

INSPECTION REPORT

Temporary Sedimentation Structure

N12-C2

Kayenta Mine

Navajo County, Arizona

For

PEABODY WESTERN COAL COMPANY

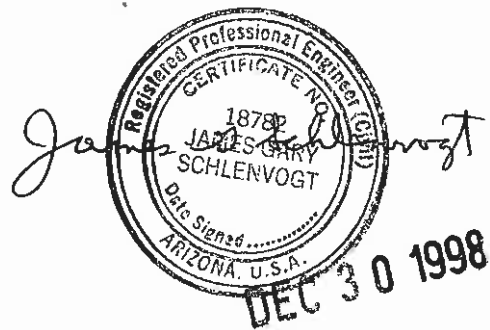


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INTRODUCTION

Sedimentation Structure N12-C2 is a partially incised structure with an earthen embankment, designed and reconstructed in 1994 by Peabody Western Coal Company as a temporary sedimentation structure to control runoff and sediment from portions of the disturbed mining area at the Black Mesa and Kayenta Mines. The location of Structure N12-C2 and its watershed boundary are shown on Drawing No. 85400 (Sheets L-7 and L-8) and Drawing No. 85405. The site-specific 1994 as-built plans are shown on the attached Exhibit 1. With this revised design evaluation, the N12-C2 structure will not require any field modifications.

This inspection report contains information specific to Structure N12-C2, which is in series with Sedimentation Structures N12-C1 and N12-C. Mine-wide design, construction, and reclamation information is presented in the "General Report, Kayenta and Black Mesa Mines, Navajo County, Arizona, for Peabody Western Coal Company", December, 1985 (PAP), Chapter 6, Attachment D, Volume 2, along with the methods and results of analyses used for slope stability, hydrology, and hydraulics, and in Chapter 6, Pages 11 to 42, "Sediment and Water Control Facility Plan".

INSPECTION

Structure N12-C2 was inspected by a Registered Professional Engineer from Peabody Western Coal Company, to assure that the existing structure is stable and no adverse conditions exist. A detailed geotechnical investigation was not performed, rather, the information in Chapter 6, Attachment D was utilized for embankment design and during construction to assure that the as-built embankment configuration would be stable.

SITE DESCRIPTION

LAND USE

The N12-C2, N12-C1 and N12-C Structures have a combined watershed of 473.0 acres and are located near Coal Mine Wash at the Kayenta Mine. The 338.0-acre watershed that contributes directly to Structure N12-C2 is classified as, 47% pinion/juniper, 29% disturbed, 18% reclaimed and 6% sagebrush/grass.

DESIGN ANALYSES

GENERAL

Structure N12-C2 was designed under the supervision of a Registered Professional Engineer from Peabody Western Coal Company. The design was performed in accordance with applicable 30 CFR 780 and 816 regulations of the United States Department of Interior, Office of Surface Mining (OSM) and included a review of available project files. The most current information contained in the Peabody Western Coal Company files includes topographic maps developed from aerial photography flown in 1998 for Peabody Western Coal Company and was used in the analyses of the structure.

STABILITY

Structure N12-C2 is a Category A-1 embankment. Structure N12-C2 is a partially incised structure with a homogeneous earthen embankment, compacted in lifts to design specifications and approximately 20 feet wide on top. An upstream slope of 3:1 (horizontal to vertical) and a downstream slope of 5:1 was constructed. Based on the total embankment height of approximately 20 feet, these slopes are equal to or flatter than the recommended "worst case" embankment/foundation condition slopes in Table 3-6, Attachment D, Chapter 6; therefore, the embankment will be stable. The emergency spillway is a 25-foot wide, riprap-lined, trapezoidal channel.

