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Birmingham Coal & Coke Company, Inc.

Old Union #2 Mine, P-3962

Detailed Design Plan Basin 028

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 028

#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	34.500	34.500	44.11	11.06	3,708.4	372,798	285.52	168.91
	Out			18.52	11.06	99.4	8,102	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	92.000%	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%	100.000%
0.0030	2.500%	93.238%
0.0010	2.000%	74.591%
0.0001	0.001%	0.037%

Structure Detail:

Structure #1 (Pond)

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Pond Inputs:

Initial Pool Elev:	565.00 ft
Initial Pool:	2.64 ac-ft
*Sediment Storage:	3.23 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Entrance Loss Coefficient	Tailwater Depth (ft)
24.00	130.00	2.00	0.0240	565.00	0.90	0.00

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
568.35	20.00	2.00:1	2.00:1	12.00

Pond Results:

Peak Elevation:	568.11 ft
H'graph Detention Time:	2.70 hrs
Pond Model:	CSTRS
Dewater Time:	0.75 days
Trap Efficiency:	97.32 %

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)	
561.96	0.745	0.000	0.000		Top of Sed. Storage
562.00	0.748	0.027	0.000		
562.32	0.773	0.270	0.000		
562.50	0.787	0.411	0.000		
563.00	0.828	0.814	0.000		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
563.50	0.869	1.239	0.000		
564.00	0.912	1.684	0.000		
564.50	0.955	2.151	0.000		
565.00	1.000	2.640	0.000		Spillway #1
565.50	1.054	3.153	1.486	4.18*	
566.00	1.109	3.694	4.189	4.00	
566.20	1.131	3.918	5.508	2.70	
566.50	1.166	4.262	7.695	2.30	
567.00	1.223	4.859	11.847	1.75	
567.20	1.247	5.107	12.928	0.55	
567.50	1.283	5.486	14.231	0.75	
567.90	1.331	6.009	17.780	0.95	
568.00	1.344	6.143	18.135	0.20	
568.10	1.356	6.277	18.490	0.50	
568.11	1.357	6.291	18.517	0.10	Peak Stage
568.20	1.368	6.414	18.751		
568.35	1.387	6.620	19.080		Spillway #2
568.50	1.406	6.830	22.121		
569.00	1.469	7.549	32.256		
569.50	1.534	8.299	57.357		
570.00	1.600	9.083	93.654		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
561.96	0.000	0.000	0.000
562.00	0.000	0.000	0.000
562.32	0.000	0.000	0.000
562.50	0.000	0.000	0.000
563.00	0.000	0.000	0.000
563.50	0.000	0.000	0.000
564.00	0.000	0.000	0.000
564.50	0.000	0.000	0.000
565.00	0.000	0.000	0.000
565.50	(3)>1.486	0.000	1.486
566.00	(3)>4.189	0.000	4.189
566.20	(3)>5.508	0.000	5.508

Elevation (ft)	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
566.50	(3)>7.695	0.000	7.695
567.00	(3)>11.847	0.000	11.847
567.20	(2)>12.928	0.000	12.928
567.50	(1)>14.231	0.000	14.231
567.90	(6)>17.780	0.000	17.780
568.00	(6)>18.135	0.000	18.135
568.10	(6)>18.490	0.000	18.490
568.20	(6)>18.751	0.000	18.751
568.35	(6)>19.080	0.000	19.080
568.50	(6)>19.408	2.713	22.121
569.00	(6)>20.503	11.753	32.256
569.50	(6)>21.505	35.852	57.357
570.00	(6)>22.499	71.155	93.654

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	33.500	0.094	0.000	0.000	81.000	F	42.56	10.573
	2	1.000	0.001	0.000	0.000	100.000	F	1.55	0.491
	Σ	**34.500**						**44.11**	**11.064**

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	800.00	11.40	0.9000	1.0000	2	3,708.4	384,258	294.30	175.40
	2	0.001	20.00	0.01	0.0001	1.0000	1	0.0	0	0.00	0.00
	Σ							**3,708.4**	**372,798**	**285.52**	**168.91**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	8.65	30.00	347.00	0.740	0.130
#1	**1**	**Time of Concentration:**					**0.094**
#1	2	5. Nearly bare and untilled, and alluvial valley fans	8.47	15.00	177.00	2.910	0.016
		8. Large gullies, diversions, and low flowing streams	2.82	40.00	1,420.00	5.030	0.078
#1	**2**	**Time of Concentration:**					**0.001**