INSPECTION REPORT

Temporary Impoundment

J3-SL

Black Mesa Mine

Navajo County, Arizona

For

PEABODY WESTERN COAL COMPANY

MAR 1 2000

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INTRODUCTION

Temporary impoundment J3-SL is an earthen embankment designed and constructed as a temporary impoundment structure to collect effluent from the Contractor's Trailer Park at Black Mesa Mine. The location of temporary impoundment J3-SL and its watershed boundary are shown in Appendix A. The 1999 site-specific plans are shown on the attached Exhibit 1.

This design report contains information specific to temporary impoundment J3-SL . 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 existing temporary impoundment J3-SL was inspected by a Registered Professional Engineer from Peabody Western Coal Company in October 1999 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 to assure that the design embankment configuration would be stable.

SITE DESCRIPTION

LAND USE

The J3-SL structure has a watershed of 4.18 acres. The 4.18 acre watershed that contributes directly to structure J3-SL is classified as 100% disturbed area.

DESIGN ANALYSES

GENERAL

Structure J3-SL was inspected under the supervision of a Registered Professional Engineer from Peabody Western Coal Company. The design analysis was performed in accordance with applicable 30 CFR 780 and 816 regulations of the United States Department of Interior, Office of Surface Mining (OSM). The most current information contained in the Peabody Western Coal Company files includes topographic maps developed by Cooper Aerial aerial surveys in 1999 and was used in the analyses of the structure.

STABILITY

Structure J3-SL is a category A-3 embankment. A homogenous earthen embankment with an approximately 13 feet wide embankment width. An upstream slope of a minimum 3:1 (horizontal to vertical) and a downstream slope of 3.5:1 was utilized. Based on the total embankment height of approximately 13 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 is stable.

HYDROLOGY

The hydrologic analysis was completed using the computer program SEDCAD 4 (see Appendix B). Structure J3-SL is classified as a low hazard structure. 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 top of embankment elevation.

Adequate storage capacity will be maintained in the impoundment above the normal operating level and below the top of the embankment to contain the storm runoff from the 100-year, 6-hour storm event with no discharge over the top of the embankment. To assure that adequate storm water storage capacity is available, the operating water level in the impoundment will be maintained at or below elevation 6581.9. Dewatering will be accomplished through pumping to trucks and hauling to the J28 Sewage Lagoons. Additionally, disposal of portable toilet waste in J3-SL is prohibited.

The storage capacity of structure J3-SL was analyzed using the 100-year, 6-hour storm event. The impoundment was verified to completely contain the 100-year, 6-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	0.0065	mi.
2.	Elevation Difference, H	26.5	ft
3.	Time of Concentration, T_c	0.020 hr	
4.	SCS Curve Number	91	
5.	Rainfall Depth, 100-year, 6-hour storm	2.4 in	
6.	Drainage Area	4.18 acres	

HYDRAULICS

The SEDCAD 4 computer program was used to evaluate inflow to the sedimentation structure. J3-SL does not incorporate an emergency spillway, instead the peak runoff from the 100-yr, 6-hr event will be contained with a minimum of one foot of freeboard. The initial conditions and results of the analysis are summarized in the following table (supporting calculations are presented in Appendix B).

J3-SL TEMPORARY IMPOUNDMENT HYDRAULICS TABLE

	Units	100-Yr, 6-Hr Storm
Initial Reservoir Volume Condition		6581.9
Inflow		
Peak Flow	Cfs	9.14
Volume	Ac-ft	0.53
Storage		
Peak Stage	Msl	6582.2
Max. Operating Elev.	Msl	6581.9
Peak Storage	Ac-ft	13.40
Storage Capacity	Ac-ft	12.87
Embankment Crest Elev.	Msl	6583.2
Freeboard	Ft	1.0

Notes: The Storage Capacity figure reflects available pond storage up to the defined Operating Elevation. The Peak Storage figures reflects available pond storage up to the Peak Storage elevation and includes Storage Capacity plus stormwater inflow volume (12.87 + 0. 53).

STORAGE CAPACITY

The impoundment stage-capacity table (see Appendix A) is based on the 1999 topographic mapping conducted by Peabody Western Coal Company. Structure J3-SL is designed to contain approximately 15.34 acre-feet at the top of embankment elevation.

The calculations for the sediment load entering structure J3-SL were made utilizing the Revised Universal Soil Loss Equation with the following parameters:

1.	Rainfall Factor, R	40
2.	Soil Erodibility Factor, K	0.22
3.	Slope Factor, LS	1.78
4.	Cover Factor, C	1.0
5.	Erosion Control Factor, P	1.0

The sediment inflow calculations are included in Appendix A. The hydrologic analysis gives the storage volume required to contain the 100-year, 6-hour storm and the remaining storage volume available for storing sediment. The existing storage capacity of J3-SL and the results of the sediment inflow analysis are summarized in the following table.