HYDROLOGY

The hydrologic analysis was completed using the computer program SEDCAD 4 (see Appendices A, B, and C). Structure N12-C2 was constructed in series with Structures N12-C1 and N12-C. Structure N12-C2 is classified as a low hazard structure (see Drawing No. 85408). In addition, the mine area is sparsely populated with no one living in the downstream floodplain. The structure will impound less than 20 acre-feet and be less than 20 vertical feet in height from the upstream toe of the embankment at the natural stream elevation to the emergency spillway invert elevation. The N12-C2 spillway was analyzed using the 25-year, 6-hour storm event. Structure N12-C2 was conservatively assumed to be full to the emergency spillway at the time of 25-year storm event. The storage capacity of structure N12-C2 was analyzed using the 10-year, 24-hour storm event. The combined ponds in series were verified to completely contain the 10-year, 24-hour storm event, and provide adequate sediment storage volume, without discharging.

The following parameters were used in the hydrologic analysis:

1.	Water Course length, L	1.684 mi.
2.	Elevation Difference, H	360 ft
3.	Time of Concentration, T_c	0.491 hr
4.	SCS Curve Number	82
5.	Rainfall Depth, 10-year, 24-hour storm	2.1 in
	25-year, 6-hour storm	1.9 in
6.	Drainage Area	338.0 acres

HYDRAULICS

The SEDCAD 4 and Flow Master computer programs were used to evaluate inflow to the sedimentation structure, outflow from the structure and the resulting water surface elevations. The initial conditions and results of the analysis are summarized in the following table (supporting calculations are presented in Appendices A, B, and C).

N12-C2 SEDIMENTATION POND HYDRAULICS TABLE

	Units	10-Yr, 24-Hr Storm	25-Yr, 6-Hr Storm
Initial Reservoir Volume Condition		Empty	Full to emergency spillway
Inflow			
Peak Flow	Cfs	183.6	207.6
Volume	ac-ft	20.2	16.5
Storage			
Peak Stage	Msl	N/A	6660.1
Emerg. Spillway Elev.	Msl	6658.3	6658.3
Peak Storage	ac-ft	N/A	22.3
Storage Capacity	ac-ft	18.95	18.95
Outflow			
Peak Flow	Cfs	N/A	149.4
Spillway Elevation	Msl	6658.3	6658.3
Embankment Crest Elev.	Msl	6663.9	6663.9
Peak Stage	Msl	--	6660.1
Freeboard	Ft	--	3.8
Emergency Spillway Channel			
Flow Depth	Ft	--	1.8
Critical Velocity	Fps	--	5.4
Mannings "n"	---	--	.031
Width	Ft	--	25
Outflow Channel			
Slope	%	--	13
Normal Velocity	Fps	--	7.5
Normal Depth	Ft	--	0.8
Mannings "n"	--	--	.055
Riprap D ₅₀	In	--	6

EMERGENCY SPILLWAY AND OUTLET CHANNEL

The emergency spillway and outlet channel for N12-C2 is a trapezoidal channel with dimensions listed below. The alignment and dimensions are shown on Exhibit 1.

Minimum Channel Depth	(Spillway)	5.6	ft
	(Outflow)	1.8	ft
Channel Width		25	ft
Channel Length	(Spillway)	46	ft
	(Outflow)	290	ft
Sideslopes (Horizontal to Vertical)		3:1	or flatter
Average Slope	(Spillway)	0	%
Maximum Slope	(Outflow)	13.0	%
Spillway Elevation		6658.3	ft

A minimum 15-foot long, riprap-lined, channel is constructed beyond the toe of the embankment as a transition into the downstream channel.

STORAGE CAPACITY

The impoundment stage-capacity table (see Exhibit 1) is based on the 1994 aerial topographic mapping conducted for Peabody Western Coal Company. Structure N12-C2 is designed to contain approximately 18.73 acre-feet.

The calculations for the sediment load entering structure N12-C2 were made utilizing the Revised Universal Soil Loss Equation with the following parameters:

1.	Rainfall Factor, R	40
2.	Soil Erodibility Factor, K	0.21
3.	Slope Factor, LS	6.18
4.	Cover Factor, C	0.490
5.	Erosion Control Factor, P	0.852

The hydrologic analysis gives the storage volume required to contain the 10-year, 24-hour storm, and the remaining storage volume available for storing sediment. Structure N12-C2 does not have sufficient storage to contain the 10-year, 24-hour storm by itself; however, in series with Structure N12-C1 and N12-C, the cumulative storage capacity of the ponds is adequate. The combined sediment storage capacity was determined for the structures in series and the results of the analysis are presented in the following table.

