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Birmingham Coal & Coke Company, Inc.

Knight Mine, P-3970

Detailed Design Plan Basin 044

5.7 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:	5.700 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 044

#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	7.200	7.200	8.80	2.20	476.5	254,526	194.94	113.12
	Out			7.83	2.20	15.2	8,532	0.01	0.01

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	92.000%	100.000%
1.0000	78.000%	100.000%
0.5000	54.000%	100.000%
0.3000	43.000%	100.000%
0.2000	34.000%	100.000%
0.1000	22.000%	100.000%
0.0500	15.000%	100.000%
0.0300	9.000%	100.000%
0.0200	5.000%	100.000%
0.0100	4.000%	100.000%
0.0050	3.000%	93.870%
0.0030	2.500%	78.225%
0.0010	2.000%	62.580%
0.0001	0.001%	0.031%

Structure Detail:

Structure #1 (Pond)

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Pond Inputs:

Initial Pool Elev:	856.00 ft
Initial Pool:	0.53 ac-ft
*Sediment Storage:	0.70 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)
24.00	120.00	2.00	0.0240	856.00	0.90	0.00

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
858.20	20.00	2.00:1	2.00:1	12.00

Pond Results:

Peak Elevation:	857.52 ft
H'graph Detention Time:	0.72 hrs
Pond Model:	CSTRS
Dewater Time:	0.65 days
Trap Efficiency:	96.80 %

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)	
852.96	0.146	0.000	0.000		Top of Sed. Storage
853.00	0.146	0.006	0.000		
853.50	0.155	0.081	0.000		
854.00	0.164	0.161	0.000		
854.50	0.173	0.245	0.000		
855.00	0.182	0.334	0.000		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
855.50	0.192	0.427	0.000		
856.00	0.201	0.525	0.000		Spillway #1
856.50	0.212	0.629	1.486	12.75	
857.00	0.222	0.737	4.189	2.30	
857.50	0.232	0.851	7.695		
857.52	0.233	0.854	7.825	0.60	Peak Stage
858.00	0.243	0.970	11.847		
858.20	0.248	1.019	12.928		Spillway #2
858.50	0.254	1.094	21.673		
859.00	0.266	1.224	38.069		
859.40	0.275	1.332	61.343		
859.50	0.277	1.360	68.173		
860.00	0.289	1.501	109.352		

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
852.96	0.000	0.000	0.000
853.00	0.000	0.000	0.000
853.50	0.000	0.000	0.000
854.00	0.000	0.000	0.000
854.50	0.000	0.000	0.000
855.00	0.000	0.000	0.000
855.50	0.000	0.000	0.000
856.00	0.000	0.000	0.000
856.50	(3)>1.486	0.000	1.486
857.00	(3)>4.189	0.000	4.189
857.50	(3)>7.695	0.000	7.695
858.00	(3)>11.847	0.000	11.847
858.20	(2)>12.928	0.000	12.928
858.50	(1)>14.231	7.442	21.673
859.00	(6)>18.223	19.846	38.069
859.40	(6)>19.296	42.047	61.343
859.50	(6)>19.528	48.646	68.173
860.00	(6)>20.681	88.671	109.352

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	7.000	0.092	0.000	0.000	81.000	F	8.51	2.104
	2	0.200	0.001	0.000	0.000	100.000	F	0.30	0.095
	Σ	**7.200**						**8.80**	**2.198**

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	150.00	21.00	0.9000	1.0000	2	476.5	262,526	201.07	117.90
	2	0.001	50.00	0.01	0.0010	1.0000	1	0.0	0	0.00	0.00
	Σ							**476.5**	**254,526**	**194.94**	**113.12**

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	3.70	5.00	135.00	1.920	0.019
		8. Large gullies, diversions, and low flowing streams	4.07	65.00	1,599.00	6.040	0.073
#1	**1**	**Time of Concentration:**					**0.092**
#1	2	3. Short grass pasture	5.90	20.00	339.00	1.940	0.048
#1	**2**	**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	2	8. Large gullies, diversions, and low flowing streams	3.91	65.00	1,663.00	5.930	0.077
#1	**2**	**Muskingum K:**					**0.000**