



DESIGN REPORT

Temporary Sedimentation Structure

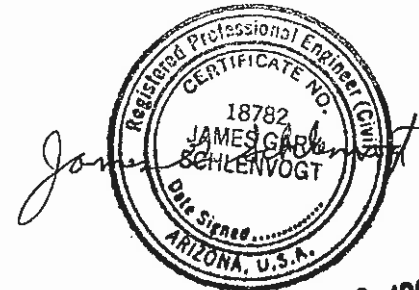
N6-K

Black Mesa Mine

Navajo County, Arizona

for

PEABODY WESTERN COAL COMPANY



JAN 20 1997

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION.....	1
INSPECTION.....	1
SITE DESCRIPTION.....	2
Land Use.....	2
DESIGN ANALYSES.....	2
General.....	2
Stability.....	3
Hydrology.....	3
Hydraulics.....	4
Emergency Spillway and Outlet Channel.....	6
Storage Capacity.....	6

APPENDIX A Hydrology and Hydraulic Calculations

APPENDIX B SEDCAD+ (Input and Output) 10-Year, 24-Hour Storm Event

APPENDIX C SEDCAD+ (Input and Output) 100-Year, 6-Hour Storm Event

EXHIBIT I Proposed N6-L & N6-K Sedimentation Pond Design

INTRODUCTION

Sedimentation structure N6-K is a partially incised structure with an earthen embankment, designed by Peabody Western Coal Company as a temporary sedimentation structure to control runoff and sediment from the proposed N-6 mining area at the Black Mesa Mine. The location of structure N6-K and its watershed boundary is shown on Drawing No. 85400 (Sheets K-7, and L-7) and Drawing No. 85405. The site-specific general construction plans of the proposed structure are shown on the attached Exhibit 1.

This design report contains information specific to proposed structure N6-K, which is located in series with existing sedimentation structure N6-K1 and proposed sedimentation structure N6-L. 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 N6-K was inspected by a Registered Professional Engineer from Peabody Western Coal Company, to ensure that the location was suitable and no adverse conditions existed. A detailed geotechnical investigation was not performed, rather, the information in Chapter 6, Attachment D was utilized for embankment design.

SITE DESCRIPTION

Land Use

The N6-K1, N6-K, and N6-L structures have a 402.6 acre combined drainage area and are located on a tributary to Coal Mine Wash. The 135.4 acre watershed contributing directly to the N6-K structure is classified as 43% disturbed spoil, and 57% reclaimed. Based on the mine plan, the N-6 pit will intercept a significant portion of the N6-K watershed. As the mining and reclamation activities progress closer to the pond, the above "worst case" assumptions will apply.

DESIGN ANALYSES

General

Structure N6-K was designed under the direct 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 1992 for Peabody Western Coal Company and was used in the analyses of the structure.

Stability

A homogeneous earthen embankment, compacted in lifts to design specifications, and approximately 15 feet wide on top will be constructed. An upstream slope of 4.5H:1V and a downstream slope of 4.5H:1V were assumed. Based on a total embankment height of 21 feet, these slopes are 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 40-foot wide riprap-lined trapezoidal channel.

Hydrology

The hydrologic analysis was completed using the computer program SEDCAD+ (see Appendices A, B, and C). Structure N6-K is located in series with existing structure N6-K1 and proposed structure N6-L. Structure N6-K is classified as a low hazard structure (see Drawing No. 85408). The mine area is sparsely populated with no one living in the downstream flood plain. The earthen embankment structure impounds less than 20 acre-feet and is less than 20 vertical feet in height from the upstream toe of embankment of the natural stream elevation to the emergency spillway elevation. The three structures have a combined capacity greater than 20 acre-feet; therefore, the spillway was analyzed using the 100-year, 6-hour storm event in lieu of the 25-year, 6-hour storm. Structures N6-K1, N6-K, and N6-L were conservatively assumed to be full to the emergency spillway at the time of 100-year storm event. The storage capacity of structure N6-K 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 downstream into Coal Mine Wash.

