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Birmingham Coal & Coke Company, Inc.

Knight Mine, P-3970

Detailed Design Plan Basin 027

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 027

#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	13.000	13.000	15.94	3.99	1,457.0	401,792	307.73	181.46
	Out			12.08	3.99	47.3	13,752	0.04	0.03

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%	92.362%
0.0030	2.500%	76.969%
0.0010	2.000%	61.575%
0.0001	0.001%	0.031%

Structure Detail:

Structure #1 (Pond)

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Pond Inputs:

Initial Pool Elev:	876.10 ft
Initial Pool:	0.71 ac-ft
*Sediment Storage:	1.25 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	876.10	0.90	0.00

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
879.00	20.00	2.00:1	2.00:1	12.00

Pond Results:

Peak Elevation:	878.22 ft
H'graph Detention Time:	1.07 hrs
Pond Model:	CSTRS
Dewater Time:	0.82 days
Trap Efficiency:	96.75 %

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)	
873.58	0.243	0.000	0.000		Top of Sed. Storage
874.00	0.256	0.105	0.000		
874.50	0.271	0.237	0.000		
875.00	0.287	0.376	0.000		
875.50	0.305	0.524	0.000		
876.00	0.323	0.681	0.000		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
876.10	0.327	0.714	0.000		Spillway #1
876.50	0.342	0.847	1.063	8.15	
877.00	0.361	1.023	3.576	9.60	
877.50	0.381	1.209	6.942	1.25	
878.00	0.402	1.405	10.971	0.60	
878.22	0.411	1.496	12.084	0.20	Peak Stage
878.50	0.423	1.611	13.495		
879.00	0.444	1.828	17.847		Spillway #2
879.50	0.466	2.055	21.485		
880.00	0.489	2.294	50.521		

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
873.58	0.000	0.000	0.000
874.00	0.000	0.000	0.000
874.50	0.000	0.000	0.000
875.00	0.000	0.000	0.000
875.50	0.000	0.000	0.000
876.00	0.000	0.000	0.000
876.10	0.000	0.000	0.000
876.50	(3)>1.063	0.000	1.063
877.00	(3)>3.576	0.000	3.576
877.50	(3)>6.942	0.000	6.942
878.00	(3)>10.971	0.000	10.971
878.50	(1)>13.495	0.000	13.495
879.00	(6)>17.847	0.000	17.847
879.50	(6)>19.296	2.189	21.485
880.00	(6)>20.457	30.064	50.521

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	12.500	0.101	0.000	0.000	81.000	F	15.19	3.756
	2	0.500	0.001	0.000	0.000	100.000	F	0.75	0.237
	Σ	**13.000**						**15.94**	**3.994**

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	300.00	22.00	0.9000	1.0000	2	1,457.0	418,242	320.33	191.75
	2	0.001	100.00	0.01	0.0010	1.0000	1	0.0	0	0.00	0.00
	Σ							**1,457.0**	**401,792**	**307.73**	**181.46**

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	1.67	5.00	300.00	1.290	0.064
		8. Large gullies, diversions, and low flowing streams	5.11	45.00	880.00	6.780	0.036
		9. Small streams flowing bankfull	4.24	5.00	118.00	18.520	0.001
#1	**1**	**Time of Concentration:**					**0.101**
#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**