

DESIGN REPORT

Temporary Sedimentation Structure

J21-H

Kayenta Mine

Navajo County, Arizona

For

PEABODY WESTERN COAL COMPANY



A circular professional seal for James J. Schlemmer, a Professional Engineer in the State of Arizona. The seal contains the text "STATE OF ARIZONA", "1878", "JAMES J. SCHLEMMER", "PROFESSIONAL ENGINEER", and "NO. 12345". A handwritten signature "James J. Schlemmer" is written across the seal. Below the seal is a date stamp "AUG 18 2006".

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INTRODUCTION

Sedimentation Structure J21-H will be an earthen embankment, designed and constructed by Peabody Western Coal Company as a temporary sedimentation structure to control runoff and sediment from portions of the J21 disturbed surface mining area at the Kayenta Mine. The location of Structure J21-H and its watershed boundary are shown on Drawing No. 85400 (Sheet M-11) and Drawing No. 85405. The site-specific general construction plans are shown on the attached Exhibit 1.

This design report contains information specific to Structure J21-H that is in series with sedimentation structure J21-H1. J21-H is the downstream pond in the series. 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

The construction site of the proposed Structure J21-H was inspected in January 2000 by a Registered Professional Engineer from Peabody Western Coal Company, to assure that the site is suitable and no adverse conditions exist to prevent the successful construction of this structure. A detailed geotechnical investigation was not performed, rather, the information in Chapter 6, Attachment D was utilized for embankment design and will be utilized during construction to construct a stable embankment.

SITE DESCRIPTION

LAND USE

The J21-H and J21-H1 Structures have a combined watershed of 235.5 acres and are located on a tributary upstream of Dinnebito Wash at the Kayenta Mine. The 104-acre watershed, which contributes directly to structure J21-H is classified as 50% undisturbed, 28% spoil and 22% disturbed.

DESIGN ANALYSES

GENERAL

Structure J21-H 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 1999 for Peabody Western Coal Company and was used in the analyses of the structure.

STABILITY

Structure J21-H is assumed to be a Category A-3 embankment. The structure will be a homogeneous earthen embankment, compacted in lifts to design specifications, and approximately 15 feet wide on top. An upstream minimum slope of 2H:1V or flatter slope and downstream minimum slope of 3.25H:1V or flatter slope were assumed. Based on the total embankment height of approximately 12 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 will be a minimum 15-foot wide, riprap-lined, trapezoidal channel.

HYDROLOGY

The hydrologic analysis was completed using the computer program SEDCAD4 (see Appendices A, B, and C). Structure J21-H will be constructed in series with proposed Structure J21-H1. J21-H is located down-gradient of J21-H1. Structure J21-H 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 of the natural stream elevation to the emergency spillway invert elevation. The two structures have a combined capacity greater than 20 acre-feet; therefore, the spillway for J21-H was analyzed using the 100-year, 6-hour storm event in lieu of the 25-year, 6-hour storm event. Structures J21-H and J21-H1 were conservatively assumed to be full to the emergency spillway at the time of 100-year storm event. The storage capacity of structure J21-H 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 into the Dinnebito Wash.

The following parameters were used in the hydrologic analysis (see Appendix B & C):

1.	Water Course length, L	<u>J21-H</u> 0.632 mi.
2.	Elevation Difference, H	211 ft
3.	Time of Concentration, T _c	0.195 hr
4.	SCS Curve Number	82
5.	Rainfall Depth, 10-year, 24-hour storm	2.1 in
	100-year, 6-hour storm	2.4 in
6.	Drainage Area	104.0 acres

Values reported represent the watershed, which drains directly to Pond J21-H. Hydrologic input parameters for upstream structure J21-H1 is presented in the Design Report for J21-H1.

Muskingum routing parameters were utilized to route the 100-year hydrographs between the J21-H and J21-H1 structures. The routing parameters are presented in Appendices B and C, and are shown on a sub-watershed basis.

HYDRAULICS

The SEDCAD4 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).