Combined Storage for Structures N12-C2, N12-C1 and N12-C

	<u>N12-C2</u>	<u>N12-C1</u>	<u>N12-C</u>	<u>Combined</u>
Total Storage Capacity	18.95	18.38	26.41	63.74 acre-ft
10-Year, 24-Hour Storm Inflow	20.15	2.46	3.63	26.24 acre-ft
Available Sediment Storage Capacity	--	--	--	37.50 acre-ft
Sediment Inflow Rate/Year	3.30	0.52	0.95	4.77 acre-ft
Sediment Storage Life	--	--	--	7.9 years

* * *

The following appendices and drawing are attached and complete this design report.

- Appendix A - Hydrology, Hydraulic, and Sedimentation Calculations
- Appendix B - SEDCAD4 (Input and Output) 10-Year, 24-Hour Storm Event
- Appendix C - SEDCAD4 (Input and Output) 25-Year, 6-Hour Storm Event
- Exhibit #1 - Proposed N12-C1 & N12-C2 Sedimentation Pond Design

APPENDIX A

Hydrology, Hydraulic, and Sedimentation Calculations

**PEABODY WESTERN COAL COMPANY
CALCULATED HYDROLOGIC DATA**

PROJECT: N12 C AREA

STRUCTURE: N12-C2 Pond

TIME OF CONCENTRATION:

Start Elevation (ft) = 7010
End Elevation (ft) = 6650
Elevation Difference, E (ft) = 360

Watercourse Length (ft) = 8890
Watercourse Length, L (mi) = 1.684

$T_c = (11.9L^{1/3}/E)^{0.385} =$ 0.491 hours

ROUTING PARAMETERS:

Between structure routing parameters were calculated using the SCS Upland Method in SEDCAD+. Input and output parameters are shown on the SEDCAD+ printouts in Appendices B and C.

SCS CURVE NUMBER:

Cover Type	Soil Group	Curve Number	Area (acres)	CN*Area
Sagebrush-Grass	B	60	17.4	1044
Sagebrush-Grass	D	79	2.6	205.4
Pinyon Juniper	B	65	5.1	331.5
Pinyon Juniper	D	83	153.5	12740.5
Reclaimed	C	81	62.3	5046.3
Disturbed/Spoil	B	86	97.1	8350.6
TOTAL:			338	27718.3

Weighted CN = Total CN*Area/ Total Area = 82

DRAINAGE BASIN AREA:

338.0 Acres

**PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENTOLOGY DATA
PROJECT: N12-C2 Pond**

SOIL ERODIBILITY FACTOR:

Soil Type	Erodibility Factor, K	Area (acres)	K*Area
12A	0.38	4.4	1.67
3C	0.16	11.2	1.79
3D	0.15	2.8	0.42
3A	0.17	1	0.17
3E	0.15	6.3	0.95
X11B	0.46	5.1	2.35
25	0.19	136.8	25.99
27	0.36	11	3.96
Reclaimed	0.38	62.3	23.67
Disturbed/Spoil	0.12	97.1	11.65
TOTAL:		338	72.62

Weighted K = Total K*Area/ Total Area = 0.21

SLOPE FACTOR:

Length (ft)	Elevation Change (ft)	Slope (%)	m	Slope Angle (deg)	LS Factor
215	45	20.9%	0.6	11.8	5.64
185	45	24.3%	0.6	13.7	6.08
165	40	24.2%	0.6	13.6	5.66
245	130	53.1%	0.6	28.0	15.30
245	50	20.4%	0.6	11.5	5.93
370	50	13.5%	0.6	7.7	4.65
170	40	23.5%	0.6	13.2	5.58
290	25	8.6%	0.5	4.9	1.91
365	65	17.8%	0.6	10.1	6.44
150	30	20.0%	0.6	11.3	4.32
195	45	23.1%	0.6	13.0	5.93
335	65	19.4%	0.6	11.0	6.76