The following parameters were used in the hydrologic analysis:

	<u>10-Year 24-Hour Storm*</u>	<u>100-Year 6-Hour Storm</u>
1. Water Course length, L.....	0.805 mi	-----
2. Elevation Difference, H	257 ft	-----
3. Time of Concentration, T_c	0.238 hr	-----
4. SCS Curve Number	83	-----
5. Rainfall Depth.....	2.1 in	2.4 in
6. Drainage Area	135.4 acres	382.4 acres

*Values reported for the 10-year, 24-hour storm event represent the watershed which drains directly to Pond N6-K. Hydrologic input parameters for additional tributaries routed through upstream and downstream structures are presented in Appendix A.

Muskingum routing parameters were utilized to route hydrographs between the N6-K1, N6-K, and N6-L structures. The routing parameters are presented in Appendices A, B, and C, and are shown on a subwatershed basis.

Hydraulics

The SEDCAD+ 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 10-year and the 100-year storms were routed through the upstream Structure N6-K1 into Structure N6-K. The initial conditions and results of the analysis are summarized in the following table (supporting calculations are presented in Appendix A, B, and C).

N6-K 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	91.6	281.2
Volume	ac-ft	8.6*	31.3
Storage			
Peak Stage	mssl	N/A	6514.9
Emerg. Spillway Elev.	mssl	6513.0	6513.0
Peak Storage	ac-ft	N/A	23.3
Storage Capacity	ac-ft	19.9	19.9
Outflow			
Peak Flow	cfs	N/A	263.5
Spillway Elevation	mssl	6513.0	6513.0
Embankment Crest Elev.	mssl	6516.0	6516.0
Peak Stage	mssl	--	6514.9
Freeboard	ft	--	1.1
Emergency Spillway Channel			
Flow Depth	ft	--	1.9
Critical Velocity	fps	--	5.7
Mannings "n"	--	--	.035
Width	ft	--	40
Outflow Channel			
Maximum Slope	%	--	25
Normal Velocity	fps	--	9.1
Normal Depth	ft	--	0.7
Mannings "n"	--	--	.062
Riprap D ₅₀	in	--	9

* Inflow volume for the drainage area between Structure N6-K1 and N6-K.

Emergency Spillway and Outlet Channel

The emergency spillway and outlet channel for N6-K will be a trapezoidal channel, the alignment and dimensions are shown on Exhibit 1 and includes the following dimensions:

Minimum Channel Depth	(Spillway)	2.9	ft
	(Outflow)	1.7	ft
Channel Width		40	ft
Channel Length	(Spillway)	40	ft
	(Outflow)	100	ft
Side Slopes (Horizontal to Vertical)		3:1	or flatter
Average Slope	(Spillway)	0	%
Maximum Slope	(Outflow)	25	%
Spillway Elevation		6513	ft

A minimum 15-foot long riprap lined channel has been constructed beyond the toe of the embankment as a transition into the downstream sedimentation structure N6-L.

Storage Capacity

The impoundment stage-capacity table (see Exhibit 1) is based on design topography. The total storage capacity of structure N6-K is designed to contain approximately 19.91 acre-feet.

The calculations for the sediment load entering structure N6-K were made utilizing the Revised Universal Soil Loss Equation with the following parameters:

1.	Rainfall Factor, R	40
2.	Soil Erodibility Factor, K	0.27
3.	Slope Factor, LS	4.12
4.	Cover Factor, C	0.85
5.	Erosion Control Factor, P	0.63

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 N6-K does not have sufficient storage to contain the 10-year, 24 hour storm by itself; however, in series with structures N6-K1 and N6-L, sufficient storage is achieved. The combined sediment storage capacity was determined for the three structures in series and the results of the analysis are presented in the following table.

