HYDROLOGY STUDY FOR
BEST COAL, INC.

NARLEY MINE

P-3850

JEFFERSON COUNTY, ALABAMA

BY

PERC ENGINEERING CO., INC.

P.O. BOX 1712

JASPER, ALABAMA 35502

FEBRUARY 24, 2004

2004
RECEIVED
SURFACE MINING
COMMISSION

STATE OF ALABAMA

SURFACE MINING COMMISSION

P. O. BOX 2390 — JASPER, ALABAMA 35502-2390
(205) 221-4130

March 10, 2004

Mr. Melvin A. Bailey
Best Coal, Inc.
P. O. Box 1253
Cullman, AL 35056

RE: Narley Mine, P-3850
Design Plans - Ponds 004 and 007

Dear Mr. Bailey:

The design plans submitted for proposed sedimentation ponds 004 and 007 are hereby approved. If there are any questions, please do not hesitate to call.

Sincerely,

Gary J. Heaton

Gary J. Heaton
P.E.

/kb

cc: PERC Engineering Co., Inc.

PERC
ENGINEERING CO., INC.

Telephone: (205) 384-5553
Facsimile: (205) 295-3114 - Main Building
(205) 295-3115 - Water Lab
Web Address: www.percengineering.com

February 24, 2004

Mr. Gary Heaton, P.E.
Alabama Surface Mining Commission
Post Office Box 2390
Jasper, Alabama 35502-2390

RE: Best Coal, Inc.
Narley Mine
P- 3850

Dear Gary:

I hereby certify the attached detailed design plans for Basins 004 & 007 for the above referenced mine are in accordance with the Regulations of the Alabama Surface Mining Commission as adopted by Act 81-435 of December 18, 1981 and amended to date, and are true and correct to the best of my knowledge and belief.

If you have any questions or required additional information, please feel free to call.

Sincerely,
PERC Engineering Co., Inc.

Steven R. Ingle, P.E.
Alabama Registration No. 18213

ALABAMA REGISTERED NO. 18213 PROFESSIONAL ENGINEER STEVEN R. INGLE

2004 RECEIVED SURFACE MINING COMMISSION

Pond Construction Criteria

The embankment for sediment basins (temporary and permanent) shall be designed and built using the following as minimum criteria:

1. The top of the dam shall be no less than 12 feet wide.

2. See design sheet for maximum and minimum embankment slopes.

3. The foundation and abutments for the impounding structure shall be designed to be stable under all conditions of construction and operation of the impoundments, with a minimum static safety factor of 1.5 for the normal pool with steady seepage saturation conditions, and a seismic safety factor of at least 1.20.

4. The dam shall be constructed with a cutoff trench based upon prudent engineering practices for the site. The cutoff shall be located on the dam centerline and be of sufficient depth to extend into a relatively impervious material from which the core of the dam shall also be constructed.

5. The embankment foundation area shall be cleared of all organic matter, all surfaces sloped to no steeper than lv:lh, and the entire foundation surface scarified.

6. The entire embankment and cutoff trench shall be compacted to 95 percent density, based on standard proctor as outlined in ASTM.

7. The material placed in the embankment shall be free of sod, roots, stones over 6 inches in diameter, and other objectionable materials. The fill material shall be placed and spread over the entire fill area, starting at the lowest point of the foundation, in layers not to exceed 12 inches in thickness. Construction of the fill shall be undertaken only at such times that the moisture content of the fill material will permit satisfactory compaction in accordance with paragraph 5.

8. The pool area of the basin will be cleared of timber and large undergrowth.

9. The primary decant system when consisting of a pipe shall be installed according to Class C pipe installation for embankment bedding.

10. The primary decant system shall be equipped with a device, or constructed, such as to insure that subsurface withdrawal is accomplished to prevent discharge of floating solids. If a channel is used as the primary decant a skimmer shall be installed to prevent floating solids from discharging.

11. A splash pad or riprap may be required under the discharge of the primary decant system where necessary to insure that the discharge does not erode the embankment.

12. The combination primary and secondary decant system shall be designed to safely carry the expected peak flow from a 25 year - 6 hour storm. The entire emergency overflow spillway channel will be a stabilized channel and will be stabilized upon completion of construction as specified within the detailed design plans using prudent engineering measures. These measures may consist of lining the spillway with concrete or a durable rock riprap, or the spillway being constructed in consolidated non-erodible material and planted with a mixture or both annual and perennial grasses, or a combination of any or all of the above.

13. Sediment basins using a single spillway system shall be an open channel of non-erodible construction consisting of concrete, durable rock riprap or its being constructed in consolidated non-erodible material as specified in the detailed design plans.

14. The settled embankment for temporary impoundments shall be a minimum of 1.0 foot above the maximum water elevation for the runoff from a 25 year - 6 hour, or a 10 year - 24 hour precipitation event (whichever has the greatest runoff). The settled embankment for permanent impoundments shall be a minimum of 1.0 foot above the maximum water elevation for the runoff from a 50 year - 6 hour, or a 10 year - 24 hour precipitation event (whichever has the greatest runoff).

15. If basins are built in series, then the combined decant system for each shall be designed to accommodate the entire contributing drainage area.

16. The dam and all disturbed areas shall be seeded with both perennial and annual grasses, fertilized and mulched in order to insure erosion is minimized. Hay bales or riprap may be placed at the toe of the dam immediately upon completion of construction.

17. The constructed height of the dam shall be increased a minimum of 5 percent over the design height to allow for settlement over the life of the embankment.

18. Final graded slopes of the entire permanent water impoundment area shall not exceed 2.5H-1.0V to provide for adequate safety and access for proposed water users.

19. Prior to Phase II bond release, additional data concerning water quality, water quantity, depth, size, configuration, postmining land use, etc., for each proposed permanent water impoundment, shall be submitted to the Regulatory Authority for permanent water impoundment approval.

20. All sediment basins will be inspected for stability, erosion, etc. two (2) times a month until removal of the structure or release of the reclamation bond.

21. The embankment and spillway will be maintained by repairing any damage such as erosion, slope failure or spillway damage until removal of the structure or release of the performance bond.

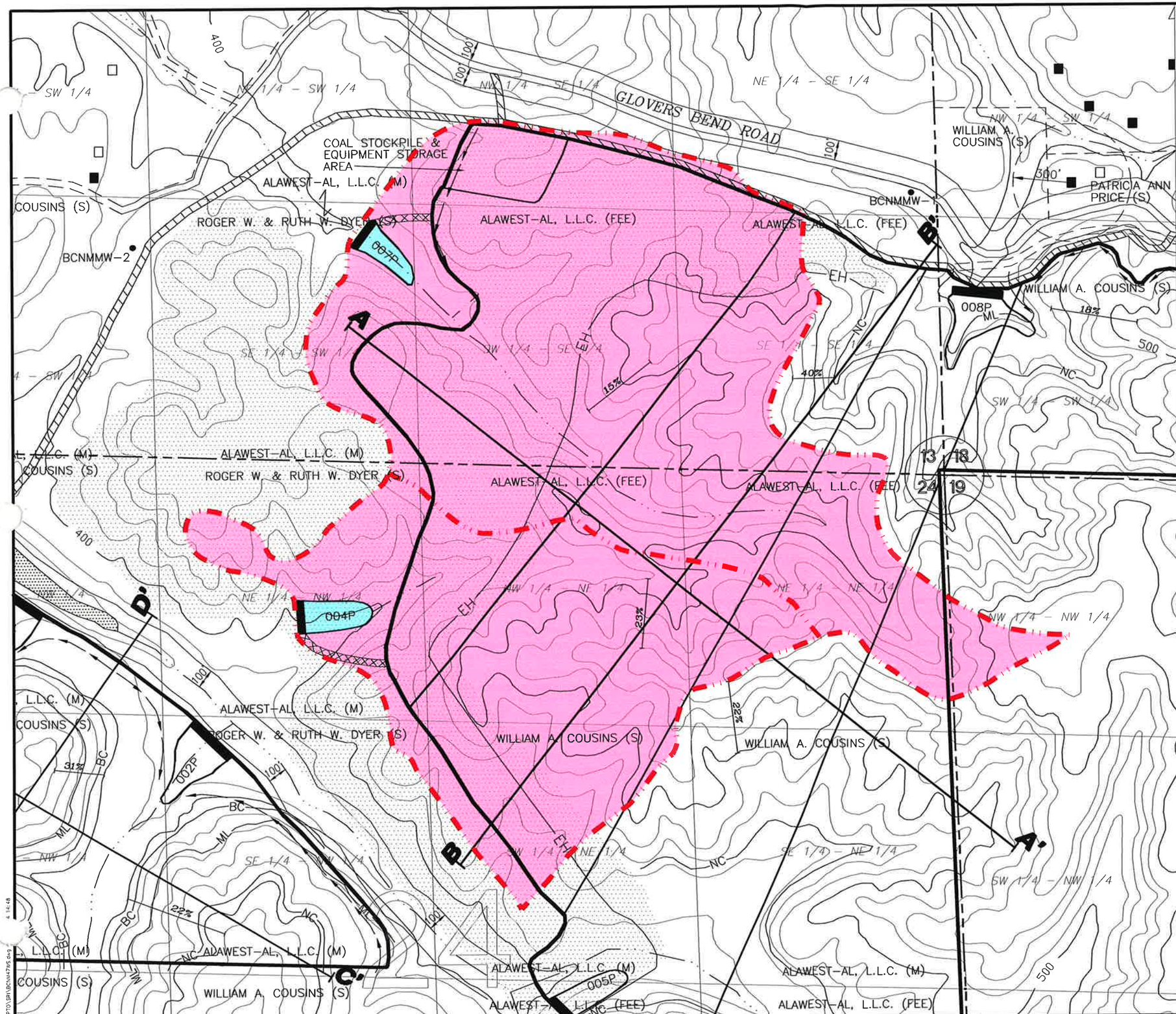
22. All ponds shall be examined quarterly for structural weakness, instability, erosion, or other hazardous conditions and maintenance performed as necessary. Formal inspections shall be made on an annual basis, including any reports or modifications, in accordance with 880-X-10C-.20[l(j)] of the Alabama Surface Mining Commission Regulations.

23. Sediment will be removed from each pond when the accumulated sediment reaches the sediment storage volume as shown on the detailed design sheet.

