819	9867	5.6	0.75	1.27
06-C2656	SHMW-05D	Increment 7	S10 - S12	157	160	D	40.68	9.6	16.18	6046	10193	6.4	0.72	1.21
06-C2657	SHMW-05D	Increment 8	S13 - S15	160	163	D	40.64	6.75	11.37	6401	10783	9.4	0.69	1.16
06-C2658	SHMW-05D	Increment 9	S16 - S18	163	166	D	40.84	7.84	13.25	6264	10588	8.5	0.5	0.85
06-C2659	SHMW-05D	Increment 10	S19 - S21	166	169	D	39.08	11.64	19.11	6091	9999	6.8	3.16	5.19
06-C2660	SHMW-05D	Increment 11	S22 - S24	169	172	D	40.12	6.31	10.54	6548	10936	11.1	0.94	1.57
06-C2661	SHMW-05D	Increment 12	S25 - S26	172	174	D	40.38	6.19	10.38	6678	11201	10.6	1.29	2.16
06-C2662	SHMW-05D	Increment 13	S27	174	175	D	37.85	24.72	39.77	4588	7382	2.8	4.51	7.26

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

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wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHMW-05D	Composite 1	Increment 5-12	153	174	< 0.67	3.26	0.45	< 0.13	4.18	0.88	5.73	4.6	0.069	0.117	91.96	2.37
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2	1	780.5	287.7	< 6.72	< 0.13	369.2	< 6.72	5.51	4.68	12.50	1.081

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.2

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHMW-06D

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2663	SHMW-06D	Increment 1	S1	54.5	55	D	35.04	32.58	50.15	2776	4273	1.2	2.61	4.02
06-C2664	SHMW-06D	Increment 2	S2	55	56	D	39.3	11.58	19.08	5603	9231	2.4	0.46	0.76
06-C2665	SHMW-06D	Increment 3	S3	56	57	D	40.88	7.85	13.28	5913	10002	3.6	0.46	0.78
06-C2666	SHMW-06D	Increment 4	S4 - S6	57	60	D	40.04	9.33	15.56	6016	10033	3.2	0.53	0.88
06-C2667	SHMW-06D	Increment 5	S7 - S9	60	63	D	41.07	6.8	11.54	6359	10791	4	1.27	2.16
06-C2668	SHMW-06D	Increment 6	S10 - S12	63	66	D	41.71	6.43	11.03	6325	10851	4.9	0.97	1.66
06-C2669	SHMW-06D	Increment 7	S13 - S14	66	68	D	41.38	8.91	15.2	6109	10422	4.1	2.11	3.6
06-C2670	SHMW-06D	Increment 8	S15	68	69	D	27.04	23.61	32.36	5776	7917	1.3	13.3	18.23
06-C2671	SHMW-06D	Increment 9	S16	69	69.5	D	32.83	9.7	14.44	7121	10601	4.4	2.21	3.29

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Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHMW-06D	Composite 1	Increment 2-7	55	68	< 0.6	1.65	0.16	< 0.12	2.8	0.68	4.44	9.56	0.098	0.165	56.21	1.36
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2.85	1.14	542.1	237.7	6.03	0.16	412.3	< 6.03	4.71	3.34	15.56	0.666

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.3

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHMW-10D

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2672	SHMW-10D	Increment 1	S1	37.4	38	D	34.85	25.84	39.66	4694	7206	1.7	3.84	5.89
06-C2673	SHMW-10D	Increment 2	S2	38	39	D	41.78	8.08	13.88	6077	10438	3.2	0.56	0.96
06-C2674	SHMW-10D	Increment 3	S3	39	40	D	36.2	15.89	24.91	5870	9200	1	0.91	1.43
06-C2675	SHMW-10D	Increment 4	S4 - S6	40	43	D	42.56	12.44	21.66	5339	9295	2.7	0.42	0.73
06-C2676	SHMW-10D	Increment 5	S7 - S9	43	46	D	43.03	8.16	14.32	5981	10499	3.3	0.93	1.63
06-C2677	SHMW-10D	Increment 6	S10 - S12	46	49	D	41.69	6.73	11.54	6210	10650	4	0.37	0.63
06-C2678	SHMW-10D	Increment 7	S13 - S15	50	52	D	42.25	8.32	14.41	5800	10043	3.5	0.65	1.13
06-C2679	SHMW-10D	Increment 8	S16	52	53	D	39.94	6.56	10.92	6442	10726	4.3	0.56	0.93
06-C2680	SHMW-10D	Increment 9	S17	53	54	D	38.96	7.89	12.93	6496	10643	3.2	0.48	0.79
06-C2681	SHMW-10D	Increment 10	S18	54	54.5	D	48.89	8.19	16.02	5224	10220	4.1	0.36	0.7

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Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHMW-10D	Composite 1	Increment 2-10	38	54.5	< 0.7	2.69	0.9	< 0.14	5.38	1.34	5.51	4.74	0.051	0.087	78.32	1.57
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					3.06	1.11	1084	229.6	7.18	0.16	447.1	< 7.04	7.99	4.76	22.68	1.774

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

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APPENDIX 2.3-19.4

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHMW-10 OB

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2754	SHMW-10-OB	Increment 1	S1	39	39.6	D	42.19	7.34	12.7	6230	10776	2.8	1.67	2.89
06-C2755	SHMW-10-OB	Increment 2	S2	39.6	40.6	D	41.81	7.88	13.54	6111	10502	2.6	0.44	0.76
06-C2756	SHMW-10-OB	Increment 3	S3	40.6	42.3	D	39.81	8.92	14.82	6223	10338	2.3	0.34	0.56
06-C2757	SHMW-10-OB	Increment 4	S4-S5	44.7	48.2	D	43.1	4.92	8.65	6320	11107	4.1	0.41	0.72
06-C2758	SHMW-10-OB	Increment 5	S6-S7	48.2	51.8	D	43.78	5.11	9.09	6196	11020	3.6	0.52	0.92
06-C2759	SHMW-10-OB	Increment 6	S8	51.8	53.6	D	41.15	9.74	16.55	6077	10326	2.3	1.22	2.07
06-C2760	SHMW-10-OB	Increment 7	S9	53.6	55	D	40.7	7.64	12.88	6426	10836	3.4	0.49	0.83
06-C2761	SHMW-10-OB	Increment 8	S10	55	56	D	43.52	4.85	8.59	6358	11256	6.1	0.52	0.92

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Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHMW-10-OB	Composite 1	Increment 1-18	39	56	< 0.54	2.99	0.83	< 0.11	3.51	1.01	4.96	7.25	0.037	0.064	59.72	1.18
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2.08	0.88	392.8	200.2	6.67	0.15	379.5	< 5.38	7.51	3.2	24.54	1.617

All metals measured on air dried coal unless otherwise noted

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APPENDIX 2.3-19.5

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHMW-12D

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2777	SHMW-12D	Increment 1	S1 - S4	35.5	39	E	41.36	10.01	17.07	5675	9678	6.6	0.79	1.35
06-C2778	SHMW-12D	Increment 2	S5 - S8	66	70	E1	40.83	9.44	15.95	6228	10526	7.4	1.68	2.84
06-C2779	SHMW-12D	Increment 3	S9	122	123	D	41.37	8.26	14.09	6143	10478	5.1	0.65	1.11
06-C2780	SHMW-12D	Increment 4	S10-S11	123	125	D	38.21	11.02	17.83	6131	9922	3.9	0.38	0.61

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APPENDIX 2.3-19.6

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-02C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2936	SHOB-2C	Increment 1	S1	28.6	29	D	50.23	8.83	17.74	4072	8181	1.7	0.32	0.64
06-C2937	SHOB-2C	Increment 2	S2	29	30	D	48.72	6.55	12.77	4709	9183	1.8	0.32	0.62
06-C2938	SHOB-2C	Increment 3	S3	30	31	D	43.56	7.99	14.16	5513	9769	1.5	0.43	0.76
06-C2939	SHOB-2C	Increment 4	S4-S5	31	34.4	D	40.45	9.33	15.67	6041	10144	1.1	0.39	0.65
06-C2940	SHOB-2C	Increment 5	S6 - S8	34.4	39.8	D	42.35	5.41	9.38	6386	11078	2.4	0.89	1.54
06-C2941	SHOB-2C	Increment 6	S9	39.8	41.6	D	45.11	3.87	7.05	6260	11405	4.3	0.52	0.95
06-C2942	SHOB-2C	Increment 7	S10	41.6	43	D	44.75	5.41	9.79	6055	10960	4.2	0.36	0.65
06-C2943	SHOB-2C	Increment 8	S11	43	43.8	D	42.12	6.5	11.23	6444	11133	4	1.49	2.57
06-C2944	SHOB-2C	Increment 9	S12	43.8	44.8	D	39.05	11.43	18.75	6230	10221	2.7	0.79	1.3
06-C2945	SHOB-2C	Increment 10	S13	44.8	45.4	D	40.18	11.17	18.67	6088	10177	3.2	3.9	6.52
06-C2946	SHOB-2C	Increment 11	S14	184.3	184.8	HT Butte	39.18	13.66	22.46	5787	9515	4.2	6.79	11.16
06-C2947	SHOB-2C	Increment 12	S15	184.8	185.5	HT Butte	43.67	5.25	9.32	6413	11385	11.1	1.09	1.94
06-C2948	SHOB-2C	Increment 13	S16-S17	185.5	188.4	HT Butte	42.94	7.5	13.14	6176	10823	8.8	1.68	2.94
06-C2949	SHOB-2C	Increment 14	S18-S19	188.4	191.8	HT Butte	40.31	14.71	24.64	5612	9403	3.7	1.83	3.07
06-C2950	SHOB-2C	Increment 15	S20-S21	191.8	195	HT Butte	43.34	6.34	11.19	6363	11230	10.1	0.9	1.59
06-C2951	SHOB-2C	Increment 16	S22	195	196.2	HT Butte	42.95	6.17	10.82	6314	11068	10.9	0.79	1.38
06-C2952	SHOB-2C	Increment 17	S23	196.2	197.2	HT Butte	43.8	5.67	10.09	6259	11136	11.9	0.79	1.41
06-C2953	SHOB-2C	Increment 18	S24	197.2	197.7	HT Butte	42.31	11.42	19.8	5706	9891	5.8	0.87	1.51

