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Birmingham Coal & Coke Company, Inc.

Old Union #2 Mine, P-3962

Detailed Design Modification Plans
Basin 138

4.8 Inches, 25 Year - 6 Hour,

SCS 6 Hour

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General Information

Storm Information:

Storm Type:	SCS 6 Hour
Design Storm:	25 yr - 6 hr
Rainfall Depth:	4.800 inches

Particle Size Distribution:

Size (mm)	Topsoil	Spoil
3.0000	100.000%	100.000%
2.0000	98.000%	92.000%
1.0000	96.000%	78.000%
0.5000	94.000%	54.000%
0.3000	88.000%	43.000%
0.2000	80.000%	34.000%
0.1000	68.000%	22.000%
0.0500	49.000%	15.000%
0.0300	36.000%	9.000%
0.0200	28.000%	5.000%
0.0100	14.000%	4.000%
0.0050	5.000%	3.000%
0.0030	4.000%	2.500%
0.0010	2.000%	2.000%
0.0001	0.001%	0.001%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 138

#1
Pond

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	17.600	17.600	46.27	3.79	378.6	110,631	84.72	54.47
	Out			9.73	3.79	8.7	2,054	0.00	0.00

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	92.005%	100.000%
1.0000	78.016%	100.000%
0.5000	54.036%	100.000%
0.3000	43.041%	100.000%
0.2000	34.042%	100.000%
0.1000	22.042%	100.000%
0.0500	15.031%	100.000%
0.0300	9.025%	100.000%
0.0200	5.021%	100.000%
0.0100	4.009%	100.000%
0.0050	3.002%	100.000%
0.0030	2.501%	100.000%
0.0010	2.000%	86.943%
0.0001	0.001%	0.043%

Structure Detail:

Structure #1 (Pond)

Basin 138

Pond Inputs:

Initial Pool Elev:	636.60 ft
Initial Pool:	1.42 ac-ft
*Sediment Storage:	0.95 ac-ft
Dead Space:	20.00 %

**Sediment capacity calculated from 0.075 times disturbed area*

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Entrance Loss Coefficient	Tailwater Depth (ft)
24.00	140.00	2.00	0.0240	636.60	0.90	0.00

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
638.40	20.00	2.00:1	2.00:1	12.00

Pond Results:

Peak Elevation:	638.35 ft
H'graph Detention Time:	2.73 hrs
Pond Model:	CSTRS
Dewater Time:	1.28 days
Trap Efficiency:	97.70 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
634.63	0.546	0.000	0.000		Top of Sed. Storage
635.00	0.626	0.220	0.000		
635.10	0.641	0.283	0.000		
635.50	0.700	0.551	0.000		
636.00	0.777	0.920	0.000		
636.10	0.793	0.998	0.000		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
636.50	0.859	1.329	0.000		
636.60	0.875	1.415	0.000		Spillway #1
636.90	0.926	1.686	0.696	23.15	
637.00	0.944	1.779	1.063	1.30	
637.21	0.981	1.981	1.999	1.65	
637.50	1.034	2.274	3.576	1.35	
638.00	1.127	2.814	6.942	1.25	
638.10	1.146	2.927	7.695	0.35	
638.20	1.166	3.043	8.478	0.60	
638.35	1.196	3.224	9.731	1.15	Peak Stage
638.40	1.205	3.280	10.117		Spillway #2
638.50	1.225	3.401	12.929		
639.00	1.326	4.039	25.248		
639.50	1.431	4.728	53.571		
640.00	1.540	5.470	90.250		
640.50	1.649	6.267	138.258		
641.00	1.761	7.120	196.874		
641.50	1.876	8.029	266.283		
642.00	1.996	8.997	346.761		
642.50	2.119	10.025	438.603		
643.00	2.246	11.116	542.175		
643.50	2.376	12.272	657.759		
644.00	2.511	13.493	785.758		
644.50	2.649	14.783	926.477		
645.00	2.790	16.142	1,080.258		
645.50	2.901	17.565	1,247.458		
646.00	3.015	19.044	1,428.359		
646.50	3.130	20.580	1,623.315		
647.00	3.248	22.175	1,832.643		
647.50	3.368	23.829	2,056.611		
648.00	3.490	25.543	2,295.553		
648.50	3.614	27.319	2,549.767		
649.00	3.741	29.158	2,819.505		
649.50	3.869	31.060	3,105.072		
650.00	4.000	33.027	3,406.749		

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
634.63	0.000	0.000	0.000
635.00	0.000	0.000	0.000
635.10	0.000	0.000	0.000
635.50	0.000	0.000	0.000
636.00	0.000	0.000	0.000
636.10	0.000	0.000	0.000
636.50	0.000	0.000	0.000
636.60	0.000	0.000	0.000
636.90	(3)>0.696	0.000	0.696
637.00	(3)>1.063	0.000	1.063
637.21	(3)>1.999	0.000	1.999
637.50	(3)>3.576	0.000	3.576
638.00	(3)>6.942	0.000	6.942
638.10	(3)>7.695	0.000	7.695
638.20	(3)>8.478	0.000	8.478
638.40	(3)>10.117	0.000	10.117
638.50	(3)>10.971	1.958	12.929
639.00	(1)>13.495	11.753	25.248
639.50	(6)>17.720	35.852	53.571
640.00	(6)>19.095	71.155	90.250
640.50	(6)>20.130	118.128	138.258
641.00	(6)>21.113	175.760	196.874
641.50	(6)>22.053	244.230	266.283
642.00	(6)>22.959	323.802	346.761
642.50	(6)>23.819	414.783	438.603
643.00	(6)>24.673	517.501	542.175
643.50	(6)>25.466	632.293	657.759
644.00	(6)>26.259	759.499	785.758
644.50	(6)>27.019	899.458	926.477
645.00	(6)>27.754	1,052.504	1,080.258
645.50	(6)>28.490	1,218.969	1,247.458
646.00	(6)>29.183	1,399.176	1,428.359
646.50	(6)>29.869	1,593.446	1,623.315
647.00	(6)>30.554	1,802.089	1,832.643
647.50	(6)>31.200	2,025.411	2,056.611
648.00	(6)>31.842	2,263.712	2,295.553
648.50	(6)>32.484	2,517.282	2,549.767
649.00	(6)>33.095	2,786.410	2,819.505
649.50	(6)>33.699	3,071.373	3,105.072
650.00	(6)>34.303	3,372.445	3,406.749

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	12.700	0.075	0.000	0.000	81.000	F	35.88	2.956
	2	4.600	0.105	0.000	0.000	70.000	M	9.27	0.719
	3	0.300	0.001	0.000	0.000	100.000	F	1.12	0.120
	Σ	**17.600**						**46.27**	**3.795**

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.240	200.00	7.88	0.9000	1.0000	2	378.3	140,727	107.78	69.05
	2	0.320	200.00	7.60	0.0030	1.0000	1	0.3	582	0.39	0.24
	3	0.001	20.00	0.01	0.0001	1.0000	1	0.0	0	0.00	0.00
	Σ							**378.6**	**110,631**	**84.72**	**54.47**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	7.88	60.00	761.00	2.800	0.075
#1	**1**	**Time of Concentration:**					**0.075**
#1	2	1. Forest with heavy ground litter	7.60	20.00	263.00	0.690	0.105
#1	**2**	**Time of Concentration:**					**0.105**
#1	3	1. Forest with heavy ground litter	10.00	20.00	200.00	0.800	0.069
		8. Large gullies, diversions, and low flowing streams	7.32	30.00	410.00	8.110	0.014
#1	**3**	**Time of Concentration:**					**0.001**