24. Upon completion of mining, successful reclamation and effluent standards being met, each sediment basin not remaining as a permanent water impoundment will be dewatered in an environmentally safe manner (such as siphoning, pumping, etc.) and reclaimed to approximate original contours by the following procedure:
A permanent diversion channel (designed for a 10 year - 24 hour precipitation event) shall be cut along the outer edge of the basin to re-route drainage around the basin and back through the stabilized spillway to allow reclamation of the sediment basin. The diversion channel shall be designed and grassed as per enclosed information. (See permanent diversion for basin disposal).Upon completion of the diversion channel the back slope of the dam shall be graded to a minimum 3H to 1V slope. The dewatered sediment basin area shall be seeded with some combination of the following: Fescue, bermuda, rye grass, canary grass and willows. After seeding the area shall be mulched. Any additional sediment or embankment material not used to meet original contour, if non-toxic, shall be spread in thin layers within the permit area and vegetated as stated in the approved reclamation plan. All toxic material encountered in the basin disposal shall be buried and covered with 4 feet of non-toxic material and vegetated as stated in the approved reclamation plan.

25. A qualified registered professional engineer or other qualified professional specialist, under the direction of the professional engineer shall conduct regular inspections during construction and upon completion shall inspect each basin for certification purposes.

26. Point source discharge embankments shall be constructed and abutments keyed into desirable material if at all possible. In the event that undesirable material is encountered, addition design and construction criteria shall be submitted prior to certification.



LEGEND

- Permit Boundary
- 001 Sediment Basin
- Occupied Dwelling
- Unoccupied Dwelling (Barn, Shed, etc..)
- Previously Surface Mined by Others
- Natural Drainage Course
- Drainage Divide
- Diversion

LANDUSE AND CURVE NUMBER INFORMATION

- Graded & Bare, Curve Number 81
- Sediment Basin, Curve Number 100

Scale: 1" = 500'

N

PERC ENGINEERING CO., INC.
1606 Highway 78 West Jasper, Alabama 35501
P.O. Box 1712 Jasper, Alabama 35502
(205) 384-5553 Office (205) 384-9491 Fax

Best Coal, Inc.
Narley Mine
P-3850
Basins 004 & 007 Watershed Map

DRAWN BY: P.T.O. DWG. NAME: BCNM47WS	DATE: 2-24-04
APPROVED BY: S.R.I.	SCALE: 1"=500'

D:\P70\SRI\BCNM47WS.dwg

Notes:

1. The sediment shall be removed from the basin when the accumulated sediment reaches the sediment storage volume.
2. Outer slopes of embankment shall be grassed.
3. Fill material shall be placed in 12" lifts and compacted to 95% of standard proctor.
4. The surface beneath the embankment shall be stripped of undesirable material.
5. Upon completion of mining, reclamation and maintenance of water quality standards the pond will be de-watered and reclaimed.
6. See the attached pond construction criteria.
7. See the attached drawings and specifications for diversions.
8. Elevations are based on assumed datum.

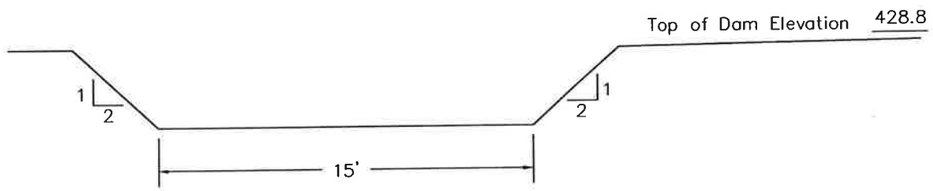
Storage Computation

Elevation (feet)	Area (acres)	Avg. Area (acres)	Interval (feet)	Storage (ac.-ft.)	Acc. Storage (ac.-ft.)
410	.000				.000
		.310	4	1.240	
414	.620				1.240
		.792	4	3.168	
418	.964				4.408
		1.148	4	4.590	
422	1.331				8.998
		1.550	4	6.198	
426	1.768				15.196
		1.975	4	7.898	
430	2.181				23.094

Key Basin Parameters

Drainage Area _____ 69 Acres
Disturbed Area _____ 67 Acres
Sediment Storage _____ 6.1 Ac. Ft.
Detention Storage _____ 5.3 Ac. Ft.
Permanent Pool Capacity _____ 8.4 Ac. Ft.
Total Basin Capacity _____ 18.1 Ac. Ft.
Peak Inflow _____ 159.1 C.F.S.
Peak Outflow _____ 43.8 C.F.S.

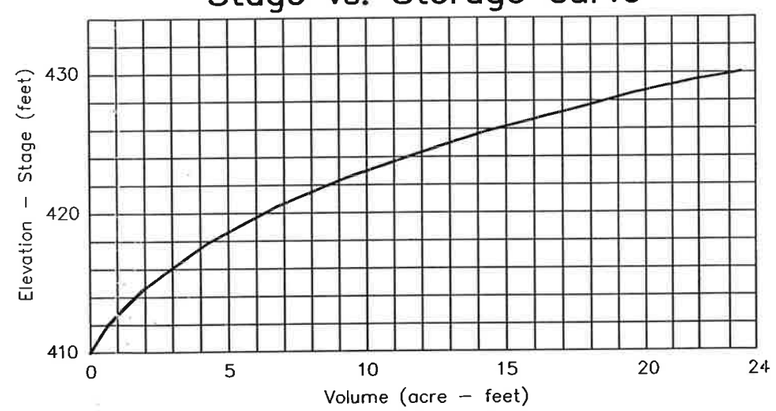
See Basin Note Sheet for Channel Lining Specifications



Spillway Gradient shall be Approximately 3 %
Crest of Emergency Spillway Elevation 427.8
Pipe Inlet Elevation 424
Q out 43.8 C.F.S.

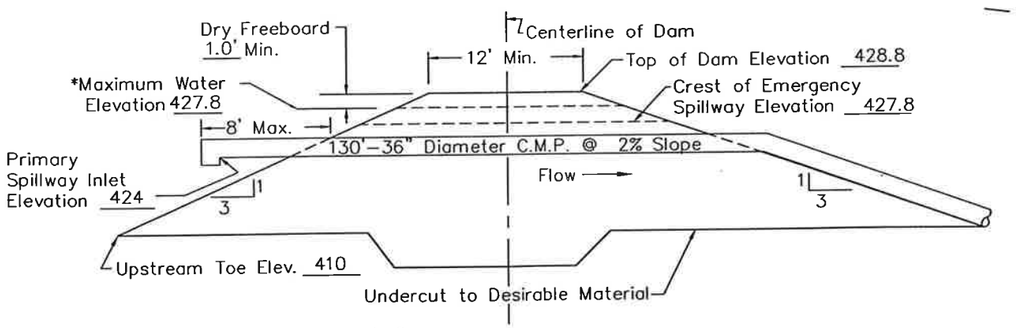
Emergency Spillway

Stage vs. Storage Curve



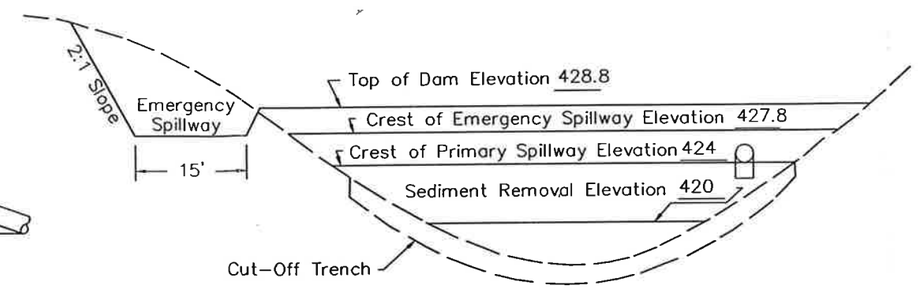
Steven R. Ingle, P.E.
AL Registration #18213

ALABAMA REGISTERED No. 18213 PROFESSIONAL ENGINEER STEVEN R. INGLE 3-10-04



*Storm with largest peak flow
Either 10 year - 24 hour event
or 25 year - 6 hour event.

Typical Cross Section Along Primary Spillway

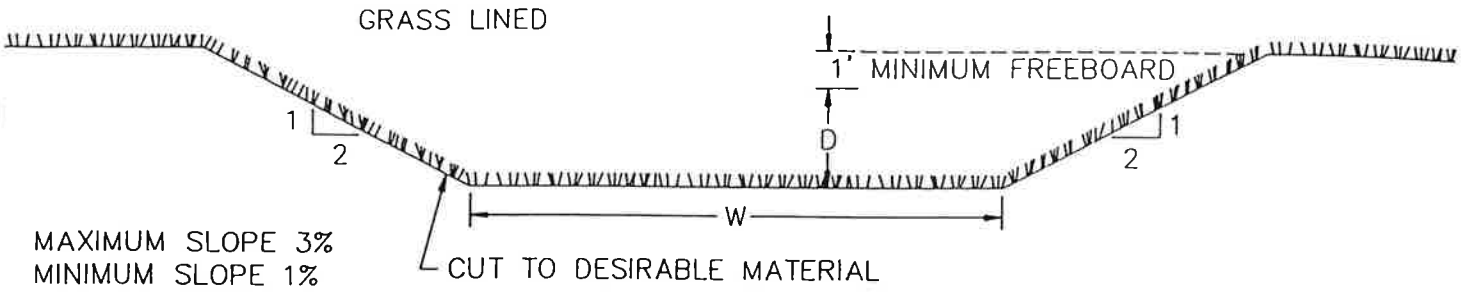


Typical Profile Looking Downstream

PERC ENGINEERING CO., INC.
1608 Highway 78 West Jasper, Alabama 35501
P.O. Box 1712 Jasper, Alabama 35502
(205) 384-3553 Office (205) 384-9411 Fax

BEST COAL, INC.
NARLEY MINE
P-3850
BASIN 004

DRAWN BY: P.T.O. DWG. NAME: BCNM04TY	DATE: 2-24-04
APPROVED BY: S.R.I.	SCALE: NONE



$$Q = \frac{1.49}{N} \quad A \quad R^{2/3} \; S^{1/2}$$

N(loose stone or grass lined) = 0.035
A = area
R = area/wetted perimeter
S = slope

* Grass lining: fescue, bermuda, rye grass

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 8.0 Ft.	
PEAK FLOW Q (CFS)	DEPTH D (Ft.)
0–15	0.5
15–50	1.0
50–100	1.5
100–180	2.0
180–270	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 10.0 Ft.	
PEAK FLOW Q (CFS)	DEPTH D (Ft.)
0–15	0.5
15–60	1.0
60–120	1.5
120–210	2.0
210–320	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 12.0 Ft.	
PEAK FLOW Q (CFS)	DEPTH D (Ft.)
0–20	0.5
20–70	1.0
70–150	1.5
150–250	2.0
250–383	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 15.0 Ft.	
PEAK FLOW Q (CFS)	DEPTH D (Ft.)
0–25	0.5
25–90	1.0
90–180	1.5
180–300	2.0
300–450	2.5

PERC
ENGINEERING CO., INC.