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Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-2C	Composite 1	Increment 1-9	28.6	44.8	< 0.51	1.83	0.55	< 0.1	3.49	1.9	7.23	4.9	0.069	0.122	85.48	1.33
SHOB-2C	Composite 2	Increment 12-17	184.8	197.2	< 0.65	13	0.40	< 0.13	2.52	< 0.65	3.63	1.68	0.061	0.105	41.26	2.08
Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
SHOB-2C	Composite 1	Increment 1-9	28.6	44.8	5.33	1.76	393.5	156	5.54	< 0.1	373.4	< 5.13	6.21	5.18	14.57	0.824
SHOB-2C	Composite 2	Increment 12-17	184.8	197.2	1.65	0.66	512.8	241.8	< 6.54	< 0.13	304.3	< 6.54	3.54	3.05	8.37	0.295

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APPENDIX 2.3-19.7

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-10C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2762	SHOB-10C	Increment 1	S1	63.1	63.7	D	42.52	11.36	19.76	5760	10021	1.9	1.67	2.91
06-C2763	SHOB-10C	Increment 2	S2	63.7	64.8	D	43.93	7.46	13.3	6170	11005	2.6	1.25	2.23
06-C2764	SHOB-10C	Increment 3	S3	64.8	66.4	D	40.95	9.51	16.1	6019	10193	2.2	0.36	0.61
06-C2765	SHOB-10C	Increment 4	S4-S5	66.4	70	D	41.58	8.38	14.34	6059	10371	2.8	0.46	0.79
06-C2766	SHOB-10C	Increment 5	S6	70	70.5	D	41.72	8.65	14.84	6097	10461	2.8	0.93	1.6
06-C2767	SHOB-10C	Increment 6	S7-S8	70.5	73.7	D	43.05	5.5	9.66	6257	10986	4.4	0.49	0.86
06-C2768	SHOB-10C	Increment 7	S9	73.7	74.6	D	28.9	45.09	63.42	2923	4111	1.3	1.94	2.73
06-C2769	SHOB-10C	Increment 8	S10-S11	74.6	78	D	42.82	6.14	10.74	6206	10854	4.1	0.5	0.87
06-C2770	SHOB-10C	Increment 9	S12	78	79.7	D	41.78	5.95	10.22	6511	11183	5.6	0.68	1.17
06-C2771	SHOB-10C	Increment 10	S13	79.7	80.9	D	41.56	8.92	15.26	5981	10235	5	0.47	0.8
06-C2772	SHOB-10C	Increment 11	S14	80.9	81.5	D	36.32	17.9	28.11	5724	8989	2.9	7.6	11.93

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wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-10C	Composite 1	Increment 2-10	63.7	80.9	< 0.92	1.47	0.43	< 0.18	6.45	1.35	6.89	4.8	0.072	0.121	95.29	1.96
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					4.08	1.7	527.9	188.7	< 9.16	< 0.18	424.2	< 9.16	10.41	7.79	16.49	1.014

All metals measured on air dried coal unless otherwise noted

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ppm = parts per million

APPENDIX 2.3-19.8

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-12C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2853	SHOB-12C	Increment 1	S1	79.7	80.4	D	37.49	18.88	30.2	5324	8518	2	4.83	7.73
06-C2854	SHOB-12C	Increment 2	S2	80.4	81.6	D	44.64	7.76	14.02	5938	10727	7.6	1.52	2.75
06-C2855	SHOB-12C	Increment 3	S3-S4	81.6	84.8	D	42.74	6.84	11.95	6206	10839	9.3	0.42	0.73
06-C2856	SHOB-12C	Increment 4	S5-S6	84.8	88	D	41.18	9.89	16.81	5956	10126	6.3	0.44	0.75
06-C2857	SHOB-12C	Increment 5	S7 - S9	88	93	D	43.28	5.86	10.33	6212	10952	10.4	0.52	0.92
06-C2858	SHOB-12C	Increment 6	S10	93	94.1	D	42.2	9.32	16.12	6048	10464	4.9	2.86	4.95
06-C2859	SHOB-12C	Increment 7	S11-S12	94.1	97.6	D	41.86	7.23	12.44	6259	10765	8.1	0.44	0.76
06-C2860	SHOB-12C	Increment 8	S13	97.6	98.8	D	41.48	8	13.67	6377	10898	8	0.75	1.28
06-C2861	SHOB-12C	Increment 9	S14	98.8	99.8	D	44.23	5.93	10.63	6133	10996	10.9	0.49	0.88
06-C2862	SHOB-12C	Increment 10	S15	99.8	100.4	D	43.61	10.05	17.82	5693	10096	7	0.62	1.1

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-12C	Composite 1	Increment 2-10	80.4	100.4	< 0.57	1.19	0.4	< 0.11	3.95	1.98	6.16	3.82	0.043	0.074	69.09	1.73
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					5.3	1.34	685.5	203.7	< 5.69	< 0.11	355.6	< 5.69	7.12	5.27	12.63	0.752

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million



APPENDIX 2.3-19.9

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-15C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2810	SHOB-15C	Increment 1	S1	13	13.6	E	29.86	51.6	73.57	1739	2479	1.9	0.4	0.57
06-C2811	SHOB-15C	Increment 2	S2	13.6	14.6	E	40.23	18.18	30.42	5083	8505	3.6	0.67	1.12
06-C2812	SHOB-15C	Increment 3	S3	14.6	16	E	42.36	7.69	13.34	6091	10568	6.5	0.49	0.85
06-C2813	SHOB-15C	Increment 4	S4	16	17	E	42.77	9.12	15.94	5945	10389	5.3	3.07	5.36
06-C2814	SHOB-15C	Increment 5	S5 - S7	17	20.5	E	46.09	7.11	13.19	5798	10755	8.9	1.68	3.12
06-C2815	SHOB-15C	Increment 6	S8	20.5	21.6	E	42.06	20.3	35.04	4592	7925	3	0.7	1.21
06-C2816	SHOB-15C	Increment 7	S9	21.6	22.2	E	41.72	20.11	34.51	4784	8209	2.9	0.81	1.39
06-C2817	SHOB-15C	Increment 8	S10	34.6	36.2	E1	42.86	11.23	19.65	5800	10150	5.6	2.08	3.64
06-C2818	SHOB-15C	Increment 9	S11	36.2	37.5	E1	37.07	32.18	51.14	3632	5772	1.8	0.73	1.16
06-C2819	SHOB-15C	Increment 10	S13	86	86.5	D	41.6	5.24	8.97	6561	11235	5.2	0.44	0.75
06-C2820	SHOB-15C	Increment 11	S14	86.5	87.5	D	42.34	5.27	9.14	6224	10795	5.3	0.4	0.69
06-C2821	SHOB-15C	Increment 12	S15	87.5	88.6	D	41.31	8.1	13.8	6154	10486	2.8	0.28	0.48
06-C2822	SHOB-15C	Increment 13	S16 - S18	88.6	93.2	D	42.46	8.9	15.47	5900	10254	3.2	0.55	0.96
06-C2823	SHOB-15C	Increment 14	S19	93.2	93.8	D	35.31	16.27	25.15	5810	8982	0.6	8.79	13.59
06-C2824	SHOB-15C	Increment 15	S20-S21	93.8	97.4	D	43.14	5.92	10.41	6374	11210	3.3	1.11	1.95
06-C2825	SHOB-15C	Increment 16	S22-S23	97.4	100.5	D	43.11	6.39	11.23	6185	10872	6.4	0.53	0.93
06-C2826	SHOB-15C	Increment 17	S24	100.5	101	D	26.83	32.37	44.24	4752	6494	1.2	15.82	21.62
06-C2827	SHOB-15C	Increment 18	S25	101	102	D	42.14	7.08	12.24	6388	11041	5.8	0.47	0.81
06-C2828	SHOB-15C	Increment 19	S26	102	102.7	D	42.79	5.95	10.4	6370	11135	6.9	0.85	1.49

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-15C	Composite 1	Increment 3-5	14.6	20.5	< 0.61	13.49	0.26	< 0.12	2.47	0.63	3.99	1.96	0.082	0.147	88.2	2.83
SHOB-15C	Composite 2	Increment 10-19	86	102.7	< 0.71	4.65	0.55	< 0.14	4.22	1.14	6.25	4.3	0.112	0.191	68.73	1.83

  

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
SHOB-15C	Composite 1	Increment 3-5	14.6	20.5	1.54	< 0.61	441.3	273	< 6.07	< 0.12	358.5	< 6.07	3.22	1.93	9.58	0.499
SHOB-15C	Composite 2	Increment 10-19	86	102.7	3.15	1.00	765.8	220.6	< 7.07	< 0.14	431.2	< 7.07	7.50	3.65	16.26	0.87