Combined Storage for Structures N6-K1, N6-K, and N6-L

	N6-K1	N6-K	N6-L	Combined
Total Storage Capacity	24.85	19.91	19.74	64.50 acre-ft
10-Year, 24-Hour Storm Inflow	15.73	8.62	1.56	25.91 acre-ft
Available Sediment Storage Capacity	----	----	----	38.59 acre-ft
Sediment Inflow Rate/Year	1.92	1.39	0.17	3.48 acre-ft
Sediment Storage Life	----	----	----	11.1 years

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

- Appendix A - Hydrology, Hydraulic, and Sedimentation Calculations
- Appendix B - SEDCAD+ (Input and Output) 10-Year, 24-Hour Storm Event
- Appendix C - SEDCAD+ (Input and Output) 100-Year, 6-Hour Storm Event
- Exhibit 1 - Proposed N6-L & N6-K Sedimentation Pond Design

APPENDIX A
Hydrology, Hydraulic, and Sedimentation Calculations

**PEABODY WESTERN COAL COMPANY
CALCULATED HYDROLOGIC DATA**

PROJECT: N6-K Pond

TIME OF CONCENTRATION:

Start Elevation (ft) = 6752
 End Elevation (ft) = 6495
 Elevation Difference, E (ft) = 257

 Watercourse Length (ft) = 4250
 Watercourse Length, L (mi) = 0.805

 $T_c = (11.9L^3/E)^{0.385} = \underline{\underline{0.238 \text{ hours}}}$

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
Reclaimed	C	81	76.8	6223.23
Spoil	B	86	58.6	5037.02
TOTAL:			135.4	11260.25

Weighted CN = Total CN*Area/ Total Area = 83

DRAINAGE BASIN AREA:

135.4 Acres

**PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENTOLOGY DATA**

PROJECT: N6-K Pond

SOIL ERODIBILITY FACTOR:

Soil Type	Erodibility Factor, K	Area (acres)	K*Area
Reclaimed	0.38	76.8	29.20
Spoil	0.12	58.6	7.03
TOTAL:		135.4	36.22

Weighted K = Total K*Area/ Total Area = 0.27

SLOPE FACTOR:

Length (ft)	Elevation Change (ft)	Slope (%)	m	Slope Angle (deg)	LS Factor
300	30	10.0%	0.5	5.7	2.38
250	40	16.0%	0.6	9.1	4.52
190	40	21.1%	0.6	11.9	5.27
250	50	20.0%	0.6	11.3	5.87
300	40	13.3%	0.6	7.6	4.03
420	40	9.5%	0.5	5.4	2.63

Average LS = 4.12

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
Reclaimed	--	--	76.8	0.73	56.09	0.34	26.12
Spoil	0%	0%	58.6	1.00	58.57	1.00	58.57
TOTAL:			135.4		114.66		84.69

Weighted C = Total C*Area/ Total Area = 0.85

Weighted P = Total P*Area/ Total Area = 0.63

RAINFALL FACTOR:

R = 40

PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENT YIELD

PROJECT: N6-K 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	0.27
Length Slope Factor	4.12
Cover Factor	0.85
Practice Factor	0.63
Gross Annual Sediment Yield	23.34 tons/acre/year
Sediment Density	94.00 pcf
Gross Annual Sediment Yield	0.0114 acre-feet/acre/year
Sediment Delivery Ratio	90%
Estimated Annual Sediment Yield	0.0103 acre-feet/acre/year
Watershed Area	135.4 acres
Watershed Annual Sediment Yield	1.39 acre-feet/year
Number of years	1 years
Calculated Sediment Volume	1.39 acre-feet

Peabody Western Coal Company
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\808\n6-l\n6.fm2
Worksheet	N6-K Spillway
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.035
Channel Slope	0.018028 ft/ft
Left Side Slope	3.000000 H : V
Right Side Slope	3.000000 H : V
Bottom Width	40.00 ft
Discharge	263.54 cfs

Results	
Depth	1.07 ft
Flow Area	46.46 ft ²
Wetted Perimeter	46.80 ft
Top Width	46.45 ft
Critical Depth	1.07 ft
Critical Slope	0.018029 ft/ft
Velocity	5.67 ft/s
Velocity Head	0.50 ft
Specific Energy	1.57 ft
Froude Number	1.00
Flow is subcritical.	

