Tuscaloosa Resources Inc. East Brookwood Mine P-3852 Re-evaluation of JWR Mine No. 5 Pond 013 with Slurry Impoundment No. 3 covered/graded and bare and Slurry Impoundment No. 4 reclaimed.

24.8 INCHES IN 6 HOURS

Design Storm for Ponf 013

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General Information

Storm Information:

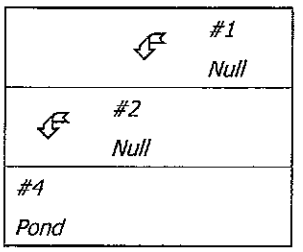
Storm Type:	SCS 6 Hour
Design Storm:	100 yr - 6 hr
Rainfall Depth:	24.800 inches

Particle Size Distribution:

Size (mm)	Topsoil	spoil
3.0000	96.000%	87.000%
2.0000	95.000%	85.000%
1.0000	92.000%	77.000%
0.5000	90.000%	68.000%
0.3000	88.000%	58.000%
0.2000	85.000%	46.000%
0.1000	74.000%	27.000%
0.0500	55.000%	16.000%
0.0300	44.000%	12.000%
0.0200	37.000%	8.000%
0.0100	28.000%	4.500%
0.0050	21.000%	3.500%
0.0030	15.000%	2.000%
0.0010	6.000%	0.500%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#2	0.290	0.363	SLURRY 4 RECLAIMED
Null	#2	==>	#4	0.007	0.449	SLURRY 3 RECLAIMED
Pond	#4	==>	End	0.000	0.000	POND 013



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	7. Paved area and small upland gullies	5.00	235.00	4,700.00	4.50	0.290
#1	**Muskingum K:**					**0.290**
#2	8. Large gullies, diversions, and low flowing streams	25.00	100.00	400.00	15.00	0.007
#2	**Muskingum K:**					**0.007**

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		102.800	102.800	1,366.23	142.26	1,234.1	13,155	9.88	4.77
#2		267.400	370.200	3,928.92	511.33	134,393.9	381,425	287.38	131.32
#4	In	288.600	658.800	6,650.23	835.93	140,028.7	237,968	179.27	87.01
	Out			5,886.77	835.93	19,378.3	35,529	18.33	8.82

Particle Size Distribution(s) at Each Structure

Structure #1 (SLURRY 4 RECLAIMED):

Size (mm)	In/Out
3.0000	97.000%
2.0000	96.400%
1.0000	87.352%
0.5000	77.162%
0.3000	65.814%
0.2000	52.198%
0.1000	30.638%
0.0500	18.156%
0.0300	13.617%
0.0200	9.078%
0.0100	5.106%
0.0050	3.972%
0.0030	2.269%
0.0010	0.567%

Structure #2 (SLURRY 3 RECLAIMED):

Size (mm)	In/Out
3.0000	92.421%
2.0000	90.314%
1.0000	81.824%
0.5000	72.273%
0.3000	61.661%
0.2000	48.925%
0.1000	28.762%
0.0500	17.088%
0.0300	12.831%
0.0200	8.571%
0.0100	4.837%
0.0050	3.760%
0.0030	2.155%
0.0010	0.544%

Structure #4:

Size (mm)	In	Out
3.0000	92.515%	100.000%
2.0000	90.450%	100.000%
1.0000	81.978%	100.000%
0.5000	72.445%	100.000%
0.3000	61.814%	100.000%
0.2000	49.046%	100.000%
0.1000	28.831%	100.000%
0.0500	17.127%	100.000%
0.0300	12.860%	92.927%
0.0200	8.589%	62.068%
0.0100	4.847%	35.022%
0.0050	3.768%	27.228%
0.0030	2.159%	15.604%
0.0010	0.545%	3.935%

Structure Detail:

Structure #1 (Null)

SLURRY 4 RECLAIMED

Structure #2 (Null)