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.10

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-21C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2863	SHOB-21C	Increment 1	S1	53.9	54.5	D	33.41	25.83	38.79	4865	7307	2.3	9.19	13.8
06-C2864	SHOB-21C	Increment 2	S2	54.5	55.5	D	40.7	10.66	17.98	6048	10199	4.5	4.82	8.13
06-C2865	SHOB-21C	Increment 3	S3	55.5	56.9	D	41.32	8.48	14.45	6161	10500	7.7	0.56	0.95
06-C2866	SHOB-21C	Increment 4	S4 - S6	56.9	62.1	D	41.44	7.61	13	6163	10525	8.4	0.5	0.85
06-C2867	SHOB-21C	Increment 5	S7	62.1	63.9	D	41.77	8.48	14.56	6212	10668	6.7	2.09	3.59
06-C2868	SHOB-21C	Increment 6	S8 - S9	63.9	67.5	D	44.11	5.15	9.21	6242	11169	10.4	0.47	0.84
06-C2869	SHOB-21C	Increment 7	S10 - S12	67.5	72	D	42.05	8.38	14.46	6185	10673	6.7	1.4	2.42
06-C2870	SHOB-21C	Increment 8	S13	72	73.3	D	41.11	8.21	13.94	6302	10701	7.1	0.6	1.02
06-C2871	SHOB-21C	Increment 9	S14	73.3	74.3	D	44.32	7.97	14.31	5800	10416	8	0.74	1.33
06-C2872	SHOB-21C	Increment 10	S15	74.3	74.7	D	28.39	56	78.2	1258	1757	0.1	0.13	0.18
06-C2873	SHOB-21C	Increment 11	S16	216.5	217.3	HT Butte	34.1	29.32	44.49	4426	6717	1.3	3.65	5.54
06-C2874	SHOB-21C	Increment 12	S17	217.3	218.3	HT Butte	42.1	3.92	6.77	6602	11403	15.7	0.38	0.66
06-C2875	SHOB-21C	Increment 13	S18 - S20	218.3	223	HT Butte	41.98	5.8	10	6457	11128	10.8	0.76	1.31
06-C2876	SHOB-21C	Increment 14	S21	223	223.6	HT Butte	38.06	7.66	12.37	6664	10758	6.3	4.47	7.22
06-C2877	SHOB-21C	Increment 15	S22 - 23	223.6	226.6	HT Butte	42.69	5.01	8.74	6601	11517	11.8	0.81	1.41
06-C2878	SHOB-21C	Increment 16	S24	226.6	228	HT Butte	40.34	6.73	11.28	6786	11374	10.3	1.26	2.11
06-C2879	SHOB-21C	Increment 17	S25	228	229.5	HT Butte	41.88	5.36	9.22	6512	11205	13.2	0.69	1.19
06-C2880	SHOB-21C	Increment 18	S26	229.5	230	HT Butte	42.37	5.36	9.3	6440	11175	13.2	0.65	1.13

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-21C	Composite 1	Increment 2-9	54.5	74.3	< 0.65	2.67	0.54	< 0.13	4.74	1.10	6.46	3.89	0.098	0.168	66.65	2.06
SHOB-21C	Composite 2	Increment 12-18	217.3	230	0.44	10.35	0.46	< 0.08	1.60	0.62	2.62	1.79	0.055	0.094	33.43	1.71

  

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
SHOB-21C	Composite 1	Increment 2-9	54.5	74.3	2.14	1.32	664.6	281.5	< 6.55	< 0.13	417.1	< 6.55	7.53	2.65	15.71	0.991
SHOB-21C	Composite 2	Increment 12-18	217.3	230	1.33	0.81	479.4	234.0	< 4.18	0.11	334.6	< 4.18	3.03	1.91	11.28	0.383

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.11

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-25C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2981	SHOB-25C	Increment 1	S1	60	60.5	D	47.07	15.51	29.3	3737	7060	1.4	1.54	2.91
06-C2982	SHOB-25C	Increment 2	S2	60.5	61.5	D	47.24	10.45	19.81	4361	8266	2.3	1.02	1.93
06-C2983	SHOB-25C	Increment 3	S3 - S4	61.5	64.8	D	44.82	11	19.93	4639	8406	2.2	1.42	2.57
06-C2984	SHOB-25C	Increment 4	S5 - S6	64.8	68.4	D	43.98	6.79	12.12	5695	10166	3.2	0.86	1.54
06-C2985	SHOB-25C	Increment 5	S7 - S8	68.4	71.4	D	42.27	7.49	12.97	6221	10776	3.2	2.36	4.09
06-C2986	SHOB-25C	Increment 6	S9	71.4	73	D	43.71	5.95	10.57	6116	10866	4.6	0.44	0.78
06-C2987	SHOB-25C	Increment 7	S10	73	74	D	40.31	8.33	13.96	6401	10723	3.2	0.44	0.74
06-C2988	SHOB-25C	Increment 8	S11	74	75	D	37.55	17.09	27.37	5816	9313	1.5	5.73	9.18
06-C2989	SHOB-25C	Increment 9	S12	75	75.5	D	41.19	14.14	24.04	5405	9191	2.3	0.37	0.63

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-25C	Composite 1	Increment 2-7	60.5	74	< 0.55	1.00	0.27	< 0.11	2.46	1.58	4.8	4.55	0.06	0.106	90.72	1.47
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					3.85	1.22	401.1	266.1	< 5.45	0.12	408.6	< 5.45	4.51	2.86	13.52	0.739

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.12

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-30C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2960	SHOB-30C	Increment 1	S1	53.15	53.7	D	39.6	18.74	31.03	5128	8490	2.4	3.96	6.56
06-C2961	SHOB-30C	Increment 2	S2	53.7	54.7	D	43.01	4.14	7.26	6491	11389	9	0.3	0.53
06-C2962	SHOB-30C	Increment 3	S3 - S4	54.7	58.2	D	41.97	8.33	14.35	6037	10404	4.8	0.35	0.6
06-C2963	SHOB-30C	Increment 4	S5 - S6	58.2	61.2	D	39.62	16.22	26.86	5371	8896	2.3	0.47	0.78
06-C2964	SHOB-30C	Increment 5	S7	61.2	62.1	D	38.9	18.71	30.62	5191	8496	1.9	0.53	0.87
06-C2965	SHOB-30C	Increment 6	S8 - S9	62.1	65.6	D	41.65	12.93	22.16	5627	9643	3.2	1.43	2.45
06-C2966	SHOB-30C	Increment 7	S10 - S11	65.6	69	D	42.53	9.59	16.69	5954	10361	3.6	1.09	1.9
06-C2967	SHOB-30C	Increment 8	S12 -S13	69	71.8	D	41.52	10.52	17.99	5931	10142	3.8	1.34	2.29
06-C2968	SHOB-30C	Increment 9	S14	71.8	73	D	42.42	4.42	7.68	6631	11516	7.8	0.43	0.75
06-C2969	SHOB-30C	Increment 10	S15	73	73.9	D	39.93	7.74	12.88	6577	10949	4.4	2.75	4.58
06-C2970	SHOB-30C	Increment 11	S16	73.9	74.45	D	38.75	11.61	18.96	6176	10083	4.4	3.89	6.35

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-30C	Composite 1	Increment 2-10	53.7	73.9	< 0.83	6.57	0.63	0.17	3.99	0.98	7.80	7.03	0.108	0.185	51.24	1.83
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2.59	1.70	445.9	196.5	< 8.33	0.18	393.4	< 8.33	8.11	27.57	36.30	1.032

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.13

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-34C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2971	SHOB-34C	Increment 1	S1	55.4	56	D	32.65	24.36	36.17	5096	7566	0.9	6.56	9.74
06-C2972	SHOB-34C	Increment 2	S2	56	57	D	40.42	5.47	9.18	6692	11233	3	0.56	0.94
06-C2973	SHOB-34C	Increment 3	S3	57	58	D	41.43	6.82	11.64	6311	10775	2	0.5	0.85
06-C2974	SHOB-34C	Increment 4	S4 - S5	58	61.6	D	41.32	9.2	15.68	5985	10199	1.8	0.45	0.77
06-C2975	SHOB-34C	Increment 5	S6 - S7	61.6	65.2	D	40.77	11.31	19.1	5841	9862	1.5	1.74	2.94
06-C2976	SHOB-34C	Increment 6	S8 - S10	65.2	69	D	43.36	5.78	10.2	6224	10989	2.8	0.51	0.9
06-C2977	SHOB-34C	Increment 7	S11 - S12	69	72	D	43.13	8.03	14.12	6010	10568	2.7	1.21	2.13
06-C2978	SHOB-34C	Increment 8	S13	72	73	D	39.65	9.94	16.47	6215	10299	3	0.42	0.7
06-C2979	SHOB-34C	Increment 9	S14	73	74	D	39.15	9.99	16.42	6332	10407	3	0.38	0.62
06-C2980	SHOB-34C	Increment 10	S15	74	74.6	D	43.3	5.87	10.35	6205	10943	5.5	0.44	0.78

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-34C	Composite 1	Increment 2-10	56	74.6	< 0.6	2.24	0.78	< 0.12	4.49	1.05	5.81	5.78	0.085	0.145	53.24	1.67
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2.60	1.55	455.2	190.1	9.27	0.12	421.9	< 6.02	6.92	2.66	22.74	1.278