Notes:

Spillway Channel set to critical slope to determine critical velocity

SEDCAD+ RIPRAP CHANNEL DESIGN

N6-K Spillway Outslope

INPUT VALUES:

Shape	TRAPEZOIDAL	
Discharge	263.54 cfs	
Slope	25.00 %	
Sideslopes (L and R)	3.00:1	3.00:1
Bottom Width	40.00 feet	
Freeboard	1 ft	

RESULTS:

Steep Slope Design - PADER Method

Depth	0.69 ft
with Freeboard	1.69 ft
Top Width	44.15 ft
with Freeboard	50.15 ft
Velocity	9.06 fps
Cross Sectional Area	29.07 sq ft
Hydraulic Radius	0.66 ft
Manning's n	0.062
Froude Number	1.97
Dmax	0.938 ft (11.25 in)
D50	0.750 ft (9.00 in)
D10	0.250 ft (3.00 in)

APPENDIX B
SEDCAD+ (Input and Output) 10-Year, 24-Hour Storm Event

CIVIL SOFTWARE DESIGN

SEDCAD+ Version 3

BLACK MESA MINE - TEMPORARY SEDIMENTATION PONDS N6-K1, N6-K, N6-L

by

Name: K. Kammerzell

Company Name: ACZ, INC.
File Name: C:\808\N6-L\N6-L

Date: 01-14-1997

Company Name: ACZ, INC.

Filename: C:\808\N6-L\N6-L User: K. Kammerzell

Date: 01-14-1997 Time: 09:32:33

Black Mesa Mine - Temporary Sedimentation Ponds N6-K1, N6-K, N6-L

Storm: 2.10 inches, 10 year-24 hour, SCS Type II

Hydrograph Convolution Interval: 0.1 hr

=====
 GENERAL INPUT TABLE
 =====

Detailed Between Structure Routing:

J	B	S	To Seg. #	Land Flow Condition	Distance (ft)	Slope (%)	Velocity (fps)	Segment Time (hr)	Muskingum	
									K	X
1	1	2	1	8	1400.32	2.14	4.39	0.09		
			2	8	300.17	3.33	5.48	0.02	0.103	0.364
1	1	3	1	8	300.17	3.33	5.48	0.02	0.015	0.381

Company Name: ACZ, INC.

Filename: C:\808\N6-L\N6-L User: K. Kammerzell

Date: 01-14-1997 Time: 09:32:33

Black Mesa Mine - Temporary Sedimentation Ponds N6-K1, N6-K, N6-L

Storm: 2.10 inches, 10 year-24 hour, SCS Type II

Hydrograph Convolution Interval: 0.1 hr

=====
 SUBWATERSHED/STRUCTURE INPUT/OUTPUT TABLE
 =====

-Hydrology-

JBS	SWS	Area (ac)	CN	UHS	Tc (hrs)	K (hrs)	X	Base- Flow (cfs)	Runoff Volume (ac-ft)	Peak Discharge (cfs)
111	1	247.00	83	F	0.306	0.000	0.000	0.0	15.73	153.55
					Type: Pond	Label: N6-K1				
111	Structure	247.00							15.73	

111	Total IN	247.00							15.73	153.55
111	Total OUT								15.73	98.65
=====										
112	1	135.40	83	F	0.238	0.000	0.000	0.0	8.62	91.62
					Type: Pond	Label: N6-K				
112	Structure	135.40							24.36	

112	Total IN	382.40							24.36	144.30
112	Total OUT								24.35	132.40
=====										
111 to 112 Routing					0.103		0.364			
=====										
113	1	20.20	86	F	0.080	0.000	0.000	0.0	1.56	19.89
					Type: Pond	Label: N6-L				
113	Structure	20.20							25.91	