J21-H SEDIMENTATION POND HYDRAULICS TABLE

	Units	10-Yr, 24-Hr Storm	100-Yr, 6-Hr Storm		
Initial Reservoir Volume Condition		Empty	Full to emergency spillway		
Inflow					
Peak Flow	cfs	65.6	176.6		
Volume	ac-ft	6.2	8.0		
Storage					
Peak Stage	msl	N/A	6878.8		
Emerg. Spillway Elev.	msl	6877.0	6877.0		
Peak Storage	ac-ft	N/A	23.1		
Storage Capacity	ac-ft	18.0	18.0		
Outflow					
Peak Flow	cfs	N/A	100.3		
Spillway Elevation	msl	6877.0	6877.0		
Embankment Crest Elev.	msl	6880	6880		
Peak Stage	msl	--	6878.7		
Freeboard	ft	--	1.3		
Emergency Spillway Channel					
Flow Depth	ft	--	1.7		
Critical Velocity	fps	--	5.3		
Mannings "n"	--	--	.03		
Width	ft	--	15		
Outflow Channel					
Slope	%	--	4	24	33
Normal Velocity	fps	--	6.4	9.0	9.0
Normal Depth	ft	--	1.9	1.7	1.7
Mannings "n"	--	--	0.039	0.057	0.066
Riprap D ₅₀	in	--	3	6	9

EMERGENCY SPILLWAY AND OUTLET CHANNEL

The emergency spillway and outlet channel for J21-H will be a trapezoidal channel with dimensions listed below. The alignment and dimensions are shown on Exhibit 1.

Minimum Channel Depth	(Spillway)	2.8	ft
	(Outflow)	2.7	ft
Channel Width		15	ft
Channel Length	(Spillway)	28	ft
	(Outflow)	170	ft
Sideslopes (Horizontal to Vertical)		3:1	or flatter
Average Slope	(Spillway)	0	%
Maximum Slope	(Outflow)	33	%
Spillway Elevation		6877.0	ft

A minimum 15-foot long riprap-lined channel will be 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 1999 aerial topographic mapping conducted for Peabody Western Coal Company. Structure J21-H is designed to contain approximately 18.0 acre-feet.

The calculations for the sediment load entering structure J21-H were made utilizing the Revised Universal Soil Loss Equation with the following parameters:

1.	Rainfall Factor, R	40
2.	Soil Erodibility Factor, K	0.20
3.	Slope Factor, LS	6.53
4.	Cover Factor, C	0.61
5.	Erosion Control Factor, P	0.95

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 J21-H has sufficient storage to contain the 10-year, 24-hour storm. The combined sediment storage capacity was determined for the two structures in series and the results of the analysis are presented in the following table.

Combined Storage for Structures J21-H1 and J21-H

	<u>J21-H1</u>	<u>J21-H</u>	<u>Combined</u>
Total Storage Capacity	17.9	18.0	35.9 acre-ft
10-Year, 24-Hour Storm Inflow	8.9	6.2	15.1 acre-ft
Available Sediment Storage Capacity	-	-	20.8 acre-ft
Sediment Inflow Rate/Year	2.42	1.39	3.81 acre-ft
Sediment Storage Life	-	-	5.5 years

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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) 100-Year, 6-Hour Storm Event

Exhibit #1- J21-H Proposed Sedimentation Pond

APPENDIX A

Hydrology, Hydraulic, and Sedimentation Calculations

**PEABODY WESTERN COAL COMPANY
CALCULATED HYDROLOGIC DATA**

PROJECT: J21 AREA

STRUCTURE: J21-H Pond (Lower Pond)

TIME OF CONCENTRATION:

Start Elevation (ft) = 7081
 End Elevation (ft) = 6870
 Elevation Difference, E (ft) = 211

Watercourse Length (ft) = 3336
 Watercourse Length, L (mi) = 0.632

$T_c = (11.9L^3/E)^{0.385} = \underline{\underline{0.195 \text{ hours}}}$

ROUTING PARAMETERS:

Between structure routing parameters were calculated using the SCS Upland Method in SEDCAD4. Input and output parameters are shown on the SEDCAD4 printouts in Appendices C.