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.14

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-41C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2781	SHOB-41C	Increment 1	S1	45.2	45.7	D	20.89	74.45	94.11	< 101	< 127	1.8	0.7	0.88
06-C2782	SHOB-41C	Increment 2	S2	45.7	46.3	D	37.31	26.71	42.61	4261	6796	1.7	3.32	5.3
06-C2783	SHOB-41C	Increment 3	S3	46.3	47.3	D	42.69	7.21	12.58	6048	10553	6.4	0.59	1.03
06-C2784	SHOB-41C	Increment 4	S4 - S5	47.3	49.9	D	41.76	9.21	15.81	6005	10310	4.3	0.52	0.89
06-C2785	SHOB-41C	Increment 5	S6	49.9	50.6	D	36.15	18.82	29.48	5560	8708	1.2	7.71	12.08
06-C2786	SHOB-41C	Increment 6	S7 - S8	50.6	54	D	41.26	12	20.43	5836	9935	1.5	2.2	3.75
06-C2787	SHOB-41C	Increment 7	S9 - S11	54	59.2	D	43.5	5.82	10.3	6251	11064	2.9	0.69	1.22
06-C2788	SHOB-41C	Increment 8	S12	59.2	60	D	41.09	10.78	18.3	5976	10144	1.8	3.14	5.33
06-C2789	SHOB-41C	Increment 9	S13	60	61.5	D	41.96	6.58	11.34	6467	11143	4	0.58	1
06-C2790	SHOB-41C	Increment 10	S14	61.5	62.5	D	41.85	7.26	12.48	6437	11069	4.4	0.59	1.01
06-C2791	SHOB-41C	Increment 11	S15	62.5	63	D	42.51	12.02	20.91	5530	9618	3.3	0.42	0.73
06-C2792	SHOB-41C	Increment 12	S16	63	63.5	D	19.63	75.86	94.39	< 101	< 125	0.5	0.33	0.41

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-41C	Composite 1	Increment 3-10	46.3	62.5	< 0.74	3.06	0.49	< 0.15	2.81	1.47	5.07	4.71	0.163	0.28	70.89	2.71
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					4.69	1.07	487.6	236.4	< 7.44	< 0.15	384.2	< 7.44	4.64	5.59	14.57	1.196

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.15

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-44C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2744	SHOB-44C	Increment 1	S1	46.3	46.9	D	20.95	69.57	88.01	812	1027	2.5	3.88	4.91
06-C2745	SHOB-44C	Increment 2	S2	46.9	47.5	D	38.35	16.14	26.18	5621	9118	2.1	1.45	2.35
06-C2746	SHOB-44C	Increment 3	S3	47.5	48.4	D	42.4	9.85	17.1	5927	10291	2.2	0.85	1.48
06-C2747	SHOB-44C	Increment 4	S4 - S5	48.4	52.2	D	41.47	9.71	16.59	5956	10176	3.6	0.52	0.89
06-C2748	SHOB-44C	Increment 5	S6 - S7	52.2	55	D	44.48	6.81	12.27	6017	10838	7.4	1.31	2.36
06-C2749	SHOB-44C	Increment 6	S8 - S9	55	58.3	D	44.97	4.64	8.43	6188	11246	5.1	0.38	0.69
06-C2750	SHOB-44C	Increment 7	S10	58.3	59.4	D	43.25	7.98	14.06	6109	10765	4.4	2.15	3.79
06-C2751	SHOB-44C	Increment 8	S11	59.4	61.1	D	43.85	6.32	11.26	6028	10736	5.2	0.35	0.62
06-C2752	SHOB-44C	Increment 9	S12	61.1	62.7	D	43.62	6.28	11.14	6264	11110	6.1	0.42	0.74
06-C2753	SHOB-44C	Increment 10	S13	62.7	63.3	D	45.84	8.52	15.73	5726	10572	4.9	1.49	2.75

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-44C	Composite 1	Increment 3-10	47.5	63.3	< 0.6	2.43	0.63	< 0.12	3.74	1.59	6.16	4.98	0.058	0.102	78.67	1.65
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2.84	1.50	576.9	210.8	7.95	< 0.12	359	< 6.02	7.28	3.46	19.52	1.033

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

APPENDIX 2.3-19.16

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-47C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
06-C2793	SHOB-47C	Increment 1	S1	40.25	40.9	D	40.64	10.61	17.87	5897	9934	3.2	0.39	0.66
06-C2794	SHOB-47C	Increment 2	S2	40.9	41.9	D	42.34	8.72	15.12	5917	10261	3.6	0.28	0.49
06-C2795	SHOB-47C	Increment 3	S3	41.9	43.5	D	43.04	10.09	17.71	5449	9566	3	0.27	0.47
06-C2796	SHOB-47C	Increment 4	S4 - S6	43.5	47.3	D	43.36	7.64	13.49	5857	10341	4	0.53	0.94
06-C2797	SHOB-47C	Increment 5	S7	47.3	47.9	D	42.48	4.45	7.74	6595	11466	6	0.52	0.9
06-C2798	SHOB-47C	Increment 6	S8 - S9	47.9	50.7	D	42.92	9.33	16.35	5897	10331	3.2	2.06	3.61
06-C2799	SHOB-47C	Increment 7	S10	50.7	51.6	D	42.09	9.5	16.4	5983	10332	3	2.98	5.15
06-C2800	SHOB-47C	Increment 8	S11 - S12	51.6	53.8	D	44.18	5.68	10.18	6165	11044	4.4	0.37	0.66
06-C2801	SHOB-47C	Increment 9	S13	53.8	54.8	D	39.69	12.33	20.44	5971	9900	2.7	0.38	0.63
06-C2802	SHOB-47C	Increment 10	S14	54.8	55.3	D	42.24	6.71	11.62	6361	11013	5.7	0.58	1
06-C2803	SHOB-47C	Increment 11	S15	184.95	185.4	HT Butte	38.57	14.74	23.99	5832	9494	3.7	4.81	7.83
06-C2804	SHOB-47C	Increment 12	S16	185.4	186.4	HT Butte	41.83	8.95	15.39	6165	10598	6.4	0.52	0.89
06-C2805	SHOB-47C	Increment 13	S17 - S18	186.4	190	HT Butte	43.66	7.58	13.45	6152	10920	8.5	1.43	2.54
06-C2806	SHOB-47C	Increment 14	S19 - S20	190	193.5	HT Butte	44.23	4.9	8.79	6358	11400	13.3	0.67	1.2
06-C2807	SHOB-47C	Increment 15	S21 - S22	193.5	197	HT Butte	41.87	5.56	9.56	6586	11330	11.9	0.43	0.74
06-C2808	SHOB-47C	Increment 16	S23	197	198	HT Butte	42.57	5.12	8.92	6557	11418	12.3	0.56	0.98
06-C2809	SHOB-47C	Increment 17	S24	198	198.6	HT Butte	42.27	6.1	10.57	6419	11119	10.1	0.5	0.87

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-47C	Composite 1	Increment 2-10	40.9	55.3	< 0.71	3.94	0.77	< 0.14	4.46	1.06	7.37	7.17	0.051	0.088	46.01	2.07
SHOB-47C	Composite 2	Increment 12-17	185.4	198.6	< 0.47	6.79	0.54	0.10	2.35	0.77	4.26	4.75	0.044	0.077	30.78	1.14

  

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
SHOB-47C	Composite 1	Increment 2-10	40.9	55.3	2.65	1.32	418.2	210.0	10.07	< 0.14	324.4	< 7.09	7.36	3.31	23.98	1.394
SHOB-47C	Composite 2	Increment 12-17	185.4	198.6	2.41	0.80	524.7	230.6	< 4.74	0.13	293.7	< 4.74	4.64	3.18	10.34	0.546

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million



APPENDIX 2.3-19.17

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-101C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4209	SHOB-101C	Increment 1	S1	5	7	E	54.82	18.72	41.43	2272	5028	1.67	1.13	2.5
07-C4210	SHOB-101C	Increment 2	S2	7	8	E	54.29	12.95	28.33	2930	6411	3.58	1.38	3.02
07-C4211	SHOB-101C	Increment 3	S3	8	9	E	49.05	9.1	17.86	4158	8161	2.75	0.83	1.63
07-C4212	SHOB-101C	Increment 4	S4	9	10	E	58.97	5.87	14.31	3337	8134	5.21	0.37	0.9
07-C4213	SHOB-101C	Increment 5	S5	10	11	E	41.9	41.53	71.48	1435	2469	0.68	0.36	0.62
07-C4214	SHOB-101C	Increment 6	S6	25.8	27	E1	41.91	10.58	18.21	5848	10067	1.38	4.23	7.28
07-C4215	SHOB-101C	Increment 7	S7	27	27.9	E1	44.84	4.26	7.72	6444	11682	3.12	0.47	0.85
07-C4216	SHOB-101C	Increment 8	S8	27.9	28.3	E1	27.99	55.04	76.43	1744	2422	0.29	0.23	0.32
07-C4217	SHOB-101C	Increment 9	S9	28.3	29.3	E1	40.79	15.05	25.42	5445	9196	0.84	4.29	7.25
07-C4218	SHOB-101C	Increment 10	S10	74	75	D	36.72	29.49	46.6	4095	6471	3.02	3.89	6.15
07-C4219	SHOB-101C	Increment 11	S11-S12	75	79	D	43.09	10.33	18.15	5819	10226	7.02	0.97	1.7
07-C4220	SHOB-101C	Increment 12	S13-S14	79	83	D	43.54	7.08	12.54	5996	10620	9.58	0.36	0.64
07-C4221	SHOB-101C	Increment 13	S15-S16	83	86	D	43.88	5.79	10.32	6174	11001	11	0.48	0.86
07-C4222	SHOB-101C	Increment 14	S17-S18	86	90	D	43.45	7.67	13.56	6028	10660	8.01	0.81	1.43
07-C4223	SHOB-101C	Increment 15	S19	90	91.5	D	40.62	8.27	13.93	6156	10367	4.45	2.13	3.59