PERMANENT DIVERSION CHANNEL FOR BASIN DISPOSAL

DRAWN BY:	DATE:
APPROVED BY:	SCALE: NONE

ATTACHMENT III–B–2–A

NOTES

1) The primary spillway of Basin 004, consisting of a 36" diameter corrugated metal pipe, will extend through the embankment back to the original drainage course.

2) A splash pad consisting of durable, non-erodible sandstone or limestone riprap, concrete pad, or consolidated non-erodible bedrock will be located at the discharge point of the primary spillway of the Basin 004 to prevent erosion.

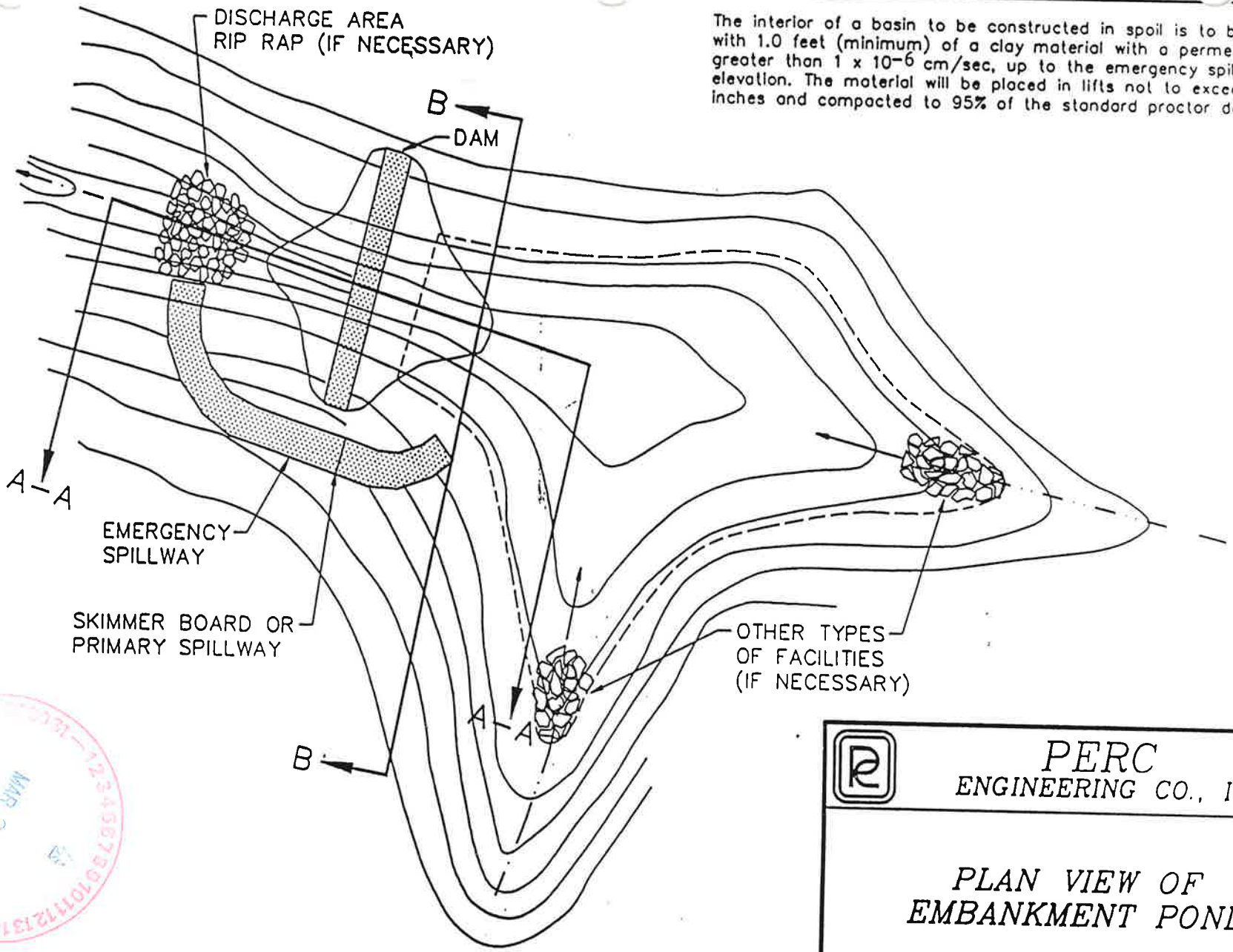
3) The emergency spillway channel of Basin 004 will be cut into consolidated material along the side of the embankment and carried out past the downstream slope of the embankment. The channel lining will consist of a grass mixture of but not limited to Fescue, Bermuda, and Sericea. The channel will be seeded with the mixture, fertilized, and mulched.

4) The primary spillway of Basin 007 will consist of a 12 foot wide open channel lined with 4 inches of concrete reinforced with standard concrete reinforcement wire. The channel lining will extend back to the existing drainage course. A 12' X 20' X 4" concrete splash pad will be located at the exit point of the tail section of the channel.

5) Due to Basin 004P being constructed in spoil material, the interior of the basin will be lined with 1.0 feet (minimum) of clay material with a permeability no greater the 1×10^{-6} cm/sec up to the emergency spillway elevation to minimize infiltration and to provide a stable pool level. The material will be placed in horizontal lifts not to exceed 6 inches and compacted to 95% of the standard proctor.

MAR 2004

The interior of a basin to be constructed in spoil is to be lined with 1.0 feet (minimum) of a clay material with a permeability no greater than 1 x 10^{-6} cm/sec, up to the emergency spillway elevation. The material will be placed in lifts not to exceed 6 inches and compacted to 95% of the standard proctor density.



PLAN VIEW OF EMBANKMENT POND

ATTACHMENT III-B-2-A

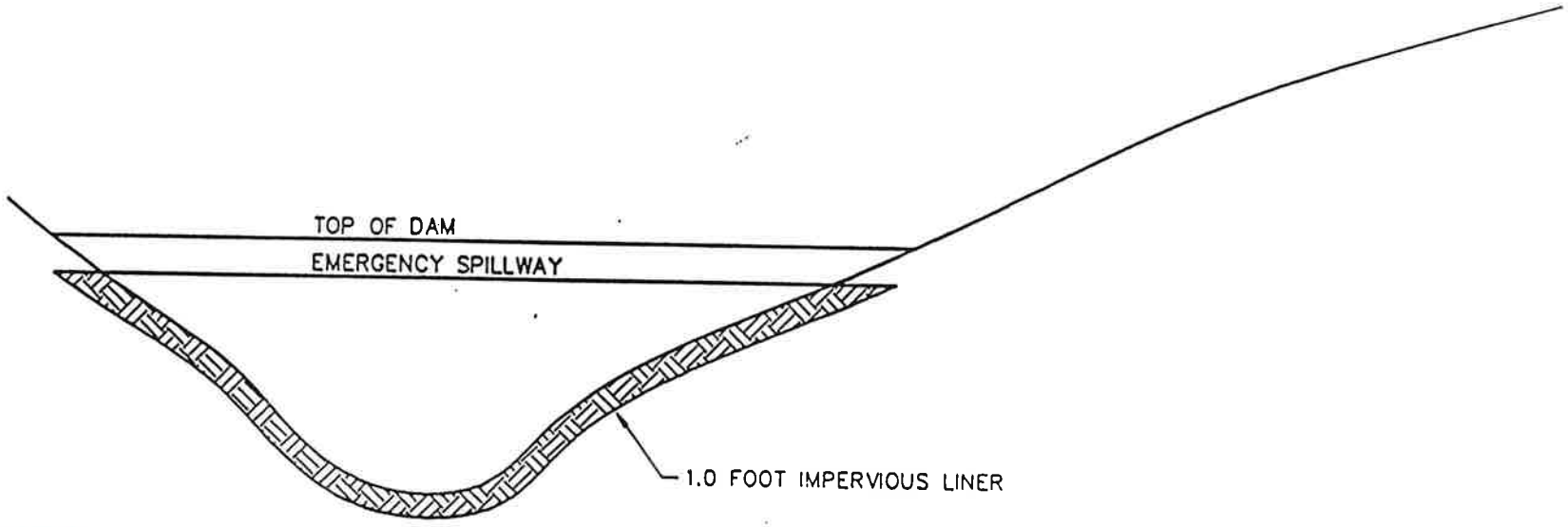
PERC
ENGINEERING CO., INC.

PLAN VIEW OF EMBANKMENT POND

DRAWN BY: DWG. NAME:	DATE:
APPROVED BY: R.E.P.	SCALE: NONE

MAR 2004

The interior of a basin to be constructed in spoil is to be lined with 1.0 feet (minimum) of a clay material with a permeability no greater than 1×10^{-6} cm/sec, up to the emergency spillway elevation. The material will be placed in lifts not to exceed 6 inches and compacted to 95% of the standard proctor density.