113	Total IN	402.60							25.91	136.48
113	Total OUT								25.91	128.91
=====										
112 to 113 Routing					0.015		0.381			
=====										

APPENDIX C
SEDCAD+ (Input and Output) 100-Year, 6-Hour Storm Event

CIVIL SOFTWARE DESIGN

SEDCAD+ Version 3

BLACK MESA MINE - TEMPORARY SEDIMENTATION PONDS N6-K1, N6-K, N6-L

by

Name: K. Kammerzell

Company Name: ACZ, INC.
File Name: C:\808\N6-L\N6-L

Date: 01-14-1997

Company Name: ACZ, INC.

Filename: C:\808\N6-L\N6-L User: K. Kammerzell

Date: 01-14-1997 Time: 09:32:36

Black Mesa Mine - Temporary Sedimentation Ponds N6-K1, N6-K, N6-L

Storm: 2.40 inches, 100 year- 6 hour, SCS Type II

Hydrograph Convolution Interval: 0.1 hr

=====
 GENERAL INPUT TABLE
 =====

Detailed Between Structure Routing:

J	B	S	To Seg. #	Land Flow Condition	Distance (ft)	Slope (%)	Velocity (fps)	Segment Time (hr)	Muskingum	
									K	X
1	1	2	1	8	1400.32	2.14	4.39	0.09		
			2	8	300.17	3.33	5.48	0.02	0.103	0.364
1	1	3	1	8	300.17	3.33	5.48	0.02	0.015	0.381

Company Name: ACZ, INC.

Filename: C:\808\N6-L\N6-L User: K. Kammerzell

Date: 01-14-1997 Time: 09:32:36

Black Mesa Mine - Temporary Sedimentation Ponds N6-K1, N6-K, N6-L

Storm: 2.40 inches, 100 year- 6 hour, SCS Type II

Hydrograph Convolution Interval: 0.1 hr

=====

SUBWATERSHED/STRUCTURE INPUT/OUTPUT TABLE

=====

-Hydrology-

JBS	SWS	Area (ac)	CN	UHS	Tc (hrs)	K (hrs)	X	Base- Flow (cfs)	Runoff Volume (ac-ft)	Peak Discharge (cfs)
111	1	247.00	83	F	0.306	0.000	0.000	0.0	20.19	280.51
					Type: Pond		Label: N6-K1			
111	Structure	247.00							20.19	

111	Total IN	247.00							20.19	280.51
111	Total OUT								20.19	195.66
=====										
112	1	135.40	83	F	0.238	0.000	0.000	0.0	11.07	168.06
					Type: Pond		Label: N6-K			
112	Structure	135.40							31.26	

112	Total IN	382.40							31.26	281.21
112	Total OUT								31.26	263.54
=====										
111 to 112 Routing					0.103	0.364				
=====										
113	1	20.20	86	F	0.080	0.000	0.000	0.0	1.96	36.24
					Type: Pond		Label: N6-L			
113	Structure	20.20							33.22	

113	Total IN	402.60							33.22	270.96
113	Total OUT								33.22	261.14
=====										
112 to 113 Routing					0.015	0.381				
=====										

Company Name: ACZ, INC.

Filename: C:\808\N6-L\N6-L User: K. Kammerzell

Date: 01-14-1997 Time: 09:32:36

Black Mesa Mine - Temporary Sedimentation Ponds N6-K1, N6-K, N6-L

Storm: 2.40 inches, 100 year- 6 hour, SCS Type II

Hydrograph Convolution Interval: 0.1 hr

=====
 POND INPUT/OUTPUT TABLE
 =====

J1, B1, S1
 N6-K1

Drainage Area from J1, B1, S1, SWS(s)1: 247.0 acres
 Total Contributing Drainage Area: 247.0 acres

DISCHARGE OPTIONS:

Emergency
 Spillway

=====
 Riser Diameter (in) ----
 Riser Height (ft) ----
 Barrel Diameter (in) ----
 Barrel Length (ft) ----
 Barrel Slope (%) ----
 Manning's n of Pipe ----
 Spillway Elevation ----

 Lowest Elevation of Holes ----
 # of Holes/Elevation ----

 Entrance Loss Coefficient ----
 Tailwater Depth (ft) ----

 Notch Angle (degrees) ----
 Weir Width (ft) ----

 Siphon Crest Elevation ----
 Siphon Tube Diameter (in) ----
 Siphon Tube Length (ft) ----
 Manning's n of Siphon ----
 Siphon Inlet Elevation ----
 Siphon Outlet Elevation ----

 Emergency Spillway Elevation 6571.4
 Crest Length (ft) 30.0
 Z:1 (Left and Right) 3 3
 Bottom Width (ft) 20.0

POND RESULTS:

Permanent
 Pool
 (ac-ft)
 =====
 24.8

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	20.19	280.51
OUT	20.19	195.66

Peak Elevation	Hydrograph Detention Time (hrs)
6573.6	0.01

J1, B1, S2
N6-K

Drainage Area from J1, B1, S2, SWS(s)1: 135.4 acres
Total Contributing Drainage Area: 382.4 acres

DISCHARGE OPTIONS:

	Emergency Spillway
Riser Diameter (in)	----
Riser Height (ft)	----
Manhole Diameter (in)	----
Manhole Length (ft)	----
Manhole Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6513.0
Crest Length (ft)	40.0
Z:1 (Left and Right)	3 3
Bottom Width (ft)	40.0

FOND RESULTS:

Permanent
Pool
(ac-ft)

=====

19.9

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
--	-----------------------------	----------------------------

IN	31.26	281.21
OUT	31.26	263.54

Peak Elevation	Hydrograph Detention Time (hrs)
-------------------	---------------------------------------

6514.9	0.13
--------	------

J1, B1, S3
N6-L

Drainage Area from J1, B1, S3, SWS(s)1:	20.2 acres
Total Contributing Drainage Area:	402.6 acres

DISCHARGE OPTIONS:

Emergency
Spillway

Riser Diameter (in)	----
Riser Height (ft)	----
Barrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6512.0
Crest Length (ft)	40.0
Z:1 (Left and Right)	3 3
Bottom Width (ft)	40.0

POND RESULTS:

Permanent

Pool
(ac-ft)
=====
19.7

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	33.22	270.96
OUT	33.22	261.14

Peak Elevation	Hydrograph Detention Time (hrs)
6513.8	0.13

Company Name: ACZ, INC.

Filename: C:\808\N6-L\N6-L User: K. Kammerzell

Date: 01-14-1997 Time: 09:32:36

Black Mesa Mine - Temporary Sedimentation Ponds N6-K1, N6-K, N6-L

Storm: 2.40 inches, 100 year- 6 hour, SCS Type II

Hydrograph Convolution Interval: 0.1 hr

=====
 ELEVATION-AREA-CAPACITY-DISCHARGE TABLE
 =====

J1, B1, S1
 N6-K1

Drainage Area from J1, B1, S1, SWS(s)1: 247.0 acres
 Total Contributing Drainage Area: 247.0 acres