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-101C	Composite 1	Increment 6-7	25.8	27.9	3.12	33.69	1.82	< 0.13	7.88	1.42	8.44	2.52	0.070	0.123	152.5	6.30
SHOB-101C	Composite 2	Increment 11-15	75	91.5	NA	NA	NA	NA	NA	NA	NA	NA	0.117	0.205	NA	NA

  

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
SHOB-101C	Composite 1	Increment 6-7	25.8	27.9	4.64	< 0.67	278.7	346.9	< 13.5	< 0.13	255.8	< 6.75	10.87	7.82	< 13.5	4.016
SHOB-101C	Composite 2	Increment 11-15	75	91.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.18

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-103C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4224	SHOB-103C	Increment 1	S1	9.1	10	E	45.86	31.49	58.16	1967	3634	1.37	1.11	2.05
07-C4225	SHOB-103C	Increment 2	S2	10	12	E	54.57	15.17	33.39	2770	6098	3.14	1.24	2.73
07-C4226	SHOB-103C	Increment 3	S3	12	13	E	45.3	9.98	18.24	4361	7973	4.97	1.4	2.56
07-C4227	SHOB-103C	Increment 4	S4	13	13.6	E	44.78	33.24	60.2	1597	2891	1.67	1.83	3.31
07-C4228	SHOB-103C	Increment 5	S5	28	29	E1	40.38	12.42	20.83	5753	9649	3.74	1.68	2.82
07-C4229	SHOB-103C	Increment 6	S6	29	30	E1	38.88	10.58	17.31	6629	10847	3.67	2.47	4.04
07-C4230	SHOB-103C	Increment 7	S7	30	31	E1	36.7	25.95	41	4442	7018	6.61	1.1	1.74
07-C4231	SHOB-103C	Increment 8	S8	76	78	D	42.61	9.22	16.07	5989	10435	7	0.84	1.46
07-C4232	SHOB-103C	Increment 9	S9-S10	78	81.7	D	39.26	12.87	21.19	5926	9756	5.12	1.11	1.83
07-C4233	SHOB-103C	Increment 10	S11-S12	81.7	85	D	42.98	7.6	13.33	6068	10642	8.84	1.12	1.96
07-C4234	SHOB-103C	Increment 11	S13	85	87	D	41.9	6.17	10.62	6412	11035	10.9	0.65	1.12
07-C4235	SHOB-103C	Increment 12	S14-S15	87	91	D	41.82	6.28	10.79	6385	10974	10.3	0.41	0.7
07-C4236	SHOB-103C	Increment 13	S16	91	92.5	D	38.44	11.6	18.84	6307	10246	5.13	0.84	1.36

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-103C	Composite 1	Increment 5-6	28	30	3.85	30.53	1.91	0.22	13.75	3.74	20.97	9.49	0.155	0.258	126.8	9.92
SHOB-103C	Composite 2	Increment 8-13	76	92.5	NA	NA	NA	NA	NA	NA	NA	NA	0.076	0.129	NA	NA

  

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
SHOB-103C	Composite 1	Increment 5-6	28	30	16.51	< 0.95	873.1	324.5	< 18.92	< 0.19	368.0	< 9.46	25.49	16.36	< 18.92	4.632
SHOB-103C	Composite 2	Increment 8-13	76	92.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.19

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-104C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4237	SHOB-104C	Increment 1	S1	10.3	11	E	34.44	48.25	73.6	1532	2336	1.22	0.75	1.14
07-C4238	SHOB-104C	Increment 2	S2	11	13	E	49.01	11.59	22.73	3847	7544	3.97	1.47	2.88
07-C4239	SHOB-104C	Increment 3	S3	13	15	E	46.58	7.98	14.94	4556	8528	5.36	0.95	1.78
07-C4240	SHOB-104C	Increment 4	S4	15	17	E	47.56	10.08	19.22	4190	7991	4.55	1.38	2.63
07-C4241	SHOB-104C	Increment 5	S5	17	18.2	E	42.06	21.65	37.37	3622	6251	2.1	1.41	2.43
07-C4242	SHOB-104C	Increment 6	S6	29.4	30	E1	43.92	10.68	19.04	5576	9944	3.58	3.75	6.69
07-C4243	SHOB-104C	Increment 7	S7	30	31	E1	46.87	6.04	11.37	5864	11038	5.73	1.2	2.26
07-C4244	SHOB-104C	Increment 8	S8	31	32	E1	31.39	45.68	66.58	2702	3938	1.1	0.85	1.24
07-C4245	SHOB-104C	Increment 9	S9	32	32.6	E1	37.14	30.35	48.28	3908	6217	1.45	1.47	2.34
07-C4246	SHOB-104C	Increment 10	S10	82.5	83	D	41.02	11.78	19.97	5918	10035	3.12	3.28	5.56
07-C4247	SHOB-104C	Increment 11	S11	83	85	D	41.05	10.95	18.58	5969	10125	3.27	1.05	1.78
07-C4248	SHOB-104C	Increment 12	S12-S13	85	88.6	D	41.17	11.86	20.16	5607	9531	3.14	0.38	0.65
07-C4249	SHOB-104C	Increment 13	S14-S15	88.6	92	D	43.84	5.89	10.49	6057	10785	5.75	0.44	0.78
07-C4250	SHOB-104C	Increment 14	S16	92	94	D	42.74	5.1	8.91	6395	11169	6.43	0.45	0.79
07-C4251	SHOB-104C	Increment 15	S17	94	96	D	43.3	6.5	11.46	6212	10956	5.72	0.83	1.46
07-C4252	SHOB-104C	Increment 16	S18-S19	96	98.5	D	41.21	7.11	12.09	6377	10848	5.83	0.58	0.99
07-C4253	SHOB-104C	Increment 17	S20	98.5	100.2	D	36.61	8.18	12.9	6937	10944	6.78	1.16	1.83

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-104C	Composite 1	Increment 2-4	11	17	1.00	12.43	0.99	< 0.18	4.54	1.10	5.60	4.25	0.066	0.126	127.2	4.84
SHOB-104C	Composite 2	Increment 10-17	82.5	100.2	NA	NA	NA	NA	NA	NA	NA	NA	0.062	0.106	NA	NA

  

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
SHOB-104C	Composite 1	Increment 2-4	11	17	5.97	1.45	1084	201.1	< 17.79	0.81	633.5	< 8.9	7.14	10.49	< 17.79	1.301
SHOB-104C	Composite 2	Increment 10-17	82.5	100.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.20

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-106C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4254	SHOB-106C	Increment 1	S1	23.5	24	E1	42.39	7.26	12.6	6455	11204	4.64	0.57	0.99
07-C4255	SHOB-106C	Increment 2	S2	24	24.8	E1	38.51	14.51	23.6	5841	9499	1.73	6.71	10.91
07-C4256	SHOB-106C	Increment 3	S3	24.8	25.3	E1	44.89	7.54	13.68	5918	10739	3.95	1.6	2.9
07-C4257	SHOB-106C	Increment 4	S4	73.9	75	D	40.3	14.29	23.94	5584	9353	4.11	1.05	1.76
07-C4258	SHOB-106C	Increment 5	S5	75	77	D	41.92	8.01	13.79	6190	10658	7.95	0.57	0.98
07-C4259	SHOB-106C	Increment 6	S6-S7	77	81	D	42.21	8.86	15.33	6034	10441	7.94	0.67	1.16
07-C4260	SHOB-106C	Increment 7	S8-S9	81	85	D	44.27	6.33	11.36	6086	10920	7.79	0.62	1.11
07-C4261	SHOB-106C	Increment 8	S10-S11	85	88	D	43.72	6	10.66	6228	11066	10.8	0.72	1.28
07-C4262	SHOB-106C	Increment 9	S12	88	90	D	42.45	6.06	10.53	6304	10953	10.3	0.58	1.01
07-C4263	SHOB-106C	Increment 10	S13	90	91.9	D	42	7.73	13.33	6307	10874	8.37	0.63	1.09

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-106C	Composite 1	Increment 4-10	73.9	91.9	NA	NA	NA	NA	NA	NA	NA	NA	0.061	1.06	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.21