SECTION B–B

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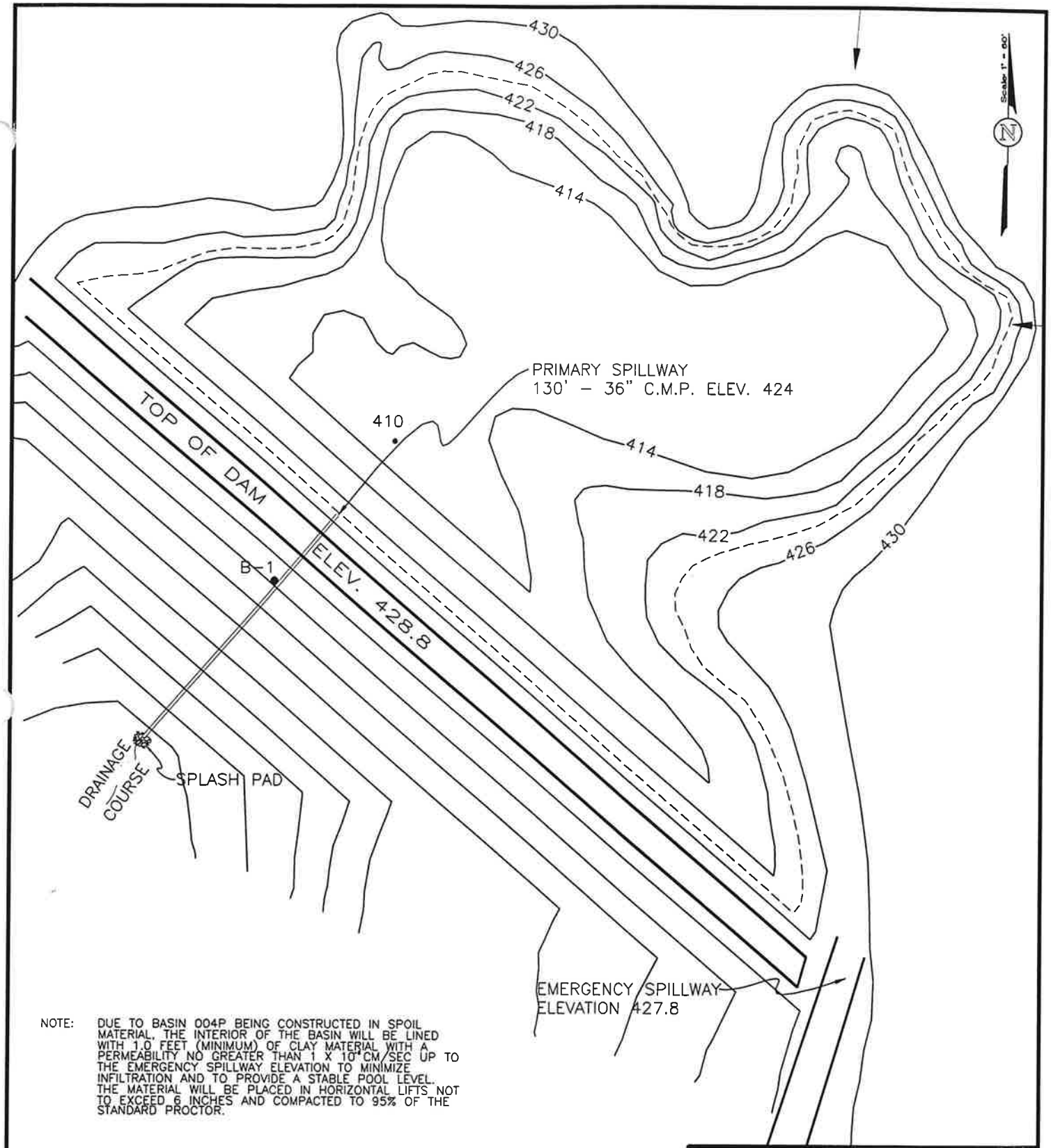
SECTION B–B

DRAWN BY: DWG. NAME:	DATE:
APPROVED BY: R.E.P.	SCALE: NONE

ATTACHMENT III–B–2–A

MAR 2004



NOTE: DUE TO BASIN 004P BEING CONSTRUCTED IN SPOIL MATERIAL, THE INTERIOR OF THE BASIN WILL BE LINED WITH 1.0 FEET (MINIMUM) OF CLAY MATERIAL WITH A PERMEABILITY NO GREATER THAN 1 X 10^{-4} CM/SEC UP TO THE EMERGENCY SPILLWAY ELEVATION TO MINIMIZE INFILTRATION AND TO PROVIDE A STABLE POOL LEVEL. THE MATERIAL WILL BE PLACED IN HORIZONTAL LIFTS NOT TO EXCEED 6 INCHES AND COMPACTED TO 95% OF THE STANDARD PROCTOR.

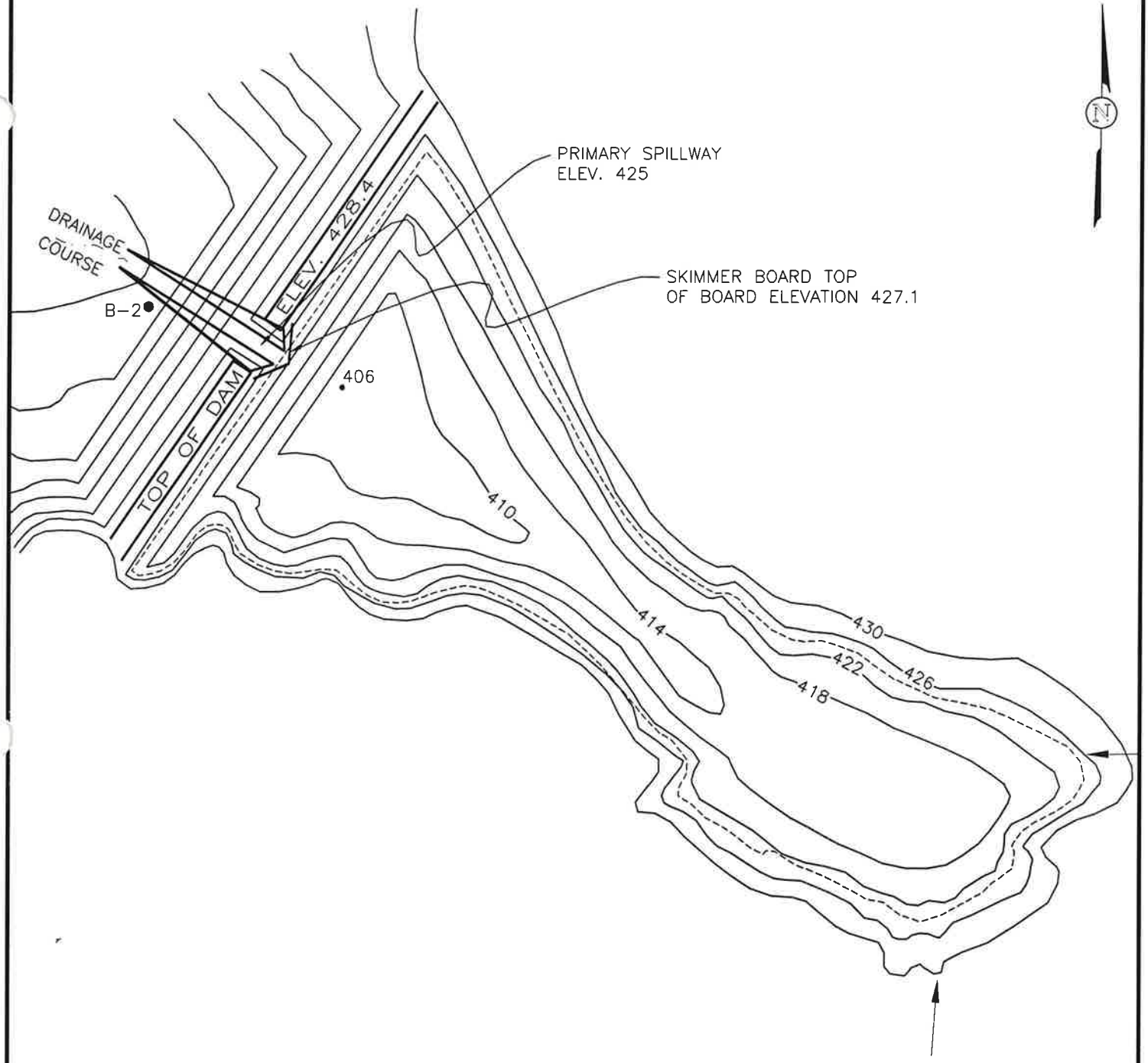
LEGEND

- ← MAJOR INFLOW
- - - - - NORMAL POOL LEVEL ELEVATION 424
- ● B-1 FOUNDATION INVESTIGATION SITE

PERC ENGINEERING CO., INC.

BEST COAL, INC.
NARLEY MINE
P-3850
BASIN 004 PLANVIEW

DRAWN BY: J.J.H. DWG. NAME: BCNMB4PV	DATE: 3-10-04
APPROVED BY: S.R.I.	SCALE: 1" = 60'



LEGEND

MAJOR INFLOW

NORMAL POOL LEVEL ELEVATION 425

B-2 FOUNDATION INVESTIGATION SITE

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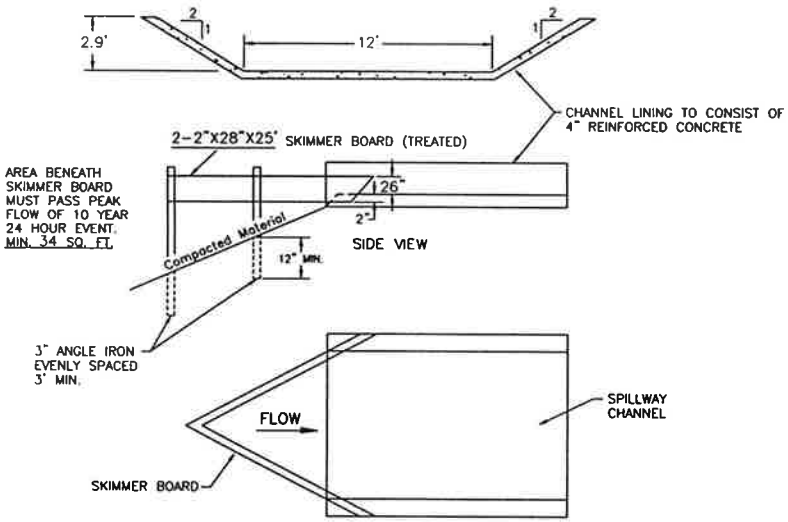
COMMISSION

PERC ENGINEERING CO., INC.

BEST COAL, INC.
NARLEY MINE
P-3850
BASIN 007 PLANVIEW

DRAWN BY: J.J.H. DWG. NAME: BCNMB7PV	DATE: 2-25-04
APPROVED BY: S.R.I.	SCALE: 1" = 100'

Skimmer Board Elev. 427.1
Spillway Elev. 425
Q Out 167.9 C.F.S.
V Out 5.0 F.P.S.



SKIMMER BOARD DETAIL

SPILLWAY GRADIENT SHALL BE APPROXIMATELY 40%

Notes:

1. The sediment shall be removed from the basin when the accumulated sediment reaches the sediment storage volume.
2. Outer slopes of embankment shall be grassed.
3. Fill material shall be placed in 12" lifts and compacted to 95% of standard proctor.
4. The surface beneath the embankment shall be stripped of undesirable material.
5. Upon completion of mining, reclamation and maintenance of water quality standards the pond will be de-watered and reclaimed.
6. See the attached pond construction criteria.
7. See the attached drawings and specifications for diversions.
8. Elevations are based on assumed datum.
9. Channel lining within the control section of the spillway channel will extend to the maximum water elevation.