SLURRY 3 RECLAIMED

Structure #4 (Pond)

POND 013

Pond Inputs:

Initial Pool Elev:	454.50 ft
Initial Pool:	24.94 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	0.00 %

**No sediment capacity defined*

Drop Inlet

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)
24.00	7.00	24.00	100.00	2.00	0.0240	454.50

Drop Inlet

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)
30.00	7.00	30.00	100.00	2.00	0.0240	454.50

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
464.70	10.00	2.00:1	2.00:1	50.00

Pond Results:

Peak Elevation:	474.34 ft
H'graph Detention Time:	0.96 hrs
Pond Model:	CSTRS
Dewater Time:	1.06 days
Trap Efficiency:	86.16 %

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)	
441.00	0.000	0.000	0.000		Top of Sed. Storage
441.50	0.020	0.003	0.000		
442.00	0.080	0.027	0.000		
442.50	0.179	0.090	0.000		
443.00	0.316	0.212	0.000		
443.50	0.491	0.412	0.000		
444.00	0.706	0.709	0.000		
444.50	0.959	1.124	0.000		
445.00	1.250	1.674	0.000		
445.50	1.367	2.328	0.000		
446.00	1.489	3.042	0.000		
446.50	1.616	3.818	0.000		
447.00	1.748	4.658	0.000		
447.50	1.885	5.566	0.000		
448.00	2.028	6.544	0.000		
448.50	2.176	7.595	0.000		
449.00	2.329	8.721	0.000		
449.50	2.487	9.924	0.000		
450.00	2.650	11.208	0.000		
450.50	2.736	12.555	0.000		
451.00	2.823	13.944	0.000		
451.50	2.911	15.378	0.000		
452.00	3.001	16.856	0.000		
452.50	3.092	18.379	0.000		
453.00	3.184	19.948	0.000		
453.50	3.278	21.563	0.000		
454.00	3.373	23.226	0.000		
454.50	3.470	24.937	0.000		Spillway #1 Spillway #2
455.00	3.570	26.697	15.495	11.05	
455.50	3.804	28.540	38.762	0.90	
456.00	4.045	30.502	47.474	0.55	
456.50	4.293	32.586	54.818	0.50	
457.00	4.549	34.797	61.288	0.45	
457.50	4.812	37.137	67.138	0.45	
458.00	5.083	39.611	72.517	0.40	
458.50	5.361	42.222	77.524	0.45	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
459.00	5.647	44.973	82.227	0.40	
459.50	5.940	47.870	86.675	0.40	
460.00	6.240	50.915	90.905	0.45	
460.50	6.427	54.081	94.948	0.40	
461.00	6.617	57.342	98.509	0.45	
461.50	6.810	60.699	101.396	0.40	
462.00	7.006	64.153	104.194	0.45	
462.50	7.204	67.706	106.910	0.45	
463.00	7.405	71.358	109.552	0.45	
463.50	7.609	75.112	111.568	0.50	
464.00	7.816	78.968	113.107	0.55	
464.50	8.026	82.928	114.626	0.60	
464.70	8.110	84.542	115.227	0.25	Spillway #3
465.00	8.210	86.990	149.930	0.40	
465.50	8.374	91.136	207.755	0.45	
466.00	8.540	95.364	326.475	0.35	
466.50	8.704	99.675	478.457	0.25	
467.00	8.870	104.068	655.724	0.15	
467.50	9.034	108.544	858.398	0.20	
468.00	9.200	113.103	1,085.208	0.35	
468.50	9.374	117.746	1,335.309	0.65	
469.00	9.550	122.477	1,608.120	0.50	
469.50	9.724	127.296	1,903.238	0.30	
470.00	9.900	132.202	2,220.388	0.25	
470.50	10.121	137.207	2,559.384	0.25	
471.00	10.345	142.324	2,920.110	0.15	
471.50	10.571	147.553	3,302.503	0.15	
472.00	10.800	152.895	3,706.542	0.05	
472.50	11.075	158.364	4,132.239	0.10	
473.00	11.353	163.971	4,579.631	0.10	
473.50	11.635	169.718	5,048.779	0.05	
474.00	11.920	175.606	5,539.761	0.10	
474.34	12.117	179.687	5,886.773	0.10	Peak Stage
474.50	12.210	181.639	6,052.668		
475.00	12.503	187.817	6,587.606		
475.50	12.800	194.142	7,144.691		
476.00	13.100	200.617	7,724.044		
476.50	13.371	207.235	8,325.799		
477.00	13.644	213.988	8,950.091		
477.50	13.921	220.879	9,597.063		
478.00	14.200	227.910	10,266.860		