SCS CURVE NUMBER:

Cover Type	Soil Group	Curve Number	Area (acres)	CN*Area
Pinyon Juniper	C	78	37.7	2940.6
Sagebrush	C	73	14.6	1065.8
Disturbed - Topsoil Stripped		90	23.1	2079
Disturbed - Spoil		86	28.6	2459.6
TOTAL:			104	8545

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

DRAINAGE BASIN AREA:

104.0 Acres

**PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENTOLOGY DATA**

PROJECT: J21-H Pond

SOIL ERODIBILITY FACTOR:

Soil Type	Erodibility Factor, K	Area (acres)	K*Area
3DE	0.15	6	0.90
15	0.37	1	0.37
20	0.25	45.3	11.33
34-spoil	0.12	28.6	3.43
Mine Pits	0.22	23.1	5.08
TOTAL:			21.11

Weighted K = Total K*Area/ Total Area = 0.20

SLOPE FACTOR:

Length (ft)	Elevation Change (ft)	Slope (%)	m	Slope Angle (deg)	LS Factor
195	40	20.5%	0.6	11.6	5.20
185	60	32.4%	0.6	18.0	8.21
400	70	17.5%	0.6	9.9	6.67
320	60	18.8%	0.6	10.6	6.32
285	70	24.6%	0.6	13.8	7.97
425	60	14.1%	0.6	8.0	5.34
145	40	27.6%	0.6	15.4	6.01

Average LS = 6.53

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
Pinyon Juniper	20%	25%	37.7	0.22	8.29	1.00	37.70
Sagebrush/Grass	20%	25%	14.6	0.20	2.92	1.00	14.60
Disturbed	0%	0%	23.1	1.00	23.10	1.00	23.10
Spoil	0%	0%	28.6	1.00	28.60	0.80	22.88
TOTAL:			104		62.91		98.28

Weighted C = Total C*Area/ Total Area = 0.605

Weighted P = Total P*Area/ Total Area = 0.945

RAINFALL FACTOR:

R = 40

PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENT YIELD

PROJECT: J21-H 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	0.20
Length Slope Factor	6.53
Cover Factor	0.60
Practice Factor	0.95
Gross Annual Sediment Yield	30.31 tons/acre/year
Sediment Density	94.00 pcf
Gross Annual Sediment Yield	0.0148 acre-feet/acre/year
Sediment Delivery Ratio	90%
Estimated Annual Sediment Yield	0.0133 acre-feet/acre/year
Watershed Area	104 acres
Watershed Annual Sediment Yield	1.39 acre-feet/year
Number of years	1 years
Calculated Sediment Volume	1.39 acre-feet

J21-H SPILLWAY CRITICAL VELOCITY
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	Y
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.013947 ft/ft	
Left Side Slope	3.000000 H : V	
Right Side Slope	3.000000 H : V	
Bottom Width	15.00	ft
Discharge	100.30	cfs

Results		
Depth	1.04	ft
Flow Area	18.79	ft ²
Wetted Perimeter	21.56	ft
Top Width	21.23	ft
Critical Depth	1.04	ft
Critical Slope	0.013948 ft/ft	
Velocity	5.34	ft/s
Velocity Head	0.44	ft
Specific Energy	1.48	ft
Froude Number	1.00	
Flow is subcritical.		

J21-H SPILLWAY OUTFLOW CHANNEL @ 4% SLOPE

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
15.00	3.0:1	3.0:1	4.0	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	100.30 cfs	
Depth:	0.89 ft	1.89 ft
Top Width:	20.34 ft	26.34 ft
Velocity:	6.38 fps	
X-Section Area:	15.73 sq ft	
Hydraulic Radius:	0.762	
Froude Number:	1.28	
Manning's n:	0.0390	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

J21-H SPILLWAY OUTFLOW CHANNEL

@

24% SLOPE

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
15.00	3.0:1	3.0:1	24.0	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	100.30 cfs	
Depth:	0.66 ft	1.66 ft
Top Width:	18.96 ft	24.96 ft
Velocity:	8.95 fps	
X-Section Area:	11.20 sq ft	
Hydraulic Radius:	0.584	
Froude Number:	2.05	
Manning's n:	0.0570	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