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-107C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4264	SHOB-107C	Increment 1	S1	15.6	16.2	E	38.56	47.81	77.82	934	1521	1.11	0.56	0.91
07-C4265	SHOB-107C	Increment 2	S2	16.2	16.5	E	21.75	71.5	91.37	385	492	0.93	0.32	0.41
07-C4266	SHOB-107C	Increment 3	S3	16.5	18.5	E	49.5	10.43	20.65	3935	7792	2.91	1.19	2.36
07-C4267	SHOB-107C	Increment 4	S4	18.5	20	E	52.28	13.45	28.19	3132	6563	2.56	1.25	2.62
07-C4268	SHOB-107C	Increment 5	S5	20	21	E	55.51	5.05	11.35	3821	8589	4.99	0.37	0.83
07-C4269	SHOB-107C	Increment 6	S6	47.4	48.5	E1	39.59	16.2	26.82	5351	8858	3.15	5.5	9.1
07-C4270	SHOB-107C	Increment 7	S7	48.5	50	E1	45.99	4.92	9.11	6145	11378	10.6	0.6	1.11
07-C4271	SHOB-107C	Increment 8	S8	50	50.7	E1	26.94	59.97	82.08	1303	1784	0.86	0.24	0.33
07-C4272	SHOB-107C	Increment 9	S9	50.7	51.6	E1	44.04	12.46	22.27	5215	9318	5.1	0.76	1.36
07-C4273	SHOB-107C	Increment 10	S10	51.6	52.7	E1	40.91	23.52	39.8	4367	7390	2.59	0.92	1.56
07-C4274	SHOB-107C	Increment 11	S11	85.3	86	D	34.94	26.06	40.06	4622	7105	2.48	5.03	7.73
07-C4275	SHOB-107C	Increment 12	S12	86	88	D	42.52	9.05	15.74	5938	10331	7.63	1.31	2.28
07-C4276	SHOB-107C	Increment 13	S13	88	90	D	41.96	9.36	16.13	5945	10244	7.59	0.4	0.69
07-C4277	SHOB-107C	Increment 14	S14-S15	90	94	D	42.18	7.46	12.9	6138	10616	9.7	0.44	0.76
07-C4278	SHOB-107C	Increment 15	S16-S17	94	98	D	44.48	5.66	10.19	6066	10926	11.3	0.53	0.95
07-C4279	SHOB-107C	Increment 16	S18-S19	98	101.3	D	44.38	6.07	10.91	6091	10951	10.8	0.61	1.1
07-C4280	SHOB-107C	Increment 17	S20	101.3	103	D	39.45	10.85	17.92	6154	10164	5.2	5.48	9.05
07-C4281	SHOB-107C	Increment 18	S21-S22	103	106	D	43.62	7.54	13.37	6154	10916	9.07	0.93	1.65
07-C4282	SHOB-107C	Increment 19	S23	106	107	D	41.41	15.88	27.1	5211	8894	4.55	1.32	2.25

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-107C	Composite 1	Increment 12-19	86	107	NA	NA	NA	NA	NA	NA	NA	NA	0.059	0.103	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.22

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-108C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4283	SHOB-108C	Increment 1	S1	66	67	D	42.68	9.17	16	6030	10520	6.69	0.93	1.62
07-C4284	SHOB-108C	Increment 2	S2	67	69	D	44.38	6.36	11.43	6143	11045	10	0.75	1.35
07-C4285	SHOB-108C	Increment 3	S3-S4	69	73	D	43.05	7.21	12.66	6093	10699	9.52	0.4	0.7
07-C4286	SHOB-108C	Increment 4	S5-S7	73	79	D	44.53	5.67	10.22	6116	11026	10.8	0.69	1.24
07-C4287	SHOB-108C	Increment 5	S8	79	81	D	40.92	7.98	13.51	6415	10858	6.9	1.91	3.23
07-C4288	SHOB-108C	Increment 6	S9-S10	81	85	D	42.04	7.52	12.97	6251	10786	7.92	0.8	1.38
07-C4289	SHOB-108C	Increment 7	S11	85	86.2	D	45.28	7.02	12.83	5956	10885	9.15	0.64	1.17

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-108C	Composite 1	Increment 1-6	66	85	NA	NA	NA	NA	NA	NA	NA	NA	0.102	0.180	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.23

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-114C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4290	SHOB-114C	Increment 1	S1	49.5	51	D	47.55	10.82	20.63	5292	10090	1.81	0.99	1.89
07-C4291	SHOB-114C	Increment 2	S2	51	53	D	46.63	9.18	17.2	4669	8749	2.16	0.48	0.9
07-C4292	SHOB-114C	Increment 3	S3	53	54	D	49.25	7.51	14.8	4509	8885	3.34	0.29	0.57
07-C4293	SHOB-114C	Increment 4	S4-S5	54	58	D	43.33	4.72	8.33	6365	11231	4.17	0.41	0.72
07-C4294	SHOB-114C	Increment 5	S6-S7	58	61	D	42.12	7.09	12.25	6239	10779	3.31	0.51	0.88
07-C4295	SHOB-114C	Increment 6	S8	61	62.3	D	41.55	7.58	12.97	6341	10849	3.34	0.45	0.77

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-114C	Composite 1	Increment 1-6	49.5	62.3	NA	NA	NA	NA	NA	NA	NA	NA	0.024	0.043	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.24

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-116C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4296	SHOB-116C	Increment 1	S1	39.1	40.2	D	40.52	15.88	26.7	5002	8410	0.52	0.38	0.64
07-C4297	SHOB-116C	Increment 2	S2-S3	40.2	44	D	43.23	6.31	11.12	6277	11056	1.15	1.03	1.81
07-C4298	SHOB-116C	Increment 3	S4-S5	44	47.5	D	42.36	7.98	13.84	6244	10833	1.35	2.04	3.54
07-C4299	SHOB-116C	Increment 4	S6	47.5	49.5	D	41.58	8.64	14.79	5911	10118	2.33	2.06	3.53
07-C4300	SHOB-116C	Increment 5	S7	49.5	51.5	D	42.51	9.08	15.79	5630	9794	2.76	0.64	1.11

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-116C	Composite 1	Increment 2-5	40.2	51.5	NA	NA	NA	NA	NA	NA	NA	NA	0.152	0.264	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed



APPENDIX 2.3-19.25

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-121C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4301	SHOB-121C	Increment 1	S1	50	51	D	39.93	14.54	24.21	5625	9364	0.78	5.17	8.61
07-C4302	SHOB-121C	Increment 2	S2-S4	51	56.5	D	41.24	10.15	17.27	5800	9870	0.7	0.33	0.56
07-C4303	SHOB-121C	Increment 3	S5-S7	56.5	62	D	43.04	5.59	9.81	6347	11143	1.35	0.56	0.98
07-C4304	SHOB-121C	Increment 4	S8-S9	62	66	D	42.16	7.57	13.09	6296	10886	1.03	1.84	3.18
07-C4305	SHOB-121C	Increment 5	S10	66	67.4	D	41.4	8.25	14.08	6340	10818	1.11	0.64	1.09

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-121C	Composite 1	Increment 2-5	51	67.4	NA	NA	NA	NA	NA	NA	NA	NA	0.055	0.095	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.26

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-122C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4306	SHOB-122C	Increment 1	S1	23	24	D	42.56	10.69	18.61	5814	10122	1.09	0.94	1.64
07-C4307	SHOB-122C	Increment 2	S2-S3	24	28	D	42.25	9.28	16.07	5540	9594	1.18	0.5	0.87
07-C4308	SHOB-122C	Increment 3	S4-S6	28	33.4	D	44.72	5.05	9.14	6140	11107	2	0.4	0.72
07-C4309	SHOB-122C	Increment 4	S7-S8	38	42	D	43.28	6.41	11.3	6194	10920	1.79	0.79	1.39
07-C4310	SHOB-122C	Increment 5	S9	42	43.7	D	41.34	9.36	15.96	6242	10642	1.53	1.13	1.93

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-122C	Composite 1	Increment 1-5	23	43.7	NA	NA	NA	NA	NA	NA	NA	NA	0.071	0.125	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Su (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.27

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-125C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4311	SHOB-125C	Increment 1	S1	103.4	104	D	42.42	7.82	13.58	6170	10716	5.26	0.64	1.11
07-C4312	SHOB-125C	Increment 2	S2-S3	104	107	D	40.83	10.16	17.17	5936	10033	4.39	0.41	0.69
07-C4313	SHOB-125C	Increment 3	S4-S5	107	110	D	42.48	9.28	16.13	5899	10255	4.74	0.48	0.83
07-C4314	SHOB-125C	Increment 4	S6-S7	110	114	D	43.21	5.59	9.84	6271	11043	6.67	0.41	0.72
07-C4315	SHOB-125C	Increment 5	S8-S9	114	117.5	D	42.86	4.49	7.86	6446	11281	8.95	0.39	0.68
07-C4316	SHOB-125C	Increment 6	S10	117.5	119	D	37.59	11.16	17.88	6293	10083	3.52	5.53	8.86
07-C4317	SHOB-125C	Increment 7	S11	119	121	D	41.8	7	12.03	6412	11016	6.53	0.52	0.89
07-C4318	SHOB-125C	Increment 8	S12	121	122.3	D	43.42	7.22	12.76	6170	10906	7.04	0.59	1.04

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-125C	Composite 1	Increment 1-8	103.4	122.3	NA	NA	NA	NA	NA	NA	NA	NA	0.039	0.067	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.28

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHOB-130C

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C4319	SHOB-130C	Increment 1	S1	24.5	25.4	D	36.01	29.06	45.41	4090	6391	0.65	0.75	1.17
07-C4320	SHOB-130C	Increment 2	S2	25.4	26.5	D	41.61	6.05	10.36	6575	11261	0.47	1.61	2.76
07-C4321	SHOB-130C	Increment 3	S3-S4	26.5	30	D	42.02	9.47	16.33	5882	10146	0.44	0.41	0.71
07-C4322	SHOB-130C	Increment 4	S5	30	32	D	42.93	9.52	16.68	5866	10279	0.5	1.11	1.94
07-C4323	SHOB-130C	Increment 5	S6	32	34	D	43.94	5.22	9.31	6138	10949	1.08	0.46	0.82
07-C4324	SHOB-130C	Increment 6	S7-S8	34	38	D	42.92	6.96	12.19	6257	10961	1.06	1.21	2.12
07-C4325	SHOB-130C	Increment 7	S9-S10	38	41	D	41.93	8.09	13.93	6178	10638	1.46	0.73	1.26
07-C4326	SHOB-130C	Increment 8	S11	41	41.9	D	35.61	18.39	28.56	5567	8646	0.81	7.46	11.59