SW#1: Emergency Spillway

Elev	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	
6552.60	0.00	0.00	0.00	0.00	
6554.60	2.00	0.29	0.20	0.00	
6556.60	4.00	0.74	1.20	0.00	
6558.60	6.00	1.08	3.01	0.00	
6560.60	8.00	1.30	5.39	0.00	
6562.60	10.00	1.49	8.18	0.00	
6564.60	12.00	1.67	11.33	0.00	
6566.60	14.00	1.85	14.84	0.00	
6568.60	16.00	2.06	18.74	0.00	
6570.60	18.00	2.23	23.04	0.00	
6571.40	18.80	2.29	24.85	0.00	Stage of SW#1
6572.10	19.50	2.35	26.47	22.76	
6572.20	19.60	2.35	26.70	29.38	
6572.30	19.70	2.36	26.94	36.62	
6572.40	19.80	2.37	27.18	44.45	
6572.60	20.00	2.38	27.65	63.85	
6572.90	20.30	2.42	28.37	97.92	
6573.40	20.80	2.47	29.59	159.73	
6573.63	21.03	2.49	30.16	195.66	Peak Stage
6573.90	21.30	2.52	30.84	239.45	
6574.40	21.80	2.58	32.12	337.51	
6574.60	22.00	2.60	32.63	381.05	
6574.90	22.30	2.62	33.42	451.00	
6575.40	22.80	2.65	34.73	580.13	
6575.90	23.30	2.68	36.07	725.18	
6576.00	23.40	2.69	36.34	756.12	

J1, B1, S2
 N6-K

Drainage Area from J1, B1, S2, SWS(s)1: 135.4 acres
 Total Contributing Drainage Area: 382.4 acres

SW#1: Emergency Spillway

Elev	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	
6497.00	0.00	0.57	0.00	0.00	
6499.00	2.00	0.67	1.24	0.00	
6501.00	4.00	0.78	2.68	0.00	
6503.00	6.00	0.89	4.36	0.00	
6505.00	8.00	1.01	6.26	0.00	
6507.00	10.00	1.14	8.42	0.00	
6509.00	12.00	1.28	10.85	0.00	
6509.00	14.00	1.43	13.56	0.00	
6511.00	16.00	1.59	16.58	0.00	
6513.00	18.00	1.74	19.91	0.00	Stage of SW#1
6513.70	18.70	1.80	21.15	40.75	
6513.80	18.80	1.81	21.33	53.23	
6513.90	18.90	1.82	21.51	66.86	
6514.00	19.00	1.83	21.70	81.58	
6514.50	19.50	1.87	22.62	179.01	
6514.86	19.86	1.91	23.30	263.54	Peak Stage
6515.00	20.00	1.92	23.57	297.43	
6515.50	20.50	1.97	24.54	432.03	
6516.00	21.00	2.01	25.54	604.94	
6516.50	21.50	2.06	26.55	801.89	
6517.00	22.00	2.10	27.59	1036.65	
6517.50	22.50	2.15	28.66	1267.13	
6518.00	23.00	2.20	29.75	1535.41	

J1, B1, S3
N6-L

Drainage Area from J1, B1, S3, SWS(s)1: 20.2 acres
Total Contributing Drainage Area: 402.6 acres

SW#1: Emergency Spillway

Elev	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	
6490.00	0.00	0.34	0.00	0.00	
6492.00	2.00	0.42	0.76	0.00	
6494.00	4.00	0.51	1.69	0.00	
6496.00	6.00	0.61	2.81	0.00	
6498.00	8.00	0.71	4.12	0.00	
6500.00	10.00	0.82	5.65	0.00	
6502.00	12.00	0.90	7.37	0.00	
6504.00	14.00	0.98	9.25	0.00	
6506.00	16.00	1.12	11.35	0.00	
6508.00	18.00	1.31	13.78	0.00	
6510.00	20.00	1.50	16.58	0.00	
6512.00	22.00	1.67	19.74	0.00	Stage of SW#1
6512.70	22.70	1.73	20.93	40.75	
6512.80	22.80	1.74	21.11	53.23	
6512.90	22.90	1.75	21.28	66.86	
6513.00	23.00	1.75	21.46	81.58	
6513.50	23.50	1.80	22.34	179.01	
6513.85	23.85	1.83	22.98	261.14	Peak Stage
6514.00	24.00	1.84	23.25	297.43	
6514.50	24.50	1.92	24.19	432.03	

6515.00	25.00	2.00	25.17	604.94
6515.50	25.50	2.08	26.19	801.89
6516.00	26.00	2.16	27.25	1036.65
6516.50	26.50	2.29	28.36	1267.13
6517.00	27.00	2.41	29.54	1535.41