J21-H SPILLWAY OUTFLOW CHANNEL @ 33% SLOPE

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
15.00	3.0:1	3.0:1	33.0	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	100.30 cfs	
Depth:	0.66 ft	1.66 ft
Top Width:	18.93 ft	24.93 ft
Velocity:	9.03 fps	
X-Section Area:	11.11 sq ft	
Hydraulic Radius:	0.581	
Froude Number:	2.08	
Manning's n:	0.0660	
Dmin:	5.00 in	
D50:	9.00 in	
Dmax:	12.00 in	

APPENDIX B

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

PEABODY WESTERN
KAYENTA MINE
POND J21H1 & J21H

10 Year, 24 Hour storm

DJK

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165 S. Union Blvd.
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Lakewood, Co. 80228

Phone: 303 763-5140

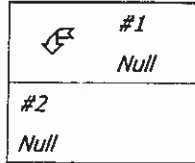
General Information

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	0.008	0.344	Pond J21H1
Null	#2	==>	End	0.000	0.000	Pond J21H



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	131.500	131.500	92.26	8.94
#2	104.000	235.500	157.42	15.14

Structure Detail:

Structure #1 (Null)

Pond J21H1

Structure #2 (Null)

Pond J21H

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	131.500	0.230	0.000	0.000	84.000	F	92.26	8.936
	Σ	131.500						92.26	8.936
#2	1	104.000	0.195	0.000	0.000	82.000	F	65.65	6.201
	Σ	235.500						157.42	15.137

APPENDIX C

SEDCAD4 (Input and Output) 100-Year, 6-Hour Storm Event

PEABODY WESTERN
KAYENTA MINE
POND J21-H

100 Year, 6 Hour storm

DJK

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165 S. Union Blvd.
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Lakewood, Co. 80228

Phone: 303 763-5140

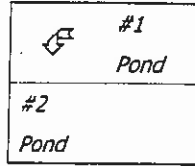
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 6 hr
Rainfall Depth:	2.400 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#2	0.008	0.344	Pond J21H1
Pond	#2	==>	End	0.000	0.000	Pond J21H



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	In			168.15	11.38
	Out	131.500	131.500	88.11	11.38
#2	In	104.000	235.500	176.61	19.40
	Out			100.29	18.35

Structure Detail:

Structure #1 (Pond)

Pond J21H1

Pond Inputs:

Initial Pool Elev:	6,896.00
Initial Pool:	17.92 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
6,896.00	17.00	3.00:1	3.00:1	15.00

Pond Results:

Peak Elevation:	6,897.53
Dewater Time:	1.53 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)
6,886.00	1.300	0.000	0.000	
6,886.50	1.340	0.660	0.000	
6,887.00	1.380	1.340	0.000	
6,887.50	1.425	2.041	0.000	
6,888.00	1.470	2.765	0.000	
6,888.50	1.517	3.511	0.000	
6,889.00	1.564	4.281	0.000	
6,889.50	1.612	5.075	0.000	
6,890.00	1.660	5.893	0.000	
6,890.50	1.709	6.735	0.000	
6,891.00	1.759	7.602	0.000	
6,891.50	1.809	8.494	0.000	
6,892.00	1.860	9.412	0.000	
6,892.50	1.921	10.357	0.000	
6,893.00	1.983	11.333	0.000	
6,893.50	2.046	12.340	0.000	
6,894.00	2.110	13.379	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
6,894.50	2.188	14.453	0.000	
6,895.00	2.267	15.567	0.000	
6,895.50	2.348	16.721	0.000	
6,896.00	2.430	17.915	0.000	Spillway #1
6,896.50	2.518	19.152	2.858	33.25
6,897.00	2.607	20.433	39.578	2.80
6,897.50	2.698	21.759	83.969	0.70
6,897.53	2.705	21.855	88.112	0.05 Peak Stage
6,898.00	2.790	23.131	143.540	
6,898.50	2.901	24.554	217.837	