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHOB-130C	Composite 1	Increment 2-10	25.4	41	NA	NA	NA	NA	NA	NA	NA	NA	0.122	0.213	NA	NA
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

**APPENDIX 2.3-19.29**

**DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES**

**SHOB-132C**

<b>MVTL Lab Number</b>	<b>Hole Number</b>	<b>Sample Description</b>	<b>Sample Site</b>	<b>From Depth (feet)</b>	<b>To Depth (feet)</b>	<b>Seam</b>	<b>Total Moisture (wt. %)</b>	<b>Ash As Rec (wt. %)</b>	<b>Ash Dry (wt. %)</b>	<b>BTU/lb As Rec</b>	<b>BTU/lb Dry</b>	<b>Sodium Oxide (wt. %)</b>	<b>Sulfur As Rec (wt. %)</b>	<b>Sulfur Dry (wt. %)</b>
07-C4327	SHOB-132C	Increment 1	S1	57	59	D	39.85	13.76	22.88	5812	9663	4.57	2.22	3.69
07-C4328	SHOB-132C	Increment 2	S2-S3	59	63	D	40.19	9.47	15.83	6082	10169	7.29	0.33	0.55
07-C4329	SHOB-132C	Increment 3	S4	63	64.7	D	41.27	8.51	14.49	6242	10629	7.05	1.56	2.66
07-C4330	SHOB-132C	Increment 4	S5-S7	64.7	69	D	42.29	6.17	10.69	6392	11076	8.99	1.07	1.85
07-C4331	SHOB-132C	Increment 5	S8-S9	69	73	D	42.14	6.96	12.03	6154	10636	6.6	0.33	0.57
07-C4332	SHOB-132C	Increment 6	S10	73	74.2	D	43.65	7.17	12.72	6147	10909	6.39	1.12	1.99

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

**APPENDIX 2.3-19.30**

**DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES**

**SHOB-135C**

<b>MVTL Lab Number</b>	<b>Hole Number</b>	<b>Sample Description</b>	<b>Sample Site</b>	<b>From Depth (feet)</b>	<b>To Depth (feet)</b>	<b>Seam</b>	<b>Total Moisture (wt. %)</b>	<b>Ash As Rec (wt. %)</b>	<b>Ash Dry (wt. %)</b>	<b>BTU/lb As Rec</b>	<b>BTU/lb Dry</b>	<b>Sodium Oxide (wt. %)</b>	<b>Sulfur As Rec (wt. %)</b>	<b>Sulfur Dry (wt. %)</b>
07-C4333	SHOB-135C	Increment 1	S1	23.3	25	D	44.94	11.06	20.09	4963	9013	3.53	0.44	0.8
07-C4334	SHOB-135C	Increment 2	S2	25	27	D	42.25	7.77	13.45	6053	10482	5.59	0.33	0.57
07-C4335	SHOB-135C	Increment 3	S3	27	28.4	D	43.03	6.66	11.69	6145	10787	6.24	0.73	1.28
07-C4336	SHOB-135C	Increment 4	S4-S5	33	37	D	42.41	8	13.89	6192	10752	5	1.78	3.09
07-C4337	SHOB-135C	Increment 5	S6	37	39	D	42.3	9.81	17	5749	9964	4.13	0.32	0.55
07-C4338	SHOB-135C	Increment 6	S7-S8	39	42	D	42.14	8.83	15.26	6073	10496	4.59	0.4	0.69
07-C4339	SHOB-135C	Increment 7	S9	42	44	D	43.85	4.33	7.71	6341	11294	9.26	0.45	0.8
07-C4340	SHOB-135C	Increment 8	S10	44	45	D	45.2	5.11	9.32	6262	11427	8.07	0.49	0.89

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

**APPENDIX 2.3-19.31**

**DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES**

**SHOB-137C**

<b>MVTL Lab Number</b>	<b>Hole Number</b>	<b>Sample Description</b>	<b>Sample Site</b>	<b>From Depth (feet)</b>	<b>To Depth (feet)</b>	<b>Seam</b>	<b>Total Moisture (wt. %)</b>	<b>Ash As Rec (wt. %)</b>	<b>Ash Dry (wt. %)</b>	<b>BTU/lb As Rec</b>	<b>BTU/lb Dry</b>	<b>Sodium Oxide (wt. %)</b>	<b>Sulfur As Rec (wt. %)</b>	<b>Sulfur Dry (wt. %)</b>
07-C4341	SHOB-137C	Increment 1	S1	22	23	D	43.51	8.57	15.17	5692	10075	0.65	0.36	0.64
07-C4342	SHOB-137C	Increment 2	S2-S3	23	26.5	D	40.22	11.84	19.81	5706	9545	0.46	0.35	0.59
07-C4343	SHOB-137C	Increment 3	S4-S5	26.5	30	D	43.76	5.89	10.47	6140	10917	0.56	0.43	0.76
07-C4344	SHOB-137C	Increment 4	S6	30	32	D	43.21	5.35	9.42	6259	11021	0.61	0.4	0.7
07-C4345	SHOB-137C	Increment 5	S7-S8	32	36	D	42.02	7.84	13.52	6122	10558	0.69	0.36	0.62
07-C4346	SHOB-137C	Increment 6	S9	36	36.5	D	36.34	13.97	21.94	6291	9882	0.6	0.4	0.63

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

**APPENDIX 2.3-19.32**

**DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES**

**SHOB-141C**

<b>MVTL Lab Number</b>	<b>Hole Number</b>	<b>Sample Description</b>	<b>Sample Site</b>	<b>From Depth (feet)</b>	<b>To Depth (feet)</b>	<b>Seam</b>	<b>Total Moisture (wt. %)</b>	<b>Ash As Rec (wt. %)</b>	<b>Ash Dry (wt. %)</b>	<b>BTU/lb As Rec</b>	<b>BTU/lb Dry</b>	<b>Sodium Oxide (wt. %)</b>	<b>Sulfur As Rec (wt. %)</b>	<b>Sulfur Dry (wt. %)</b>
07-C4347	SHOB-141C	Increment 1	S1	11.7	13.2	E	44.39	25.15	45.23	2893	5202	0.97	0.68	1.22
07-C4348	SHOB-141C	Increment 2	S2	36.4	37	E1	38.66	24.21	39.47	4531	7386	1.67	2.42	3.95
07-C4349	SHOB-141C	Increment 3	S3-S4	37	40	E1	41.51	10.86	18.57	5945	10165	2.66	3.11	5.32
07-C4350	SHOB-141C	Increment 4	S5	40	40.7	E1	33.23	39.54	59.22	3182	4766	0.89	0.73	1.09
07-C4351	SHOB-141C	Increment 5	S6	82.8	84	D	41.2	8.38	14.25	6154	10466	4.57	0.33	0.56
07-C4352	SHOB-141C	Increment 6	S7-S8	84	88	D	41.29	10.7	18.23	5963	10157	3.92	1.14	1.94
07-C4353	SHOB-141C	Increment 7	S9-S11	88	92.7	D	42.64	6.39	11.14	6325	11027	6.07	0.74	1.29
07-C4354	SHOB-141C	Increment 8	S12-S13	94.6	98	D	43.3	7.16	12.63	6037	10648	5.38	0.57	1.01
07-C4355	SHOB-141C	Increment 9	S14	98	100	D	40.09	11.02	18.39	6181	10317	3.47	1.53	2.55
07-C4356	SHOB-141C	Increment 10	S15	100	100.8	D	42.79	5.7	9.96	6424	11229	8.05	0.54	0.94

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent



APPENDIX 2.3-19.33

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SH-07-01

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
07-C573	SH-07-01	Increment 1	S1	42.25	42.73	D	41.73	8.38	14.38	6012	10317	5.9	0.33	0.57
07-C574	SH-07-01	Increment 2	S2	42.75	43.2	D	39.38	11.58	19.10	6066	10007	4.02	0.26	0.43
07-C575	SH-07-01	Increment 3	S3	43.2	44	D	42.09	8.76	15.13	6201	10708	5.54	1.20	2.07
07-C576	SH-07-01	Increment 4	S4	44	45	D	42.85	9.26	16.20	5713	9997	5.56	0.27	0.47
07-C577	SH-07-01	Increment 5	S5	45	46	D	44.62	6.52	11.77	5879	10615	7.13	0.29	0.52
07-C578	SH-07-01	Increment 6	S6	46	47.8	D	44.09	6.73	12.04	5872	10502	6.93	0.37	0.66
07-C579	SH-07-01	Increment 7	S7	47.8	49.6	D	45.38	4.70	8.60	5992	10971	9.68	0.33	0.60
07-C580	SH-07-01	Increment 8	S8	49.6	50.8	D	42.45	8.50	14.77	6122	10637	5.05	1.59	2.76
07-C581	SH-07-01	Increment 9	S9	50.8	51.8	D	43.74	3.22	5.72	6381	11342	11.9	0.32	0.57
07-C582	SH-07-01	Increment 10	S10	51.8	53	D	44.48	4.20	7.56	6250	11256	9.47	0.30	0.54
07-C583	SH-07-01	Increment 11	S11	53	54	D	41.08	10.50	17.82	5924	10054	4.13	1.15	1.95
07-C584	SH-07-02	Increment 12	S12	54	55	D	44.16	5.44	9.74	6106	10934	7.71	0.56	1.00
07-C585	SH-07-03	Increment 13	S13	55	55.8	D	41.34	6.66	11.35	6505	11090	6.32	0.43	0.73
07-C586	SH-07-04	Increment 14	S14	55.8	56.2	D	36.95	18.92	30.01	5481	8693	2.24	0.37	0.59

