

J21#1

DESIGN REPORT

Temporary Sedimentation Structure

J21-H1

Kayenta Mine

Navajo County, Arizona

For

PEABODY WESTERN COAL COMPANY

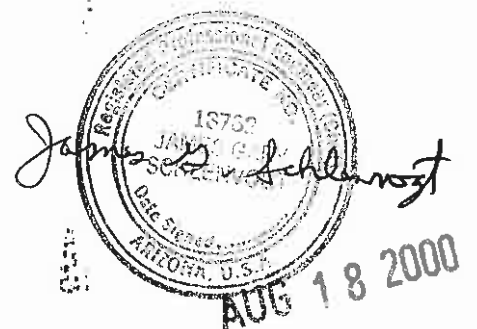


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INTRODUCTION

Sedimentation Structure J21-H1 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-H1 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-H1 that is in series with sedimentation structure J21-H. J21-H1 is the upstream 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-H1 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 131.5-acre watershed, which contributes directly to structure J21-H1 is classified as 43% undisturbed, 23% spoil and 34% disturbed.

DESIGN ANALYSES

GENERAL

Structure J21-H1 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-H1 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. A minimum upstream slope of 2H:1V or flatter slope and minimum downstream slope of 3.25H:1V or flatter slope were assumed. Based on the total embankment height of approximately 12.5 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-H1 will be constructed in series with proposed Structure J21-H. Structure J21-H1 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; however, since J21-H1 is the upstream pond and has a capacity of less than 20 acre-feet, the spillway was analyzed using the 25-year, 6-hour storm. In addition, the spillway was verified to pass the peak flow from the 100-year, 6-hour storm. Structures J21-H and J21-H1 were conservatively assumed to be full to the emergency spillway at the time of the design storm event. The storage capacity of structure J21-H1 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):

	<u>J21-H1</u>
1. Water Course length, L	0.770 mi.
2. Elevation Difference, H	247 ft
3. Time of Concentration, T _c	0.230 hr
4. SCS Curve Number	84
5. Rainfall Depth, 10-year, 24-hour storm	2.1 in
25-year, 6-hour storm	1.9 in
100-year, 6-hour storm	2.4 in
6. Drainage Area	131.5 ac

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

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-H1 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	92.3	108.5	
Volume	ac-ft	8.9	7.4	
Storage				
Peak Stage	msl	N/A	6897.2	
Emergency Spillway Elev.	msl	6896.0	6896.0	
Peak Storage	ac-ft	N/A	20.6	
Storage Capacity	ac-ft	17.9	17.9	
Outflow				
Peak Flow	cfs	N/A	46.6	
Spillway Elevation	msl	6896.0	6896.0	
Embankment Crest Elev.	msl	6898.5	6898.5	
Peak Stage	msl	—	6897.1	
Freeboard	ft	—	1.4	
Emergency Spillway Channel				
Flow Depth	ft	--	1.1	
Critical Velocity	fps	--	4.3	
Mannings "n"	--	--	0.03	
Width	ft	--	15	
Outflow Channel				
Slope	%		13	33
Normal Velocity	fps	--	6.4	6.6
Normal Depth	ft	--	1.4	1.4
Mannings "n"	--	--	0.046	0.070
Riprap D ₅₀	in	—	3	6

EMERGENCY SPILLWAY AND OUTLET CHANNEL

The emergency spillway and outlet channel for J21-H1 will be a trapezoidal channel with dimensions listed below. The alignment and dimensions are shown on Exhibit 1.

Minimum Channel Depth	(Spillway)	2.2	ft
	(Outflow)	2.4	ft
Channel Width		15	ft
Channel Length	(Spillway)	17	ft
	(Outflow)	300	ft
Sideslopes (Horizontal to Vertical)		3:1	or flatter
Average Slope	(Spillway)	0	%
Maximum Slope	(Outflow)	33	%
Spillway Elevation		6896.0	ft

The riprap-lined channel will extend a minimum 15-feet beyond the toe of the embankment as shown on Exhibit 1.

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-H1 is designed to contain approximately 17.9 acre-feet.

The calculations for the sediment load entering structure J21-H1 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	7.87
4.	Cover Factor, C	0.66
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-H1 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) 25-Year, 6-Hour Storm Event

Exhibit #1- J21-H and J21-H1 Proposed Sedimentation Ponds

APPENDIX A

Hydrology, Hydraulic, and Sedimentation Calculations

**PEABODY WESTERN COAL COMPANY
CALCULATED HYDROLOGIC DATA**

PROJECT: J21 AREA

STRUCTURE: J21-H1 Pond (Upper Pond)

TIME OF CONCENTRATION:

Start Elevation (ft) = 7112
 End Elevation (ft) = 6865
 Elevation Difference, E (ft) = 247

Watercourse Length (ft) = 4068
 Watercourse Length, L (mi) = 0.770

$T_c = (1.49L^{0.76}/E)^{0.385} = \underline{\underline{0.230 \text{ hours}}}$

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	46.5	3627
Sagebrush	C	73	10	730
Disturbed - Topsoil Stripped		90	44.7	4023
Disturbed - Spoil		86	30.3	2605.8
TOTAL:			131.5	10985.8

Weighted CN = Total CN*Area/ Total Area = 84

DRAINAGE BASIN AREA:

131.5 Acres

PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENTOLOGY DATA

PROJECT: J21-H1 Pond

SOIL ERODIBILITY FACTOR:

Soil Type	Erodibility Factor, K	Area (acres)	K*Area
20	0.25	56.5	14.13
34-spoil	0.12	30.3	3.64
Mine Pits	0.22	44.7	9.83
TOTAL:		131.5	27.60