Detailed Discharge Table

Elevation	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
6,886.00	0.000	0.000
6,886.50	0.000	0.000
6,887.00	0.000	0.000
6,887.50	0.000	0.000
6,888.00	0.000	0.000
6,888.50	0.000	0.000
6,889.00	0.000	0.000
6,889.50	0.000	0.000
6,890.00	0.000	0.000
6,890.50	0.000	0.000
6,891.00	0.000	0.000
6,891.50	0.000	0.000
6,892.00	0.000	0.000
6,892.50	0.000	0.000
6,893.00	0.000	0.000
6,893.50	0.000	0.000
6,894.00	0.000	0.000
6,894.50	0.000	0.000
6,895.00	0.000	0.000
6,895.50	0.000	0.000
6,896.00	0.000	0.000
6,896.50	2.858	2.858
6,897.00	39.578	39.578
6,897.50	83.969	83.969

Elevation	Emergency Spillway (cfs)	Combined Total Discharge (cfs) *
6,898.00	143.540	143.540
6,898.50	0.000	217.837

Structure #2 (Pond)

Pond J21H

Pond Inputs:

Initial Pool Elev:	6,877.00
Initial Pool:	18.04 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
6,877.00	28.00	3.00:1	3.00:1	15.00

Pond Results:

Peak Elevation:	6,878.71
Dewater Time:	3.66 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)
6,868.00	1.420	0.000	0.000	
6,868.50	1.462	0.720	0.000	
6,869.00	1.504	1.462	0.000	
6,869.50	1.547	2.224	0.000	
6,870.00	1.590	3.009	0.000	
6,870.50	1.658	3.820	0.000	
6,871.00	1.727	4.667	0.000	
6,871.50	1.798	5.548	0.000	
6,872.00	1.870	6.465	0.000	
6,872.50	1.955	7.421	0.000	
6,873.00	2.041	8.420	0.000	
6,873.50	2.130	9.462	0.000	
6,874.00	2.220	10.549	0.000	
6,874.50	2.309	11.682	0.000	
6,875.00	2.400	12.859	0.000	

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Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
6,875.50	2.494	14.082	0.000	
6,876.00	2.590	15.353	0.000	
6,876.50	2.690	16.673	0.000	
6,877.00	2.791	18.043	0.000	Spillway #1
6,877.50	2.895	19.464	0.242	71.15*
6,878.00	3.000	20.938	35.287	15.15
6,878.50	3.119	22.468	78.406	1.10
6,878.71	3.170	23.126	100.291	0.45 Peak Stage
6,879.00	3.240	24.057	131.226	
6,879.50	3.364	25.708	200.210	
6,880.00	3.490	27.421	286.263	

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

Detailed Discharge Table

Elevation	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
6,868.00	0.000	0.000
6,868.50	0.000	0.000
6,869.00	0.000	0.000
6,869.50	0.000	0.000
6,870.00	0.000	0.000
6,870.50	0.000	0.000
6,871.00	0.000	0.000
6,871.50	0.000	0.000
6,872.00	0.000	0.000
6,872.50	0.000	0.000
6,873.00	0.000	0.000
6,873.50	0.000	0.000
6,874.00	0.000	0.000
6,874.50	0.000	0.000
6,875.00	0.000	0.000
6,875.50	0.000	0.000
6,876.00	0.000	0.000
6,876.50	0.000	0.000
6,877.00	0.000	0.000
6,877.50	0.242	0.242
6,878.00	35.287	35.287
6,878.50	78.406	78.406

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Elevation	Emergency Spillway (cfs)	Combined Total Discharge (cfs) *
6,879.00	131.226	131.226
6,879.50	200.210	200.210
6,880.00	286.263	286.263

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	131.500	0.230	0.000	0.000	84.000	F	168.15	11.385
Σ		131.500						168.15	11.385
#2	1	104.000	0.195	0.000	0.000	82.000	F	122.82	8.019
Σ		235.500						176.61	19.404