Average LS = 6.18

The LS Factor was calculated by:

LS = (Slope Length/72.6)^m*(10.8*sin(slope angle) + 0.03) for Slopes < 9%

LS = (Slope Length/72.6)^m*(16.8*sin(slope angle) - 0.5) for Slopes > 9%

Where:

Slope < 3% m = 0.3

Slope = 4% m = 0.4

5% > Slope < 10% m = 0.5

Slope > 10% m = 0.6

COVER AND PRACTICE FACTORS:

Cover Type	Cover (%)	Canopy (%)	Area (acres)	Cover Factor, C	C*Area	Practice Factor, P	P*Area
Sagebrush-Grass	40%	25%	150.1	0.13	19.51	1.00	150.10
Pinyon Juniper	40%	25%	28.5	0.14	3.99	1.00	28.50
Spoil	0%	0%	97.1	1.00	97.10	0.80	77.68
Reclaimed	0%	0%	62.3	0.73	45.17	0.51	31.77
TOTAL:			338		165.77		288.05

Weighted C = Total C*Area/ Total Area = 0.490

Weighted P = Total P*Area/ Total Area = 0.852

RAINFALL FACTOR:

R = 40

PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENT YIELD

PROJECT: N12-C2 Pond

The following spreadsheet calculates the predicted sediment yield for the project area. The gross sediment yield is determined according to the Revised Universal Soil Loss Equation.

<u>PARAMETER DESCRIPTION</u>	<u>VALUE</u>
Annual Rainfall Factor	40.00
Soil Erodibility Factor	0.21
Length Slope Factor	6.18
Cover Factor	0.49
Practice Factor	0.85
Gross Annual Sediment Yield	22.21 tons/acre/year
Sediment Density	94.00 pcf
Gross Annual Sediment Yield	0.0109 acre-feet/acre/year
Sediment Delivery Ratio	90%
Estimated Annual Sediment Yield	0.0098 acre-feet/acre/year
Watershed Area	338 acres
Watershed Annual Sediment Yield	3.30 acre-feet/year
Number of years	1 years
Calculated Sediment Volume	3.30 acre-feet

N12-C2 Spillway
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	N12-C2 Emergency Spillway
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.031
Channel Slope	0.014718 ft/ft
Left Side Slope	3.000000 H : V
Right Side Slope	3.000000 H : V
Bottom Width	25.00 ft
Discharge	149.40 cfs

Results		
Depth	0.99	ft
Flow Area	27.80	ft ²
Wetted Perimeter	31.28	ft
Top Width	30.96	ft
Critical Depth	0.99	ft
Critical Slope	0.014718	ft/ft
Velocity	5.37	ft/s
Velocity Head	0.45	ft
Specific Energy	1.44	ft
Froude Number	1.00	
Flow is supercritical.		

N12-C2 Outflow Channel

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
25.00	3.0:1	3.0:1	13.0	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Depth:	0.73 ft	1.73 ft
Top Width:	29.40 ft	35.40 ft
Velocity:	7.50 fps	
X-Section Area:	19.93 sq ft	
Hydraulic Radius:	0.672	
Froude Number:	1.60	
Manning's n:	0.0550	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

APPENDIX B

SEDCAD4 (Input and Output) 10-Year, 24-Hour Storm Event

Peabody Western Coal Co.
N12-C Series Ponds 10-YR., 24-HR

DGG

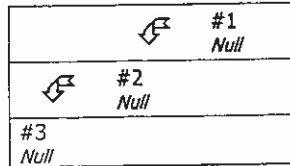
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	2.100 inches

Structure Networking:

Type	Stru #	(flows Into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#2	0.035	0.389	C2 Spillway
Null	#2	==>	#3	0.059	0.373	C1 Spillway
Null	#3	==>	End	0.000	0.000	



