Birmingham Coal & Coke Company, Inc.
Old Union #2 Mine, P-3962
Detailed Design Plan Basin 003

5.9 Inches, 10 Year - 24 Hour,

DRN 58

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General Information

Storm Information:

Storm Type:	DRN 58
Design Storm:	10 yr - 24 hr
Rainfall Depth:	5.900 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 003

#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	21.805	21.805	24.16	5.83	258.2	54,508	41.73	24.61
	Out			8.49	5.83	6.9	1,058	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	92.029%	100.000%
1.0000	78.063%	100.000%
0.5000	54.126%	100.000%
0.3000	43.140%	100.000%
0.2000	34.142%	100.000%
0.1000	22.140%	100.000%
0.0500	15.104%	100.000%
0.0300	9.082%	100.000%
0.0200	5.069%	100.000%
0.0100	4.030%	100.000%
0.0050	3.006%	100.000%
0.0030	2.505%	94.364%
0.0010	2.000%	75.356%
0.0001	0.001%	0.038%

Structure Detail:

Structure #1 (Pond)

Basin 003

Pond Inputs:

Initial Pool Elev:	622.50 ft
Initial Pool:	1.15 ac-ft
*Sediment Storage:	0.84 ac-ft
Dead Space:	20.00 %

**Sediment capacity calculated from 0.100 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)
18.00	140.00	2.00	0.0240	622.50	0.90	0.00

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
624.90	20.00	2.00:1	2.00:1	12.00

Pond Results:

Peak Elevation:	624.81 ft
H'graph Detention Time:	2.88 hrs
Pond Model:	CSTRS
Dewater Time:	1.39 days
Trap Efficiency:	97.35 %

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)	
620.30	0.390	0.000	0.000		Top of Sed. Storage
620.50	0.412	0.080	0.000		
620.80	0.446	0.209	0.000		
621.00	0.470	0.300	0.000		
621.30	0.507	0.447	0.000		
621.50	0.532	0.551	0.000		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
622.00	0.598	0.833	0.000		
622.30	0.639	1.019	0.000		
622.50	0.668	1.149	0.000		Spillway #1
623.00	0.741	1.501	1.111	20.70	
623.40	0.802	1.810	2.684	4.25	
623.50	0.818	1.891	3.142	1.35	
624.00	0.899	2.320	5.206	3.75	
624.50	0.983	2.790	7.917	2.05	
624.80	1.036	3.093	8.466	1.30	
624.81	1.038	3.107	8.488	0.05	Peak Stage
624.90	1.053	3.197	8.628		Spillway #2
625.00	1.071	3.303	10.691		
625.50	1.176	3.865	21.006		
626.00	1.285	4.480	45.609		
626.50	1.400	5.151	81.382		
627.00	1.519	5.881	128.816		
627.50	1.643	6.671	186.876		
628.00	1.773	7.525	255.773		
628.50	1.907	8.445	335.741		
629.00	2.046	9.433	427.115		
629.50	2.190	10.492	530.215		
630.00	2.338	11.623	645.370		

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
620.30	0.000	0.000	0.000
620.50	0.000	0.000	0.000
620.80	0.000	0.000	0.000
621.00	0.000	0.000	0.000
621.30	0.000	0.000	0.000
621.50	0.000	0.000	0.000
622.00	0.000	0.000	0.000
622.30	0.000	0.000	0.000
622.50	0.000	0.000	0.000
623.00	(3)>1.111	0.000	1.111
623.40	(3)>2.684	0.000	2.684
623.50	(3)>3.142	0.000	3.142
624.00	(2)>5.206	0.000	5.206

Elevation (ft)	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
624.50	(5)>7.917	0.000	7.917
624.80	(6)>8.466	0.000	8.466
624.90	(6)>8.628	0.000	8.628
625.00	(6)>8.732	1.958	10.691
625.50	(6)>9.254	11.753	21.006
626.00	(6)>9.757	35.852	45.609
626.50	(6)>10.227	71.155	81.382
627.00	(6)>10.688	118.128	128.816
627.50	(6)>11.115	175.760	186.876
628.00	(6)>11.543	244.230	255.773
628.50	(6)>11.939	323.802	335.741
629.00	(6)>12.331	414.783	427.115
629.50	(6)>12.714	517.501	530.215
630.00	(6)>13.076	632.293	645.370

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	8.402	0.055	0.019	0.417	81.000	F	10.68	2.652
	2	12.873	0.109	0.000	0.000	70.000	M	12.67	2.919
	3	0.530	0.001	0.000	0.000	100.000	F	0.82	0.260
	Σ	**21.805**						**24.16**	**5.831**

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	10.00	0.9000	1.0000	2	257.4	119,663	91.65	52.80
	2	0.320	200.00	6.50	0.0030	1.0000	1	0.8	347	0.24	0.13
	3	0.001	20.00	0.01	0.0001	1.0000	1	0.0	0	0.00	0.00
	Σ							**258.2**	**54,508**	**41.73**	**24.61**

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	10.07	64.00	635.49	3.170	0.055
#1	**1**	**Time of Concentration:**					**0.055**
#1	2	1. Forest with heavy ground litter	10.00	20.00	200.00	0.800	0.069
		8. Large gullies, diversions, and low flowing streams	3.64	30.00	825.01	5.720	0.040
#1	**2**	**Time of Concentration:**					**0.109**
#1	3	5. Nearly bare and untilled, and alluvial valley fans	17.49	45.00	257.32	4.180	0.017
#1	**3**	**Time of Concentration:**					**0.001**

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	8. Large gullies, diversions, and low flowing streams	8.17	48.00	587.75	8.570	0.019
#1	**1**	**Muskingum K:**					**0.019**