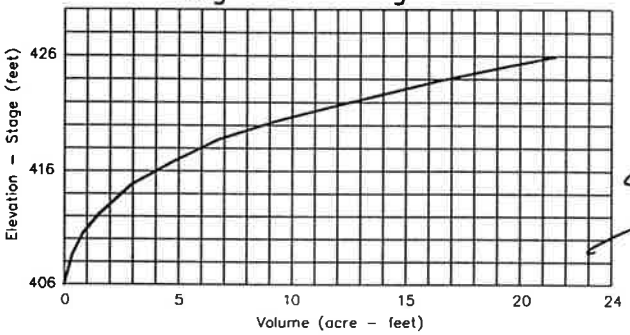
Storage Computation

Elevation (feet)	Area (acres)	Avg. Area (acres)	Interval (feet)	Storage (ac.-ft.)	Acc. Storage (ac.-ft.)
406	.000				.000
		.127	4	.506	
410	.253				.506
		.425	4	1.700	
414	.597				2.206
		.964	4	3.856	
418	1.331				6.062
		1.624	4	6.496	
422	1.917				12.558
		2.198	4	8.792	
426	2.479				21.350

Key Basin Parameters

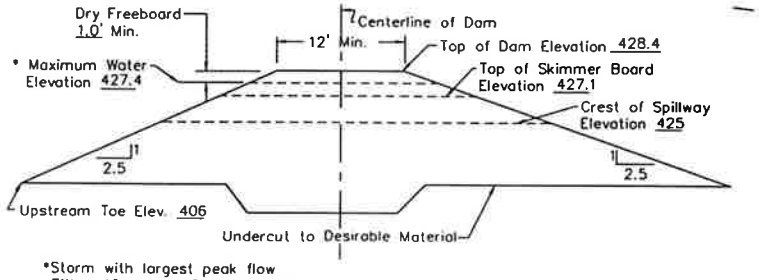
Drainage Area 119 Acres
Disturbed Area 117 Acres
Sediment Storage 8.7 Ac. Ft.
Detention Storage 9.9 Ac. Ft.
Permanent Pool Capacity 18.6 Ac. Ft.
Total Basin Capacity 18.6 Ac. Ft.
Peak Inflow 235.6 C.F.S.
Peak Outflow 167.9 C.F.S.

Stage vs. Storage Curve



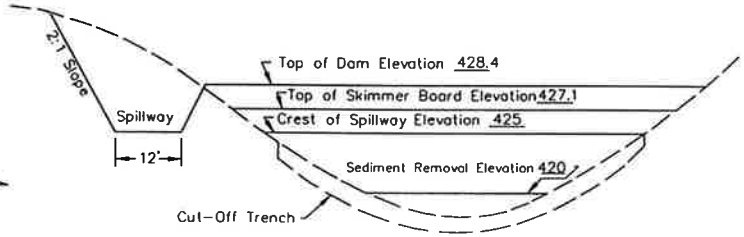
Steven R. Ingle, P.E.
AL Registration #18213

ALABAMA REGISTERED No. 18213 PROFESSIONAL ENGINEER STEVEN R. INGLE



*Storm with largest peak flow Either 10 year - 24 hour event or 25 year - 6 hour event.

Typical Cross Section Along Spillway

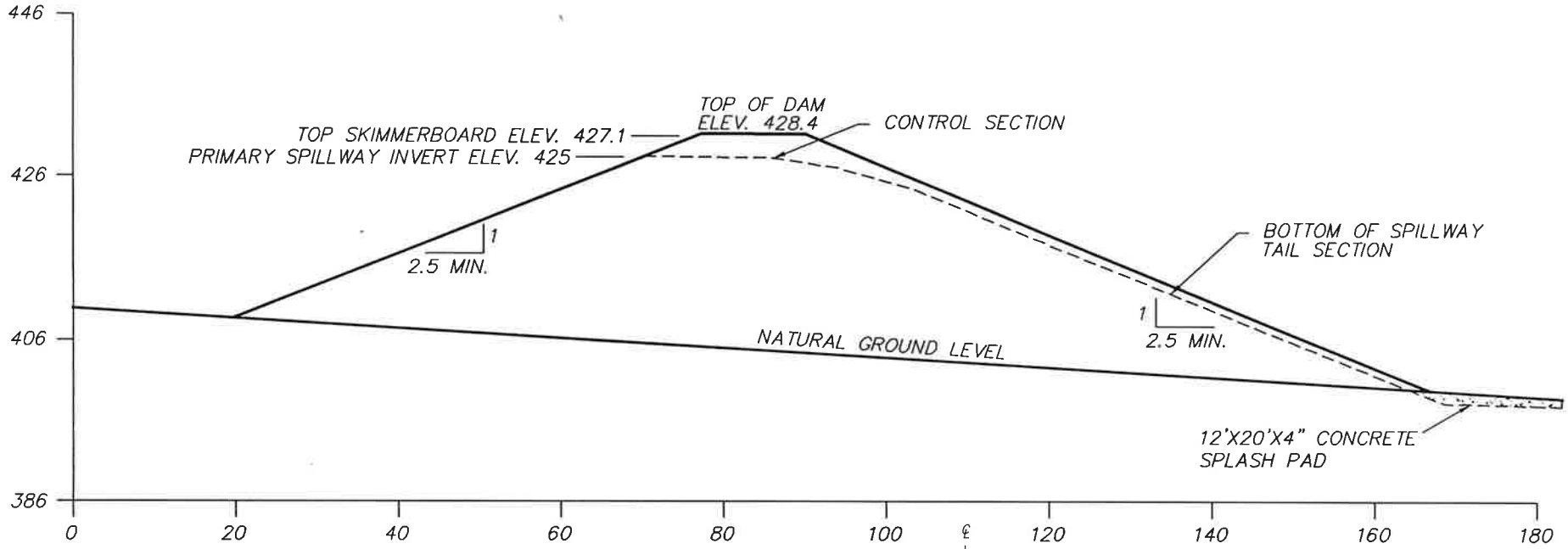


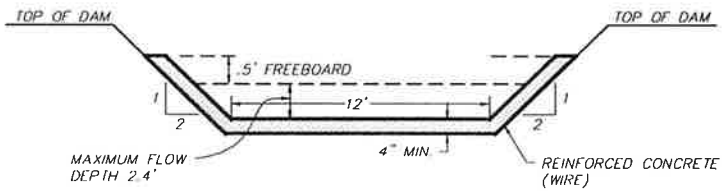
Typical Profile Looking Downstream

PERC ENGINEERING CO., INC.

BEST COAL, INC.
NARLEY MINE
P-3850
BASIN 007

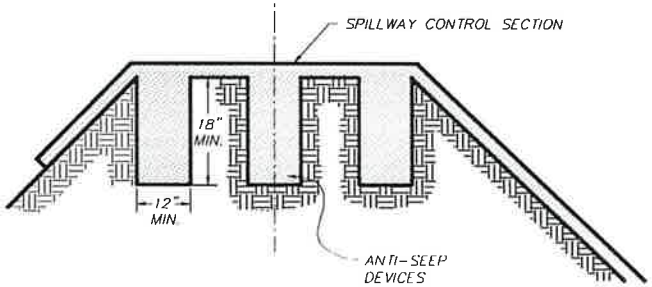
DRAWN BY: P.T.O.	DATE: 2-24-04
DWG. NAME: BCNM07TY	
APPROVED BY: S.R.I.	SCALE NONE





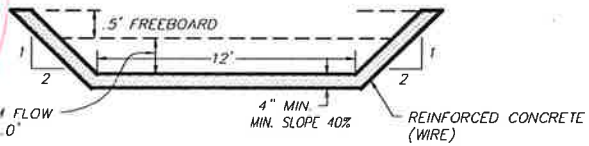
SPILLWAY CONTROL SECTION TYPICAL

N.T.S.



ANTI-SEEP DEVICE TYPICAL

N.T.S.



SPILLWAY TAIL SECTION TYPICAL

N.T.S.

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SURFACE MINING
COMMISSION

PERC ENGINEERING CO. INC.

BEST COAL, INC.
NARLEY MINE
P-3850
BASIN 007 MODIFICATION
DAM DETAILS

DRAWN BY: J.J.H. DWG. NAME: BCNM7DD	DATE: 2-25-04
APPROVED BY: S.R.I.	SCALE: AS NOTED

Best Coal, Inc.

Narley Mine

P-3850

Basin 004

6.0 Inches, 10 Year-24 Hour,

DRN58

SRI

General Information

Storm Information:

Storm Type:	DRN58
Design Storm:	10 yr - 24 hr
Rainfall Depth:	6.000 inches

Particle Size Distribution:

Size (mm)	Topsoil	Spoil
3.0000	97.000%	98.000%
2.0000	93.000%	97.000%
1.0000	82.000%	85.000%
0.5000	63.000%	70.000%
0.3000	52.000%	46.000%
0.2000	44.000%	37.000%
0.1000	34.000%	26.000%
0.0500	22.000%	15.000%
0.0300	18.000%	12.000%
0.0200	10.000%	9.000%
0.0100	7.000%	6.000%
0.0050	5.000%	4.000%
0.0030	3.000%	2.000%
0.0010	2.000%	1.000%
0.0001	0.000%	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 004

#1
Pond

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	69.000	69.000	84.97	22.68	7,853.8	404,010	300.59	174.22
	Out			44.78	22.68	347.2	16,260	0.04	0.03

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	100.000%	100.000%
1.0000	87.620%	100.000%
0.5000	72.157%	100.000%
0.3000	47.418%	100.000%
0.2000	38.140%	100.000%
0.1000	26.801%	100.000%
0.0500	15.462%	100.000%
0.0300	12.370%	100.000%
0.0200	9.277%	100.000%
0.0100	6.185%	100.000%
0.0050	4.123%	93.258%
0.0030	2.062%	46.629%
0.0010	1.031%	23.314%
0.0001	0.000%	0.000%

Structure Detail:

Structure #1 (Pond)

Basin 004

Pond Inputs:

Initial Pool Elev:	424.00
Initial Pool:	5.34 ac-ft
*Sediment Storage:	6.07 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Entrance Loss Coefficient	Tailwater Depth (ft)
36.00	100.00	2.00	0.0240	424.00	0.90	0.00