Storage for Structure J3-SL

J3-SL

	J3-SL
Total Storage Capacity	15.34 acre-ft
100-Year, 6-Hour Storm Inflow plus 1 ft Freeboard	2.47 acre-ft
Available Sediment Storage Capacity	12.87 acre-ft
Sediment Inflow Rate/Year	0.029 acre-ft /yr
Sediment Storage Life	443 yrs

*   *   *

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

Appendix A   - Hydrology, Hydraulic, and Sedimentation Calculations

-Watershed Map

-Stage Storage Table

Appendix B   - SEDCAD4 100-Year, 6-Hour Storm Event

Exhibit #1   - J3-SL Temporary Impoundment

APPENDIX A

Hydrology, Hydraulic, and Sedimentation Calculations

Watershed Map

Stage Storage Table

TIME OF CONCENTRATION

	H (HI)	H (LO)	H
ELEV. DIFFERENCE (H):	6598	6571.5	26.5

	L (FT.)		L (MI.)
WATERCOURSE LENGTH (L):	229		0.043371

$TC = [(11.9 \times (L^3)) / H] ^ 0.385$

$TC = \quad 0.019593$

SCS CURVE NUMBER

COVER TYPE	HYDROLOGIC CONDITION	SOIL TYPE	CN	AREA (Ac.)	CN*AREA
Newly graded or bare area	----	C	91	4.18	380.38

$CN = \quad 91$

DRAINAGE BASIN AREA

ACRES = 4.18   SQ. MILES= 0.006531

PROJECT: J3-SL

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.

PARAMETER DESCRIPTION	VALUE
Soil Erodibility Factor	0.220
Length Slope Factor	1.78
Cover Factor	1.0
Practice Factor	1.0
Annual Rainfall Factor	40
Gross Annual Sediment Yield	15.62 *tons/acre/year*
Sediment Density	94 pcf
Gross Annual Sediment Yield	0.00763 acre-feet/acre/year
Sediment Delivery Ratio	90%
Estimated Annual Sediment Yield	0.0069 acre-feet/acre/year
Watershed Area	4.2 acres
Watershed Annual Sediment Yield	0.0288 acre-feet/year
Number of years	1 years
Required Pond Sediment Storage	0.029 acre-feet

PROJECT: J3-SL

SOIL ERODIBILITY FACTOR:

Soil Type	Soil Group	Erodibility Factor, K	Area (Acres)	K*Area
Disturbed	D	0.22	4.2	0.924
TOTAL :			4.2	0.92

Weighted K = Total K*Area/Total Area =   0.220

LENGTH SLOPE FACTOR:

Length (ft)	Elevation Change (ft)	Slope (%)	m	Slope Angle (deg)	LS Factor
25	6	24.0%	0.6	13.5	1.80
24	6	25.0%	0.6	14.0	1.84
52	8	15.4%	0.6	8.7	1.68

Average LS =   1.78

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 > or = 9%

Where:

Slope < or = 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
Disturbed	0	0	4.2	1	4.2	1	4.2
		TOTAL	4.2		4.2		4.2

Weighted C = Total C*Area/ Total Area =   1

Weighted P = Total P*Area/ Total Area =   1.00

RAINFALL FACTOR:

R =   40

PLAN VIEW

SCALE: 1" = 100'

SURVEY DATE: 09-25-99

C.I. = 2'

J3-SL
WATERSHED MAP

BLACK MESA MINE
PEABODY WESTERN COAL COMPANY
PO BOX 605 KAYENTA, ARIZONA 86033

DESIGNED BY: PWCC	SCALE: AS SHOWN
DRAWN BY: CI	DRAWING DATE: 2-23-00
CHECKED BY: RL	SURVEY DATE: 09-25-99
CONTOUR INT.: 2'	DWG FILE: SL_WATER.DWG

REVISIONS

DATE	CHK'D	DESCRIPTION

WATERSHED BOUNDARY

CELL #1

CELL #2

TANK

N-19800
N-20000
E25800
E26000
E26200
E26400

SEWAGE CELL #1 POND STAGE CAPACITY TABLE

ELEVATION (ft-msl)	STAGE (ft)	AREA (acres)	CAPACITY (ac-ft)	TOTAL CAPACITY (ac-ft)	DESCRIPTION
6572.2	0.0	0.00	0.00	0.00	BOTTOM OF POND
6574.0	1.8	0.75	0.68	0.68	
6576.0	3.8	0.87	1.62	2.30	
6578.0	5.8	0.98	1.85	4.15	
6580.0	7.8	1.09	2.07	6.22	
6582.0	9.8	1.20	2.29	8.51	
6583.2	11.0	1.27	1.48	9.99	TOP OF EMBANKMENT

SEWAGE CELL #2 POND STAGE CAPACITY TABLE

ELEVATION (ft-msl)	STAGE (ft)	AREA (acres)	CAPACITY (ac-ft)	TOTAL CAPACITY (ac-ft)	DESCRIPTION
6572.2	0.0	0.00	0.00	0.00	BOTTOM OF POND
6574.0	1.8	0.36	0.32	0.32	
6576.0	3.8	0.45	0.81	1.13	
6578.0	5.8	0.52	0.97	2.10	
6580.0	7.8	0.60	1.12	3.22	
6582.0	9.8	0.68	1.28	4.50	
6583.2	11.0	0.74	0.85	5.35	TOP OF EMBANKMENT

APPENDIX B

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

Temporary Impoundment J3-SL

Christopher Irwin

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
Null	#1	==>	End	0.000	0.000	SL

```
#1
Null
```

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	4.180	4.180	9.14	0.53

Structure Detail:

Structure #1 (Null)

SL

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	4.180	0.020	0.000	0.000	91.000	F	9.14	0.53
	Σ	4.180						9.14	0.53