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SH-07-01	Composite 1	Increment 1-14	42.25	56.2	< 0.57	1.10	0.36	< 0.11	3.96	0.83	5.96	5.18	0.045	0.078	49.63	1.29
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2.12	1.00	562.0	265.0	6.19	0.13	373.6	< 5.75	7.19	2.97	19.62	1.094

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.34

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHMW-03HTB

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
09-C2649	SHMW-03HTB	Increment 1	S1	57.8	58.3	-	16.21	80.32	95.86	< 101	< 120	1.5	0.43	0.51
09-C2650	SHMW-03HTB	Increment 2	S2	58.3	58.5	D	47.84	8.84	16.95	4927	9445	1.33	0.24	0.46
09-C2651	SHMW-03HTB	Increment 3	S3	62.3	64	D	41.54	5.54	9.48	6370	10897	1.81	0.39	0.67
09-C2652	SHMW-03HTB	Increment 4	S4	64.6	66.6	D	40.57	8.48	14.27	6197	10428	5.29	1.54	2.59
09-C2653	SHMW-03HTB	Increment 5	S5-S6	66.6	70.6	D	42.28	5.00	8.66	6374	11043	8.74	0.46	0.80
09-C2654	SHMW-03HTB	Increment 6	S7	70.6	72.6	D	41.15	7.66	13.02	6293	10693	6.20	0.65	1.10
09-C2655	SHMW-03HTB	Increment 7	S8	72.6	74.6	D	41.12	9.69	16.46	6107	10373	4.69	2.77	4.70
09-C2656	SHMW-03HTB	Increment 8	S9	74.6	76	D	40.81	10.54	17.81	6163	10413	4.78	2.83	4.78
09-C2657	SHMW-03HTB	Increment 9	S10	76	76.5	-	23.22	63.99	83.34	1154	1503	1.4	0.31	0.40
09-C2658	SHMW-03HTB	Increment 10	S11	76.5	77	-	14.23	74.22	86.53	738	860	1.61	11.57	13.49
09-C2659	SHMW-03HTB	Increment 11	S12	197	197.5	-	20.6	73.92	93.10	< 101	< 127	1.39	0.09	0.11
09-C2660	SHMW-03HTB	Increment 12	S13	197.5	198	HT Butte	34.91	21.83	33.54	5216	8014	3.4	3.21	4.93
09-C2661	SHMW-03HTB	Increment 13	S14	198	200	HT Butte	42.42	7.32	12.71	6305	10951	9.61	1.28	2.22
09-C2662	SHMW-03HTB	Increment 14	S15-S16	200	204	HT Butte	41.59	6.44	11.03	6493	11116	10.30	1.32	2.26
09-C2663	SHMW-03HTB	Increment 15	S17	204	206	HT Butte	40.74	7.24	12.22	6552	11056	9.7	0.79	1.33
09-C2664	SHMW-03HTB	Increment 16	S18	206	208	HT Butte	41.87	4.09	7.04	6710	11544	14.30	0.71	1.22
09-C2665	SHMW-03HTB	Increment 17	S19-S20	208	212	HT Butte	41.39	6.06	10.34	6626	11305	11.40	0.91	1.55
09-C2666	SHMW-03HTB	Increment 18	S21	212	213.6	HT Butte	43.65	4.78	8.48	6251	11094	14.20	0.50	0.89
09-C2667	SHMW-03HTB	Increment 19	S22	213.6	214.1	HT Butte	31.91	33.78	49.61	4453	6540	1.93	0.46	0.68
09-C2668	SHMW-03HTB	Increment 20	S23	214.1	214.6	-	17.62	76.20	92.50	< 101	< 122	2.24	< 0.01	< 0.01

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHMW-03HTB	Composite 1	Increment 3-8	62.3	76	0.67	11.22	0.55	<0.12	5.8	1.14	5.57	4.12	0.153	0.261	55.5	7.18
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					3.76	0.61	727.4	257.3	6.49	<0.12	327	<6.01	7.12	4.92	19.96	1.47
SHMW-03HTB	Composite 2	Increment 13-18	198	213.6	<0.44	8.83	0.24	<0.09	2.46	0.88	3.54	2.17	0.073	0.126	21.07	1.32
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2.4	0.60	596.6	223.6	<4.42	<0.09	379.2	<4.42	3.6	4.85	<8.84	0.58

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed

APPENDIX 2.3-19.35

DETAILED INCREMENTAL ANALYSES FOR THE CORED HOLES

SHMW-08HTB

MVTL Lab Number	Hole Number	Sample Description	Sample Site	From Depth (feet)	To Depth (feet)	Seam	Total Moisture (wt. %)	Ash As Rec (wt. %)	Ash Dry (wt. %)	BTU/lb As Rec	BTU/lb Dry	Sodium Oxide (wt. %)	Sulfur As Rec (wt. %)	Sulfur Dry (wt. %)
09-C2669	SHMW-08HTB	Increment 1	S1	113.5	114	-	21.52	73.75	93.97	< 101	< 128	2.3	0.17	0.22
09-C2670	SHMW-08HTB	Increment 2	S2	114	114.5	D	35.72	15.70	24.42	5902	9182	3.63	7.73	12.03
09-C2671	SHMW-08HTB	Increment 3	S3	114.5	116.5	D	40.22	12.91	21.60	5870	9819	5.37	1.86	3.11
09-C2672	SHMW-08HTB	Increment 4	S4	116.5	118.5	D	42.18	7.96	13.77	5989	10357	9.32	0.34	0.59
09-C2673	SHMW-08HTB	Increment 5	S5-S6	118.5	122.5	D	42.6	6.97	12.14	6097	10621	10.50	0.36	0.63
09-C2674	SHMW-08HTB	Increment 6	S7-S8	122.5	126.5	D	44.6	8.35	15.07	5873	10602	9.40	1.73	3.12
09-C2675	SHMW-08HTB	Increment 7	S9-S10	126.5	130.5	D	43.83	7.04	12.53	6034	10742	11.50	0.46	0.82
09-C2676	SHMW-08HTB	Increment 8	S11	130.5	131.5	D	42.45	6.94	12.06	6235	10834	11.70	0.70	1.22
09-C2677	SHMW-08HTB	Increment 9	S12	134	134.5	-	25.79	66.55	89.68	475	640	1.8	0.50	0.67
09-C2678	SHMW-08HTB	Increment 10	S13	285.5	286.1	-	19.99	75.14	93.91	169	211	2.20	0.07	0.09
09-C2679	SHMW-08HTB	Increment 11	S14	286.1	286.6	HT Butte	37.06	21.99	34.94	4993	7933	4.53	0.70	1.11
09-C2680	SHMW-08HTB	Increment 12	S15	286.6	288.6	HT Butte	42.24	6.10	10.56	6304	10913	12.6	0.29	0.50
09-C2681	SHMW-08HTB	Increment 13	S16-S17	288.6	292.6	HT Butte	42.23	7.06	12.22	6300	10905	9.85	2.03	3.51
09-C2682	SHMW-08HTB	Increment 14	S18	292.6	294.6	HT Butte	41.25	4.33	7.37	6743	11477	16.30	0.34	0.58
09-C2683	SHMW-08HTB	Increment 15	S19	294.6	296.1	HT Butte	41.64	5.86	10.04	6552	11227	12.4	0.39	0.67
09-C2684	SHMW-08HTB	Increment 16	S20	296.1	296.6	HT Butte	43.38	5.44	9.61	6286	11101	13.40	0.44	0.78
09-C2685	SHMW-08HTB	Increment 17	S21	296.6	297.1	-	18.01	77.63	94.68	184	224	2.15	0.76	0.93

MVTL = Minnesota Valley Testing Laboratories Inc.

Rec = Received

BTU/lb = British Thermal Unit per pound

wt. % = weight percent

Borehole Number	Sample Description	Composite Information	From Depth (feet)	To Depth (feet)	Sb (ppm)	As (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Co (ppm)	Cu (ppm)	Pb (ppm)	Hg as received (µg/g)	Hg dry (µg/g)	Mn (ppm)	Mo (ppm)
SHMW-08HTB	Composite 1	Increment 2-8	114	131.5	<0.69	2.61	0.39	<0.14	3.05	1.93	6.16	5.13	0.096	0.168	100.2	1.84
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					4.02	0.85	823.9	280.1	<6.87	<0.14	465.5	<6.87	4.51	3.67	14.56	1.14
SHMW-08HTB	Composite 2	Increment 11-16	286.1	296.6	<0.56	6.61	1.07	<0.11	2.84	1.04	3.68	1.87	0.058	0.1	47.1	1.58
					Ni (ppm)	Se (ppm)	Ba (ppm)	B (ppm)	Li (ppm)	Ag (ppm)	Sr (ppm)	Sn (ppm)	V (ppm)	Zn (ppm)	Zr (ppm)	U (ppm)
					2.61	<0.56	754.4	286.1	<5.59	<0.11	381.1	<5.59	5.26	4.18	23.25	0.56

All metals measured on air dried coal unless otherwise noted

µg/g= microgram per gram

ppm = parts per million

NA- not analyzed