Pond Results:

Peak Elevation:	427.78
H'graph Detention Time:	2.40 hrs
Pond Model:	CSTRS
Dewater Time:	0.77 days
Trap Efficiency:	95.58 %

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)	
420.00	1.140	0.000	0.000		Top of Sed. Storage
420.00	1.140	0.000	0.000		
420.50	1.186	0.582	0.000		
421.00	1.234	1.187	0.000		
421.50	1.282	1.816	0.000		
422.00	1.331	2.469	0.000		
422.50	1.382	3.147	0.000		
423.00	1.434	3.851	0.000		
423.50	1.488	4.582	0.000		
424.00	1.542	5.339	0.000		Spillway #1

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
424.50	1.597	6.124	2.224	4.27*	
425.00	1.653	6.936	6.287	2.50	
425.50	1.710	7.777	11.541	6.05	
426.00	1.768	8.646	17.776	2.20	
426.50	1.817	9.542	24.832	1.40	
427.00	1.867	10.463	32.640	0.85	
427.50	1.918	11.410	40.983	0.70	
427.78	1.947	11.959	44.776	0.60	Peak Stage
428.00	1.969	12.381	47.696		
428.50	2.021	13.379	53.633		
429.00	2.074	14.403	57.249		
429.50	2.127	15.453	60.385		
430.00	2.181	16.530	63.357		

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

Detailed Discharge Table

Elevation	Straight Pipe (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000
420.00	0.000	0.000
420.50	0.000	0.000
421.00	0.000	0.000
421.50	0.000	0.000
422.00	0.000	0.000
422.50	0.000	0.000
423.00	0.000	0.000
423.50	0.000	0.000
424.00	0.000	0.000
424.50	(3)>2.224	2.224
425.00	(3)>6.287	6.287
425.50	(3)>11.541	11.541
426.00	(3)>17.776	17.776
426.50	(3)>24.832	24.832
427.00	(3)>32.640	32.640
427.50	(3)>40.983	40.983
428.00	(5)>47.696	47.696
428.50	(6)>53.633	53.633
429.00	(6)>57.249	57.249

Elevation	Straight Pipe (cfs)	Combined Total Discharge (cfs)
429.50	(6)>60.385	60.385
430.00	(6)>63.357	63.357

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	67.000	0.136	0.000	0.000	81.000	F	82.39	21.684
	2	2.000	0.000	0.000	0.000	100.000	S	3.15	1.000
	Σ	**69.000**						**84.97**	**22.684**

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.240	200.00	22.00	0.9000	1.0000	2	7,853.8	408,971	304.28	181.29
	2	0.001	200.00	0.01	0.0010	1.0000	1	0.0	0	0.00	0.00
	Σ							**7,853.8**	**404,010**	**300.59**	**174.22**

Best Coal, Inc.

Narley Mine

P-3850

Basin 004

4.8 Inches, 25 Year-6 Hour,

SCS 6 Hour

SRI

General Information

Storm Information:

Storm Type:	Rainfall Event

Accumulated Time (hrs)	Accumulated Depth (in)
0.00	0.0000
0.50	0.1680
1.00	0.3840
1.50	0.6480
2.00	1.1040
2.50	2.8800
3.00	3.3600
3.50	3.7440
4.00	4.0080
4.50	4.2480
5.00	4.4400
5.50	4.6320
6.00	4.8000

Peak 30-minute Intensity: 3.552 in/hr

Particle Size Distribution:

Size (mm)	Topsoil	Spoil
3.0000	97.000%	98.000%
2.0000	93.000%	97.000%
1.0000	82.000%	85.000%
0.5000	63.000%	70.000%
0.3000	52.000%	46.000%
0.2000	44.000%	37.000%
0.1000	34.000%	26.000%
0.0500	22.000%	15.000%
0.0300	18.000%	12.000%
0.0200	10.000%	9.000%
0.0100	7.000%	6.000%
0.0050	5.000%	4.000%
0.0030	3.000%	2.000%

Size (mm)	Topsoil	Spoil
0.0010	2.000%	1.000%
0.0001	0.000%	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 004

#1
Pond

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	69.000	69.000	159.10	16.49	9,405.4	564,790	418.80	269.92
	Out			43.81	16.49	445.6	23,742	0.11	0.10

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	100.000%	100.000%
1.0000	91.521%	100.000%
0.5000	75.370%	100.000%
0.3000	49.529%	100.000%
0.2000	39.839%	100.000%
0.1000	27.995%	100.000%
0.0500	16.151%	100.000%
0.0300	12.921%	100.000%
0.0200	9.690%	100.000%
0.0100	6.460%	100.000%
0.0050	4.307%	90.901%
0.0030	2.153%	45.451%
0.0010	1.077%	22.725%
0.0001	0.000%	0.000%

Structure Detail:

Structure #1 (Pond)

Basin 004

Pond Inputs:

Initial Pool Elev:	424.00
Initial Pool:	5.34 ac-ft
*Sediment Storage:	6.07 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Entrance Loss Coefficient	Tailwater Depth (ft)
36.00	100.00	2.00	0.0240	424.00	0.90	0.00

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
427.80	10.00	2.00:1	2.00:1	15.00

Pond Results:

Peak Elevation:	427.71
H'graph Detention Time:	2.17 hrs
Pond Model:	CSTRS
Dewater Time:	1.41 days
Trap Efficiency:	95.26 %

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)	
420.00	1.140	0.000	0.000		Top of Sed. Storage
420.00	1.140	0.000	0.000		
420.50	1.186	0.582	0.000		
421.00	1.234	1.187	0.000		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
421.50	1.282	1.816	0.000		
422.00	1.331	2.469	0.000		
422.50	1.382	3.147	0.000		
423.00	1.434	3.851	0.000		
423.50	1.488	4.582	0.000		
424.00	1.542	5.339	0.000		Spillway #1
424.50	1.597	6.124	2.224	26.00	
425.00	1.653	6.936	6.287	2.50	
425.50	1.710	7.777	11.541	1.20	
426.00	1.768	8.646	17.776	0.70	
426.50	1.817	9.542	24.832	0.55	
427.00	1.867	10.464	32.640	1.20	
427.50	1.918	11.410	40.983	1.00	
427.71	1.939	11.814	43.806	0.80	Peak Stage
427.80	1.949	11.990	45.031		Spillway #2
428.00	1.969	12.382	54.013		
428.50	2.021	13.379	75.740		
429.00	2.074	14.403	114.988		
429.50	2.127	15.453	167.756		
430.00	2.181	16.530	231.329		

Detailed Discharge Table

Elevation	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.00	0.000	0.000	0.000
420.50	0.000	0.000	0.000
421.00	0.000	0.000	0.000
421.50	0.000	0.000	0.000
422.00	0.000	0.000	0.000
422.50	0.000	0.000	0.000
423.00	0.000	0.000	0.000
423.50	0.000	0.000	0.000
424.00	0.000	0.000	0.000
424.50	(3)>2.224	0.000	2.224
425.00	(3)>6.287	0.000	6.287
425.50	(3)>11.541	0.000	11.541
426.00	(3)>17.776	0.000	17.776

Elevation	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
426.50	(3)>24.832	0.000	24.832
427.00	(3)>32.640	0.000	32.640
427.50	(3)>40.983	0.000	40.983
427.80	(5)>45.031	0.000	45.031
428.00	(5)>47.696	6.317	54.013
428.50	(6)>53.633	22.107	75.740
429.00	(6)>57.249	57.738	114.988
429.50	(6)>60.385	107.371	167.756
430.00	(6)>63.357	167.971	231.329

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	67.000	0.136	0.000	0.000	81.000	F	157.17	15.685
	2	2.000	0.000	0.000	0.000	100.000	S	7.16	0.800
	Σ	**69.000**						**159.10**	**16.485**

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.240	200.00	22.00	0.9000	1.0000	2	9,405.4	570,159	422.78	281.27
	2	0.001	200.00	0.01	0.0010	1.0000	1	0.0	0	0.00	0.00
	Σ							**9,405.4**	**564,790**	**418.80**	**269.92**

Best Coal, Inc.
Narley Mine
P-3850
Basin 004
Stability Analysis

MAR 2004

REAME (Rotational Equilibrium Analysis of Multilayered Embankments)

Implemented on the 16-bit Microcomputers C. F. Hains, Jr. and D. M. Hains
2301 22nd Ave.
Northport, AL 35476
(205)-339-6536

Best Coal, Inc. Narley Mine Basin 004 Static

Number of cases to be analyzed 1

Case Number 1

Number of boundary lines= 4
Number of points on boundary lines are: 2 2 3 7

On boundary line no. 1 Point no. and coordinates are:

1	72.727	47.000	2	500.000	.000

On boundary line no. 2 Point no. and coordinates are:

200.000	35.000	2	372.239	16.054

On boundary line no. 3 Point no. and coordinates are:

1	72.727	49.000	2	200.000	35.000	3	242.000	49.000

On boundary line no. 4 Point no. and coordinates are:

1	72.727	49.000	2	242.000	49.000	3	247.000	53.800	4	259.000	53.800	5	336.657	27.914
6	372.239	16.054	7	500.000	2.000									

Line no. and slope of each segment are:

1	-.110				
2	-.110				
3	-.110	.333			
4	.000	.960	.000	-.333	-.333	-.110

No. of radius control zones= 1 Plot or no plot= 1 No. of seepage cases= 1

Total no. of lines at bottom of radius control zones is: 1

For rad. cont. zone no. 1 Radius decrement= .000 No. of Circles= 5 Id no. for first circle=, 1
Line no.= 1 Begin pt. no.= 1 End pt. no.= 2

Soil no.	Cohesion	F. angle	Unit wt.
1	273.600	33.000	132.100
2	115.200	24.200	129.900
3	.000	.000	62.400

Seismic coefficient= .000 Min. depth of tallest slice= .000 Unit weight of water= 62.400

The factors of safety are determined by the SIMPLIFIED BISHOP method

MAR 2004

NSPG= 1 NSRCH= 0 No. of slices= 10 No. of add. radii= 2

No. of points on water table for each case= 6

Under seepage condition 1point no. and coordinates of water table are:

1	72.727	49.000	2	242.000	49.000	3	283.028	39.940	4	336.657	27.914	5	372.239	16.054
6	500.000	2.000												

point1=(260.000, 75.000) point2=(260.000, 55.000) point3=(373.000, 55.000) NJ= 2 NI= 2