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	338.000	338.000	183.59	20.15
#2	54.500	392.500	198.70	22.61
#3	80.500	473.000	220.37	26.24

Structure Detail:

Structure #1 (Null)

C2 Spillway

Structure #2 (Null)

C1 Spillway

Structure #3 (Null)

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	338.000	0.491	0.000	0.000	82.000	F	183.59	20.15
	Σ	338.000						183.59	20.15
#2	1	54.500	0.145	0.000	0.000	78.000	F	34.06	2.46
	Σ	392.500						198.70	22.61
#3	1	80.500	0.229	0.000	0.000	78.000	F	44.80	3.63
	Σ	473.000						220.37	26.24

APPENDIX C

SEDCAD4 (Input and Output) 25-Year, 6-Hour Storm Event

Peabody Western Coal Co.
N12-C Series Ponds 25-YR., 6-HR

DGG

Montgomery Watson
165 S. Union Blvd.
Suite 460
Lakewood, CO. 80228

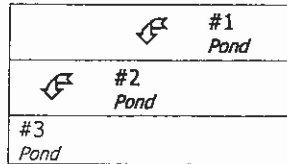
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 6 hr
Rainfall Depth:	1.900 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#2	0.035	0.389	C2 Spillway
Pond	#2	==>	#3	0.059	0.373	C1 Spillway
Pond	#3	==>	End	0.000	0.000	Pond C



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	In	338.000	338.000	207.55	16.44
	Out			150.92	16.44
#2	In	54.500	392.500	161.00	18.39
	Out			132.39	18.40
#3	In	80.500	473.000	141.82	21.27
	Out			43.21	21.27

Structure Detail:

Structure #1 (Pond)

C2 Spillway

Pond Inputs:

Permanent Pool Elev:	6,658.30
Permanent Pool:	18.73 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
6,658.30	46.00	3.00:1	3.00:1	25.00

Pond Results:

Peak Elevation:	6,660.02
H'graph Detention Time:	0.37 hrs
Dewater Time:	0.27 days

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)
6,638.40	0.000	0.000	0.000	
6,639.40	0.172	0.057	0.000	
6,640.00	0.440	0.235	0.000	
6,640.40	0.458	0.414	0.000	
6,641.40	0.504	0.895	0.000	
6,642.40	0.553	1.424	0.000	
6,643.40	0.604	2.002	0.000	
6,644.40	0.657	2.632	0.000	
6,645.00	0.690	3.037	0.000	
6,645.40	0.710	3.317	0.000	
6,646.40	0.761	4.052	0.000	
6,647.40	0.814	4.839	0.000	
6,648.40	0.869	5.681	0.000	
6,649.40	0.925	6.578	0.000	
6,650.00	0.960	7.143	0.000	
6,650.40	0.997	7.535	0.000	
6,651.40	1.092	8.579	0.000	
6,652.40	1.191	9.720	0.000	

SEDCAD 4 for Windows

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Civil Software Design

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
6,653.40	1.295	10.963	0.000	
6,654.40	1.403	12.312	0.000	
6,655.00	1.470	13.174	0.000	
6,655.40	1.520	13.772	0.000	
6,656.40	1.650	15.356	0.000	
6,657.40	1.784	17.073	0.000	
6,658.30	1.910	18.735	0.000	Spillway #1
6,658.40	1.923	18.927	5.525	2.95
6,659.40	2.051	20.913	60.719	2.80
6,660.02	2.141	22.225	150.917	0.70 Peak Stage
6,660.40	2.193	23.035	206.648	
6,661.40	2.353	25.307	423.894	
6,662.40	2.520	27.743	728.002	
6,663.40	2.692	30.349	1,103.250	
6,663.90	2.780	31.717	1,322.553	