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

SLOPE FACTOR:

Length (ft)	Elevation Change (ft)	Slope (%)	m	Slope Angle (deg)	LS Factor
270	70	25.9%	0.6	14.5	8.17
230	90	39.1%	0.6	21.4	11.23
190	70	36.8%	0.6	20.2	9.45
200	50	25.0%	0.6	14.0	6.57
345	60	17.4%	0.6	9.9	6.06
240	50	20.8%	0.6	11.8	6.00
420	90	21.4%	0.6	12.1	8.66
360	80	22.2%	0.6	12.5	8.22
250	60	24.0%	0.6	13.5	7.18
375	100	26.7%	0.6	14.9	10.25
130	40	30.8%	0.6	17.1	6.30
100	30	30.0%	0.6	16.7	5.24
190	40	21.1%	0.6	11.9	5.27
210	60	28.6%	0.6	15.9	7.78
520	130	25.0%	0.6	14.0	11.65

Average LS = 7.87

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	40%	25%	46.5	0.22	10.23	1.00	46.50
Sagebrush/Grass	40%	25%	10	0.20	2.00	1.00	10.00
Disturbed	0%	0%	44.7	1.00	44.70	1.00	44.70
Spoil	0%	0%	30.3	1.00	30.30	0.80	24.24
TOTAL:			131.5		87.23		125.44

Weighted C = Total C*Area/ Total Area = 0.663

Weighted P = Total P*Area/ Total Area = 0.954

RAINFALL FACTOR:

R = 40

PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENT YIELD

PROJECT: J21-H1 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	7.87
Cover Factor	0.66
Practice Factor	0.95
Gross Annual Sediment Yield	41.80 tons/acre/year
Sediment Density	94.00 pcf
Gross Annual Sediment Yield	0.0204 acre-feet/acre/year
Sediment Delivery Ratio	90%
Estimated Annual Sediment Yield	0.0184 acre-feet/acre/year
Watershed Area	131.5 acres
Watershed Annual Sediment Yield	2.42 acre-feet/year
Number of years	1 years
Calculated Sediment Volume	2.42 acre-feet

J21-H1 SPILLWAY CRITICAL VELOCITY
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	T
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.030
Channel Slope	0.016003 ft/ft
Left Side Slope	3.000000 H : V
Right Side Slope	3.000000 H : V
Bottom Width	15.00 ft
Discharge	46.60 cfs

Results	
Depth	0.64 ft
Flow Area	10.83 ft ²
Wetted Perimeter	19.05 ft
Top Width	18.84 ft
Critical Depth	0.64 ft
Critical Slope	0.016004 ft/ft
Velocity	4.30 ft/s
Velocity Head	0.29 ft
Specific Energy	0.93 ft
Froude Number	1.00
Flow is subcritical.	

J21-H1 SPILLWAY OUTFLOW CHANNEL @ 13% 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	13.0	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	46.60 cfs	
Depth:	0.44 ft	1.44 ft
Top Width:	17.67 ft	23.67 ft
Velocity:	6.42 fps	
X-Section Area:	7.26 sq ft	
Hydraulic Radius:	0.408	
Froude Number:	1.76	
Manning's n:	0.0460	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

J21-H1 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:	46.60 cfs	
Depth:	0.43 ft	1.43 ft
Top Width:	17.60 ft	23.60 ft
Velocity:	6.61 fps	
X-Section Area:	7.05 sq ft	
Hydraulic Radius:	0.397	
Froude Number:	1.84	
Manning's n:	0.0700	
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
KAYENTA MINE
POND J21H1 & J21H

10 Year, 24 Hour storm

DJK

Montgomery Watson
165 S. Union Blvd.
Suite 410
Lakewood, Co. 80228

Phone: 303 763-5140

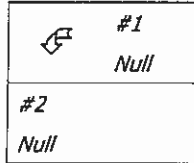
General Information

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) 25-Year, 6-Hour Storm Event

PEABODY WESTERN
KAYENTA MINE
POND J21-H1

25-Year, 6-Hour storm

DJK

Montgomery Watson
165 S. Union Blvd.
Suite 410
Lakewood, Co. 80228

Phone: 303 763-5140

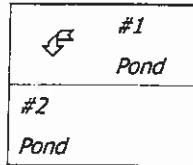
General Information

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	0.008	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	131.500	131.500	108.47	7.39
	Out			46.59	7.39
#2	In	104.000	235.500	98.89	12.45
	Out			45.65	11.24

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:	6,897.08
Dewater Time:	1.52 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	3.05
6,897.08	2.622	20.642	46.587	0.30 Peak Stage
6,897.50	2.698	21.759	83.969	
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	217.837	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	10.00

Pond Results:

Peak Elevation:	6,878.33
Dewater Time:	5.22 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	

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	0.161	106.51*
6,878.00	3.000	20.938	24.669	17.25
6,878.33	3.081	21.955	45.654	1.45 Peak Stage
6,878.50	3.119	22.468	56.242	
6,879.00	3.240	24.057	96.142	
6,879.50	3.364	25.708	149.618	
6,880.00	3.490	27.421	217.853	

**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	0.161	0.161
6,878.00	24.669	24.669
6,878.50	56.242	56.242

SEDCAD 4 for Windows

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Elevation	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
6,879.00	96.142	96.142
6,879.50	149.618	149.618
6,880.00	217.853	217.853

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	108.47	7.385
	Σ	131.500						108.47	7.385
#2	1	104.000	0.195	0.000	0.000	82.000	F	78.00	5.060
	Σ	235.500						98.89	12.445