Detailed Discharge Table

Elevation (ft)	Drop Inlet (cfs)	Drop Inlet (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.00	0.000	0.000	0.000	0.000
441.50	0.000	0.000	0.000	0.000
442.00	0.000	0.000	0.000	0.000
442.50	0.000	0.000	0.000	0.000
443.00	0.000	0.000	0.000	0.000
443.50	0.000	0.000	0.000	0.000
444.00	0.000	0.000	0.000	0.000
444.50	0.000	0.000	0.000	0.000
445.00	0.000	0.000	0.000	0.000
445.50	0.000	0.000	0.000	0.000
446.00	0.000	0.000	0.000	0.000
446.50	0.000	0.000	0.000	0.000
447.00	0.000	0.000	0.000	0.000
447.50	0.000	0.000	0.000	0.000
448.00	0.000	0.000	0.000	0.000
448.50	0.000	0.000	0.000	0.000
449.00	0.000	0.000	0.000	0.000
449.50	0.000	0.000	0.000	0.000
450.00	0.000	0.000	0.000	0.000
450.50	0.000	0.000	0.000	0.000
451.00	0.000	0.000	0.000	0.000
451.50	0.000	0.000	0.000	0.000
452.00	0.000	0.000	0.000	0.000
452.50	0.000	0.000	0.000	0.000
453.00	0.000	0.000	0.000	0.000
453.50	0.000	0.000	0.000	0.000
454.00	0.000	0.000	0.000	0.000
454.50	0.000	0.000	0.000	0.000
455.00	6.886	8.608	0.000	15.495
455.50	15.127	23.635	0.000	38.762
456.00	18.526	28.947	0.000	47.474
456.50	21.392	33.426	0.000	54.818
457.00	23.917	37.371	0.000	61.288
457.50	26.200	40.938	0.000	67.138
458.00	28.299	44.218	0.000	72.517
458.50	30.253	47.271	0.000	77.524
459.00	32.089	50.138	0.000	82.227
459.50	33.824	52.851	0.000	86.675

Elevation (ft)	Drop Inlet (cfs)	Drop Inlet (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	35.475	55.430	0.000	90.905
460.50	37.053	57.895	0.000	94.948
461.00	38.251	60.259	0.000	98.509
461.50	38.863	62.534	0.000	101.396
462.00	39.465	64.728	0.000	104.194
462.50	40.059	66.851	0.000	106.910
463.00	40.644	68.909	0.000	109.552
463.50	41.220	70.348	0.000	111.568
464.00	41.789	71.319	0.000	113.107
464.50	42.350	72.276	0.000	114.626
464.70	42.572	72.655	0.000	115.227
465.00	42.903	73.221	33.806	149.930
465.50	43.450	74.154	90.152	207.755
466.00	43.990	75.075	207.411	326.475
466.50	44.523	75.985	357.949	478.457
467.00	45.050	76.884	533.790	655.724
467.50	45.570	77.773	735.054	858.398
468.00	46.085	78.652	960.471	1,085.208
468.50	46.595	79.521	1,209.193	1,335.309
469.00	47.098	80.381	1,480.641	1,608.120
469.50	47.597	81.231	1,774.410	1,903.238
470.00	48.090	82.073	2,090.225	2,220.388
470.50	48.578	82.906	2,427.899	2,559.384
471.00	49.062	83.731	2,787.317	2,920.110
471.50	49.540	84.548	3,168.415	3,302.503
472.00	50.014	85.357	3,571.171	3,706.542
472.50	50.484	86.159	3,995.596	4,132.239
473.00	50.949	86.953	4,441.729	4,579.631
473.50	51.410	87.740	4,909.629	5,048.779
474.00	51.867	88.520	5,399.374	5,539.761
474.50	52.320	89.293	5,911.055	6,052.668
475.00	52.770	90.059	6,444.778	6,587.606
475.50	53.215	90.819	7,000.657	7,144.691
476.00	53.656	91.573	7,578.815	7,724.044
476.50	54.094	92.320	8,179.384	8,325.799
477.00	54.529	93.062	8,802.500	8,950.091
477.50	54.960	93.798	9,448.306	9,597.063
478.00	55.388	94.528	10,116.950	10,266.860