Detailed Discharge Table

Elevation	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
6,638.40	0.000	0.000
6,639.40	0.000	0.000
6,640.00	0.000	0.000
6,640.40	0.000	0.000
6,641.40	0.000	0.000
6,642.40	0.000	0.000
6,643.40	0.000	0.000
6,644.40	0.000	0.000
6,645.00	0.000	0.000
6,645.40	0.000	0.000
6,646.40	0.000	0.000
6,647.40	0.000	0.000
6,648.40	0.000	0.000
6,649.40	0.000	0.000
6,650.00	0.000	0.000
6,650.40	0.000	0.000
6,651.40	0.000	0.000
6,652.40	0.000	0.000
6,653.40	0.000	0.000
6,654.40	0.000	0.000
6,655.00	0.000	0.000
6,655.40	0.000	0.000
6,656.40	0.000	0.000
6,657.40	0.000	0.000
6,658.30	0.000	0.000
6,658.40	5.525	5.525
6,659.40	60.719	60.719
6,660.40	206.648	206.648
6,661.40	423.894	423.894
6,662.40	728.002	728.002
6,663.40	1,103.250	1,103.250
6,663.90	1,322.553	1,322.553

Structure #2 (Pond)

C1 Spillway

Pond Inputs:

Permanent Pool Elev:	6,630.40
Permanent Pool:	18.22 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
6,630.40	46.00	3.00:1	3.00:1	30.00

Pond Results:

Peak Elevation:	6,631.85
H'graph Detention Time:	0.33 hrs
Dewater Time:	0.29 days

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)
6,610.50	0.000	0.000	0.000	
6,610.90	0.250	0.033	0.000	
6,611.50	0.281	0.193	0.000	
6,612.50	0.337	0.502	0.000	
6,613.50	0.399	0.869	0.000	
6,614.50	0.465	1.301	0.000	
6,615.00	0.500	1.542	0.000	
6,615.50	0.527	1.798	0.000	
6,616.50	0.583	2.353	0.000	
6,617.50	0.641	2.965	0.000	
6,618.50	0.703	3.637	0.000	
6,619.50	0.767	4.371	0.000	
6,620.00	0.800	4.763	0.000	
6,620.50	0.841	5.173	0.000	
6,621.50	0.925	6.055	0.000	
6,622.50	1.013	7.024	0.000	
6,623.50	1.105	8.082	0.000	
6,624.50	1.201	9.234	0.000	
6,625.00	1.250	9.847	0.000	
6,625.50	1.302	10.485	0.000	
6,626.50	1.410	11.841	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
6,627.50	1.522	13.306	0.000	
6,628.50	1.638	14.886	0.000	
6,629.50	1.758	16.583	0.000	
6,630.00	1.820	17.478	0.000	
6,630.40	1.870	18.216	0.000	Spillway #1
6,630.50	1.883	18.404	6.561	3.30
6,631.50	2.012	20.351	72.106	3.05
6,631.85	2.061	21.085	132.387	0.60 Peak Stage
6,632.50	2.146	22.430	242.709	
6,633.50	2.285	24.645	492.895	
6,634.50	2.427	27.001	838.518	
6,635.50	2.699	29.563	1,260.185	
6,635.60	2.740	29.835	1,307.390	

Detailed Discharge Table

Elevation	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
6,610.50	0.000	0.000
6,610.90	0.000	0.000
6,611.50	0.000	0.000
6,612.50	0.000	0.000
6,613.50	0.000	0.000
6,614.50	0.000	0.000
6,615.00	0.000	0.000
6,615.50	0.000	0.000
6,616.50	0.000	0.000
6,617.50	0.000	0.000
6,618.50	0.000	0.000
6,619.50	0.000	0.000
6,620.00	0.000	0.000
6,620.50	0.000	0.000
6,621.50	0.000	0.000
6,622.50	0.000	0.000
6,623.50	0.000	0.000
6,624.50	0.000	0.000
6,625.00	0.000	0.000
6,625.50	0.000	0.000
6,626.50	0.000	0.000
6,627.50	0.000	0.000
6,628.50	0.000	0.000
6,629.50	0.000	0.000
6,630.00	0.000	0.000
6,630.40	0.000	0.000
6,630.50	6.561	6.561
6,631.50	72.106	72.106
6,632.50	242.709	242.709
6,633.50	492.895	492.895
6,634.50	838.518	838.518
6,635.50	1,260.185	1,260.185
6,635.60	1,307.390	1,307.390