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	88.800	0.154	0.000	0.000	72.000	M	1,222.22	124.328
	2	4.700	0.125	0.000	0.000	75.000	M	65.76	6.749
	3	7.300	0.125	0.000	0.000	60.000	S	68.08	7.499
	4	2.000	0.100	0.000	0.000	81.000	F	37.72	3.683
	Σ	**102.800**						**1,366.23**	**142.259**
#2	1	126.000	0.700	0.000	0.000	55.000	S	585.47	120.111
	2	141.400	0.253	0.000	0.000	81.000	F	2,396.39	248.956
	Σ	**370.200**						**3,928.92**	**511.325**
#4	1	34.000	0.125	0.000	0.000	75.000	M	475.70	48.822
	2	169.000	0.267	0.000	0.000	60.000	S	1,382.28	172.631
	3	24.500	0.125	0.028	0.395	75.000	M	342.79	35.181
	4	6.400	0.100	0.028	0.395	81.000	F	120.71	11.785
	5	54.700	0.125	0.028	0.395	60.000	S	510.15	56.188
	Σ	**658.800**						**6,650.23**	**835.932**

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	5.00	0.0500	1.0000	2	892.2	8,206	6.15	3.94
	2	0.320	200.00	6.00	0.0500	1.0000	2	53.9	9,131	6.84	4.38
	3	0.320	200.00	5.00	0.0030	1.0000	2	3.3	497	0.37	0.24
	4	0.240	200.00	5.00	0.9000	1.0000	2	284.8	83,905	63.49	41.88
	Σ							**1,234.1**	**13,155**	**9.88**	**4.77**
#2	1	0.320	200.00	11.00	0.0030	1.0000	1	144.7	1,222	0.42	0.31
	2	0.240	200.00	15.00	0.9000	1.0000	2	133,016.6	493,574	372.13	251.12
	Σ							**134,393.9**	**381,425**	**287.38**	**131.32**
#4	1	0.300	200.00	15.00	0.0500	1.0000	2	1,639.1	37,965	28.44	18.28
	2	0.300	200.00	15.00	0.0030	1.0000	2	403.7	2,614	1.92	1.26
	3	0.300	200.00	16.00	0.0500	1.0000	2	1,229.8	39,504	29.60	19.03
	4	0.240	200.00	10.00	0.9000	1.0000	2	2,312.0	202,420	153.16	102.15
	5	0.300	200.00	9.00	0.0030	1.0000	2	55.0	1,118	0.83	0.53
	Σ							**140,028.7**	**237,968**	**179.27**	**87.01**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	2	7. Paved area and small upland gullies	5.00	205.00	4,100.00	4.500	0.253
#2	**2**	**Time of Concentration:**					**0.253**
#4	2	7. Paved area and small upland gullies	1.68	42.00	2,500.00	2.600	0.267
#4	**2**	**Time of Concentration:**					**0.267**