Structure #3 (Pond)

Pond C

Pond Inputs:

Permanent Pool Elev:	6,584.56
Permanent Pool:	25.30 ac-ft

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Entrance Loss Coefficient	Tailwater Depth (ft)
48.00	72.00	15.00	0.0150	6,584.56	0.90	0.00

Pond Results:

Peak Elevation:	6,587.52
H'graph Detention Time:	3.57 hrs
Dewater Time:	1.69 days

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)
6,570.90	0.000	0.000	0.000	
6,571.90	0.077	0.026	0.000	
6,572.90	0.306	0.205	0.000	
6,573.90	0.688	0.689	0.000	
6,574.90	1.221	1.631	0.000	
6,575.00	1.280	1.756	0.000	
6,575.90	1.498	3.005	0.000	
6,576.90	1.758	4.631	0.000	
6,577.90	2.041	6.529	0.000	
6,578.90	2.343	8.719	0.000	
6,579.90	2.667	11.222	0.000	
6,580.00	2.700	11.491	0.000	
6,580.90	2.826	13.977	0.000	
6,581.90	2.970	16.875	0.000	
6,582.90	3.118	19.919	0.000	
6,583.90	3.268	23.112	0.000	
6,584.56	3.370	25.303	0.000	Spillway #1
6,584.90	3.424	26.457	3.020	30.00
6,585.00	3.440	26.801	3.909	1.20
6,585.90	3.594	29.966	13.243	5.00
6,586.90	3.770	33.647	29.978	2.30
6,587.52	3.883	36.059	43.211	2.00 Peak Stage

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
6,587.90	3.949	37.507	51.151	
6,588.90	4.133	41.548	75.774	
6,589.90	4.321	45.774	97.979	
6,590.00	4.340	46.208	100.035	
6,590.90	4.575	50.219	116.197	
6,591.90	4.842	54.926	131.980	
6,592.90	5.118	59.905	146.013	
6,593.90	5.400	65.164	158.880	
6,594.90	5.691	70.709	170.749	
6,595.90	6.138	76.622	181.814	
6,596.90	6.620	82.999	192.258	

Detailed Discharge Table

Elevation	Straight Pipe (cfs)	Combined Total Discharge (cfs)
6,570.90	0.000	0.000
6,571.90	0.000	0.000
6,572.90	0.000	0.000
6,573.90	0.000	0.000
6,574.90	0.000	0.000
6,575.00	0.000	0.000
6,575.90	0.000	0.000
6,576.90	0.000	0.000
6,577.90	0.000	0.000
6,578.90	0.000	0.000
6,579.90	0.000	0.000
6,580.00	0.000	0.000
6,580.90	0.000	0.000
6,581.90	0.000	0.000
6,582.90	0.000	0.000
6,583.90	0.000	0.000
6,584.56	0.000	0.000
6,584.90	(1)>3.020	3.020
6,585.00	(1)>3.909	3.909
6,585.90	(3)>13.243	13.243
6,586.90	(3)>29.978	29.978
6,587.90	(3)>51.151	51.151
6,588.90	(3)>75.774	75.774
6,589.90	(5)>97.979	97.979
6,590.00	(5)>100.035	100.035
6,590.90	(5)>116.197	116.197
6,591.90	(5)>131.980	131.980
6,592.90	(5)>146.013	146.013
6,593.90	(5)>158.880	158.880
6,594.90	(5)>170.749	170.749
6,595.90	(5)>181.814	181.814
6,596.90	(5)>192.258	192.258

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	338.000	0.491	0.000	0.000	82.000	F	207.55	16.44
	Σ	338.000						207.55	16.44
#2	1	54.500	0.145	0.000	0.000	78.000	F	39.56	1.95
	Σ	392.500						161.00	18.39
#3	1	80.500	0.229	0.000	0.000	78.000	F	51.47	2.88
	Σ	473.000						141.82	21.27