Automatic search will follow after grid with XINC= 10.000 and YINC= 10.000

At point (260.000, 75.000) under seepage 1,the radius and the corresponding factor of safety are:

48.309	14.057	42.892	11.553	37.475	11.205	32.058	9.169	26.641	6.796
24.835	7.579	23.029	11.951						

Lowest factor of safety= 6.796 and occurs at radius = 26.641

At point (260.000, 65.000) under seepage 1,the radius and the corresponding factor of safety are:

38.369	14.587	32.944	11.059	27.519	9.636	22.094	6.943	16.669	6.113
14.861	6.988	13.053	10.146						

Lowest factor of safety= 6.113 and occurs at radius = 16.669

At point (260.000, 55.000) under seepage 1,the radius and the corresponding factor of safety are:

28.429	15.317	23.034	10.534	17.639	7.628	12.244	6.852	6.849	7.412
15.841	7.065	14.042	6.863	10.446	7.165	8.648	7.293		

Lowest factor of safety= 6.852 and occurs at radius = 12.244

point (316.500, 75.000) under seepage 1,the radius and the corresponding factor of safety are:

54.486	1.855	51.248	1.526	48.010	1.672	44.772	1.981	41.534	2.822
53.407	1.760	52.328	1.493	50.169	1.563	49.089	1.611		

Lowest factor of safety= 1.493 and occurs at radius = 52.328

At point (316.500, 65.000) under seepage 1,the radius and the corresponding factor of safety are:

44.546	1.970	41.399	1.602	38.251	1.738	35.104	2.043	31.956	2.903
43.497	1.870	42.448	1.574	40.350	1.636	39.300	1.681		

Lowest factor of safety= 1.574 and occurs at radius = 42.448

At point (316.500, 55.000) under seepage 1,the radius and the corresponding factor of safety are:

34.606	2.165	31.549	1.742	28.492	1.865	25.436	2.161	22.379	3.025
33.587	2.063	32.568	1.718	30.530	1.772	29.511	1.812		

Lowest factor of safety= 1.718 and occurs at radius = 32.568

At point (373.000, 75.000) under seepage 1,the radius and the corresponding factor of safety are:

60.664	2.993	59.764	3.118	58.863	2.926	57.963	3.031	57.062	5.347
59.464	3.131	59.163	3.094	58.563	2.456	58.263	2.702		

Lowest factor of safety= 2.456 and occurs at radius = 58.563

At point (373.000, 65.000) under seepage 1,the radius and the corresponding factor of safety are:

50.724	3.330	49.914	3.540	49.104	3.589	48.295	3.305	47.485	5.880
48.835	3.318	48.565	2.939	48.025	3.819	47.755	4.591		

Lowest factor of safety= 2.939 and occurs at radius = 48.565

MAR 2004 REC'D SURVEY & MAPS

At point (373.000, 55.000) under seepage 1,the radius and the corresponding factor of safety are:

40.784	3.796	40.065	4.115	39.346	4.421	38.627	3.651	37.907	6.551
39.106	4.397	38.866	4.026	38.387	4.230	38.147	5.099		

Lowest factor of safety= 3.651 and occurs at radius = 38.627

For piezometric line No. 1

At point (316.500, 75.000) ,RADIUS 52.328

the minimum factor of safety is 1.493

At point (316.500, 75.000) under seepage 1,the radius and the corresponding factor of safety are:

54.486	1.855	51.248	1.526	48.010	1.672	44.772	1.981	41.534	2.822
53.407	1.760	52.328	1.493	50.169	1.563	49.089	1.611		

Lowest factor of safety= 1.493 and occurs at radius = 52.328

At point (326.500, 75.000) under seepage 1,the radius and the corresponding factor of safety are:

55.580	1.829	52.755	1.475	49.931	1.623	47.107	1.954	44.282	2.922
54.638	1.751	53.697	1.557	51.814	1.515	50.872	1.562		

Lowest factor of safety= 1.475 and occurs at radius = 52.755

At point (336.500, 75.000) under seepage 1,the radius and the corresponding factor of safety are:

56.673	1.829	54.263	1.449	51.852	1.604	49.441	1.942	47.031	2.985
55.870	1.773	55.066	1.650	53.459	1.489	52.655	1.540		

Lowest factor of safety= 1.449 and occurs at radius = 54.263

At point (346.500, 75.000) under seepage 1,the radius and the corresponding factor of safety are:

57.767	1.885	55.770	1.453	53.773	1.623	51.776	1.986	49.779	3.098
57.101	1.844	56.435	1.765	55.104	1.498	54.438	1.553		

Lowest factor of safety= 1.453 and occurs at radius = 55.770

At point (336.500, 85.000) under seepage 1,the radius and the corresponding factor of safety are:

66.613	1.772	64.112	1.423	61.611	1.584	59.109	1.922	56.608	2.968
65.779	1.716	64.946	1.591	63.278	1.465	62.444	1.518		

Lowest factor of safety= 1.423 and occurs at radius = 64.112

At point (336.500, 95.000) under seepage 1,the radius and the corresponding factor of safety are:

76.553	1.728	73.961	1.406	71.369	1.571	68.777	1.910	66.186	2.947
75.689	1.673	74.825	1.543	73.097	1.450	72.233	1.504		

Lowest factor of safety= 1.406 and occurs at radius = 73.961

At point (336.500, 105.000) under seepage 1,the radius and the corresponding factor of safety are:

86.493	1.694	83.811	1.395	81.128	1.561	78.446	1.901	75.763	2.923
85.599	1.639	84.705	1.501	82.917	1.439	82.022	1.494		

Lowest factor of safety= 1.395 and occurs at radius = 83.811

At point (336.500, 115.000) under seepage 1,the radius and the corresponding factor of safety are:

96.433	1.666	93.660	1.386	90.887	1.551	88.114	1.896	85.340	2.896
95.509	1.611	94.585	1.463	92.736	1.431	91.811	1.486		

Lowest factor of safety= 1.386 and occurs at radius = 93.660

At point (336.500, 125.000) under seepage 1,the radius and the corresponding factor of safety are:

106.373	1.644	103.510	1.379	100.646	1.544	97.782	1.892	94.918	2.868
105.419	1.588	104.464	1.423	102.555	1.426	101.600	1.478		

Lowest factor of safety= 1.379 and occurs at radius = 103.510

At point (336.500, 135.000) under seepage 1,the radius and the corresponding factor of safety are:

116.313	1.636	113.359	1.373	110.404	1.539	107.450	1.886	104.495	2.831
115.329	1.573	114.344	1.362	112.374	1.418	111.389	1.471		

Lowest factor of safety= 1.362 and occurs at radius = 114.344

At point (336.500, 145.000) under seepage 1,the radius and the corresponding factor of safety are:

126.253	1.638	123.208	1.372	120.163	1.534	117.118	1.882	114.073	2.785
125.238	1.570	124.223	1.337	122.193	1.417	121.178	1.467		

Lowest factor of safety= 1.337 and occurs at radius = 124.223

At point (336.500, 155.000) under seepage 1,the radius and the corresponding factor of safety are:

136.194	1.652	133.058	1.380	129.922	1.533	126.786	1.878	123.650	2.741
135.148	1.577	134.103	1.346	132.012	1.422	130.967	1.473		

Lowest factor of safety= 1.346 and occurs at radius = 134.103

At point (346.500, 145.000) under seepage 1,the radius and the corresponding factor of safety are:

127.347	1.638	124.716	1.379	122.084	1.551	119.453	1.912	116.821	2.949
126.470	1.595	125.593	1.480	123.838	1.425	122.961	1.482		

Lowest factor of safety= 1.379 and occurs at radius = 124.716

At point (326.500, 145.000) under seepage 1,the radius and the corresponding factor of safety are:

125.160	1.717	121.701	1.418	118.242	1.559	114.783	1.867	111.324	2.626
124.007	1.619	122.854	1.392	120.548	1.453	119.395	1.499		

Lowest factor of safety= 1.392 and occurs at radius = 122.854

At point (339.000, 145.000) under seepage 1,the radius and the corresponding factor of safety are:

126.527	1.632	123.585	1.370	120.643	1.537	117.702	1.886	114.760	2.831
125.546	1.569	124.566	1.379	122.605	1.415	121.624	1.468		

Lowest factor of safety= 1.370 and occurs at radius = 123.585

At point (334.000, 145.000) under seepage 1,the radius and the corresponding factor of safety are:

125.980	1.649	122.832	1.378	119.683	1.532	116.534	1.878	113.386	2.741
124.931	1.574	123.881	1.345	121.782	1.421	120.732	1.471		

Lowest factor of safety= 1.345 and occurs at radius = 123.881

At point (336.500, 147.500) under seepage 1,the radius and the corresponding factor of safety are:

128.738	1.639	125.671	1.374	122.603	1.532	119.535	1.881	116.467	2.773
127.716	1.571	126.693	1.339	124.648	1.417	123.625	1.467		

Lowest factor of safety= 1.339 and occurs at radius = 126.693

At point (336.500, 142.500) under seepage 1,the radius and the corresponding factor of safety are:

123.768	1.637	120.746	1.372	117.723	1.536	114.701	1.883	111.679	2.796
122.761	1.570	121.753	1.336	119.738	1.417	118.731	1.467		

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Lowest factor of safety= 1.336 and occurs at radius = 121.753

At point (336.500, 140.000) under seepage 1,the radius and the corresponding factor of safety are:

121.283	1.636	118.284	1.371	115.284	1.537	112.284	1.884	109.284	2.808
120.284	1.570	119.284	1.335	117.284	1.416	116.284	1.468		

Lowest factor of safety= 1.335 and occurs at radius = 119.284

At point (336.500, 137.500) under seepage 1,the radius and the corresponding factor of safety are:

118.798	1.635	115.821	1.372	112.844	1.538	109.867	1.885	106.890	2.819
117.806	1.571	116.814	1.335	114.829	1.417	113.837	1.470		

Lowest factor of safety= 1.335 and occurs at radius = 116.814

At point (336.500, 135.000) under seepage 1,the radius and the corresponding factor of safety are:

116.313	1.636	113.359	1.373	110.404	1.539	107.450	1.886	104.495	2.831
115.329	1.573	114.344	1.362	112.374	1.418	111.389	1.471		

Lowest factor of safety= 1.362 and occurs at radius = 114.344

At point (339.000, 137.500) under seepage 1,the radius and the corresponding factor of safety are:

119.072	1.633	116.198	1.374	113.324	1.540	110.451	1.889	107.577	2.861
118.114	1.574	117.156	1.411	115.240	1.418	114.282	1.472		

Lowest factor of safety= 1.374 and occurs at radius = 116.198

At point (334.000, 137.500) under seepage 1,the radius and the corresponding factor of safety are:

118.525	1.641	115.444	1.374	112.364	1.536	109.283	1.882	106.203	2.774
117.498	1.572	116.471	1.339	114.418	1.419	113.391	1.470		

Lowest factor of safety= 1.339 and occurs at radius = 116.471

For piezometric line No. 1

At point (336.500, 137.500) ,RADIUS 116.814
the minimum factor of safety is 1.335

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Cross section in distorted scale. Numerals indicate boundary line no.
If there area more than 10 bound. lines, alphabets will then be used. P indicates
Piezometric line. If a portion of Piezometric line coincides with
the ground or another boundary line, only the ground or boundary
line will be shown. X indicates intersection of two boundary
lines. * indicates failure surface.
The minimum factor of safety is 1.335

```
7.200E+01 X+++++++++X+++++++++X+++++++++X+++++++++X+++++++++X
          +                                                 +
          +                                                 +
          +                                                 +
          +                                                 +
6.400E+01 X         +         +         +         +         X
          +                                                 +
          +                                                 +
          +                                                 +
          +                                                 +
5.600E+01 X         +         +         +         +         X
          +                   44                            +
          +                                                 +
          +                     4                           +
          + XX44444444444444X                               +
4.800E+01 X   3     +         P  4      +         +         X
          + 11 33                                           +
          +   1  3          3  P* 4                         +
          +    11 33            P                           +
          +      1  3      3       4                        +
4.000E+01 X       11+33       +  P      +         +         X
          +         1  3  3      *P 4                       +
          +          11 3          P                        +
          +            1 X2          4                      +
          +             11 2        P                       +
3.200E+01 X         +     1 22+   *  P4 +         +         X
          +               11 2       P                      +
          +                 1 22  *                         +
          +                  11 2     4                     +
          +                    1 2 *                        +
2.400E+01 X         +         +  1122   4         +         X
          +                       1 2                       +
          +                        1122 4                   +
          +                          1 2                    +
          +                           112                   +
1.600E+01 X         +         +         +1X4      +         X
          +                              114                +
          +                                144              +
          +                                 114             +
          +                                   144           +
8.000E+00 X         +         +         +       114         X
          +                                     144         +
          +                                      114        +
          +                                        14       +
          +                                         14      +
 .000E+00 X+++++++++X+++++++++X+++++++++X+++++++++X++++1++++X
          +                                                 +
          +                                                 +
          +                                                 +
          +                                                 +
-8.000E+00 X+++++++++X+++++++++X+++++++++X+++++++++X+++++++++X
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COMMISSION

Best Coal, Inc.
Narley Mine
P-3850
Basin 007

6.0 Inches, 10 Year-24 Hour,

DRN58

SRI

General Information

Storm Information:

Storm Type:	DRN58
Design Storm:	10 yr - 24 hr
Rainfall Depth:	6.000 inches

Particle Size Distribution:

Size (mm)	Topsoil	Spoil
3.0000	97.000%	98.000%
2.0000	93.000%	97.000%
1.0000	82.000%	85.000%
0.5000	63.000%	70.000%
0.3000	52.000%	46.000%
0.2000	44.000%	37.000%
0.1000	34.000%	26.000%
0.0500	22.000%	15.000%
0.0300	18.000%	12.000%
0.0200	10.000%	9.000%
0.0100	7.000%	6.000%
0.0050	5.000%	4.000%
0.0030	3.000%	2.000%
0.0010	2.000%	1.000%
0.0001	0.000%	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 007

#1
Pond

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	119.000	119.000	140.59	38.87	14,356.8	428,020	317.94	187.67
	Out			127.73	38.85	783.8	26,539	0.49	0.35

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	100.000%	100.000%
1.0000	89.493%	100.000%
0.5000	73.700%	100.000%
0.3000	48.432%	100.000%
0.2000	38.956%	100.000%
0.1000	27.374%	100.000%
0.0500	15.793%	100.000%
0.0300	12.634%	100.000%
0.0200	9.476%	100.000%
0.0100	6.317%	100.000%
0.0050	4.211%	77.139%
0.0030	2.106%	38.569%
0.0010	1.053%	19.285%
0.0001	0.000%	0.000%

Structure Detail:

Structure #1 (Pond)

Basin 007

Pond Inputs:

Initial Pool Elev:	425.00
Initial Pool:	9.89 ac-ft
*Sediment Storage:	8.69 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
425.00	10.00	2.00:1	2.00:1	12.00

Pond Results:

Peak Elevation:	427.08
H'graph Detention Time:	1.14 hrs
Pond Model:	CSTRS
Dewater Time:	0.76 days
Trap Efficiency:	94.54 %

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)	
420.00	1.611	0.000	0.000		Top of Sed. Storage
420.00	1.611	0.000	0.000		
420.50	1.685	0.824	0.000		
421.00	1.761	1.685	0.000		
421.50	1.838	2.585	0.000		
422.00	1.917	3.524	0.000		
422.50	1.983	4.499	0.000		
423.00	2.051	5.507	0.000		
423.50	2.119	6.549	0.000		
424.00	2.189	7.627	0.000		
424.50	2.260	8.739	0.000		
425.00	2.332	9.886	0.000		Spillway #1

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
425.50	2.405	11.071	2.491	5.75*	
426.00	2.479	12.291	33.633	10.65	
426.50	2.542	13.547	71.155	1.10	
427.00	2.606	14.834	118.128	0.50	
427.08	2.617	15.053	127.731	0.15	Peak Stage
427.50	2.670	16.153	175.760		
428.00	2.736	17.504	244.230		
428.50	2.802	18.888	323.802		
429.00	2.869	20.306	414.783		
429.50	2.936	21.757	517.501		
430.00	3.005	23.243	632.293		

**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)
420.00	0.000	0.000
420.00	0.000	0.000
420.50	0.000	0.000
421.00	0.000	0.000
421.50	0.000	0.000
422.00	0.000	0.000
422.50	0.000	0.000
423.00	0.000	0.000
423.50	0.000	0.000
424.00	0.000	0.000
424.50	0.000	0.000
425.00	0.000	0.000
425.50	2.491	2.491
426.00	33.633	33.633
426.50	71.155	71.155
427.00	118.128	118.128
427.50	175.760	175.760
428.00	244.230	244.230
428.50	323.802	323.802
429.00	414.783	414.783
429.50	517.501	517.501
430.00	632.293	632.293

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	117.000	0.333	0.000	0.000	81.000	F	138.55	37.866
	2	2.000	0.000	0.000	0.000	100.000	S	3.15	1.000
	Σ	**119.000**						**140.59**	**38.866**

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.240	200.00	22.00	0.9000	1.0000	2	14,356.8	431,113	320.24	191.52
	2	0.001	200.00	0.01	0.0010	1.0000	1	0.0	0	0.00	0.00
	Σ							**14,356.8**	**428,020**	**317.94**	**187.67**

Best Coal, Inc.

Narley Mine

P-3850

Basin 007

4.8 Inches, 25 Year-6 Hour,

SCS 6 Hour

SRI

General Information

Storm Information:

Storm Type:	Rainfall Event

Accumulated Time (hrs)	Accumulated Depth (in)
0.00	0.0000
0.50	0.1680
1.00	0.3840
1.50	0.6480
2.00	1.1040
2.50	2.8800
3.00	3.3600
3.50	3.7440
4.00	4.0080
4.50	4.2480
5.00	4.4400
5.50	4.6320
6.00	4.8000

Peak 30-minute Intensity: 3.552 in/hr

Particle Size Distribution:

Size (mm)	Topsoil	Spoil
3.0000	97.000%	98.000%
2.0000	93.000%	97.000%
1.0000	82.000%	85.000%
0.5000	63.000%	70.000%
0.3000	52.000%	46.000%
0.2000	44.000%	37.000%
0.1000	34.000%	26.000%
0.0500	22.000%	15.000%
0.0300	18.000%	12.000%
0.0200	10.000%	9.000%
0.0100	7.000%	6.000%
0.0050	5.000%	4.000%
0.0030	3.000%	2.000%

Size (mm)	Topsoil	Spoil
0.0010	2.000%	1.000%
0.0001	0.000%	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 007

#1
Pond

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	119.000	119.000	236.45	28.19	16,080.1	548,885	404.06	272.38
	Out			167.94	28.19	1,066.9	36,984	0.91	0.76

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	100.000%	100.000%
1.0000	100.000%	100.000%
0.5000	82.310%	100.000%
0.3000	54.090%	100.000%
0.2000	43.507%	100.000%
0.1000	30.572%	100.000%
0.0500	17.638%	100.000%
0.0300	14.110%	100.000%
0.0200	10.583%	100.000%
0.0100	7.055%	100.000%
0.0050	4.703%	70.892%
0.0030	2.352%	35.446%
0.0010	1.176%	17.723%
0.0001	0.000%	0.000%

Structure Detail:

Structure #1 (Pond)

Basin 007

Pond Inputs:

Initial Pool Elev:	425.00
Initial Pool:	9.89 ac-ft
*Sediment Storage:	8.69 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
425.00	10.00	2.00:1	2.00:1	12.00

Pond Results:

Peak Elevation:	427.43
H'graph Detention Time:	0.89 hrs
Pond Model:	CSTRS
Dewater Time:	1.69 days
Trap Efficiency:	93.37 %

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)	
420.00	1.611	0.000	0.000		Top of Sed. Storage
420.00	1.611	0.000	0.000		
420.50	1.685	0.824	0.000		
421.00	1.761	1.685	0.000		
421.50	1.838	2.585	0.000		
422.00	1.917	3.524	0.000		
422.50	1.983	4.499	0.000		
423.00	2.051	5.507	0.000		
423.50	2.119	6.549	0.000		
424.00	2.189	7.627	0.000		
424.50	2.260	8.739	0.000		
425.00	2.332	9.886	0.000		Spillway #1

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
425.50	2.405	11.071	2.491	35.70	
426.00	2.479	12.291	33.633	1.35	
426.50	2.542	13.547	71.155	2.30	
427.00	2.606	14.834	118.128	0.70	
427.43	2.662	15.974	167.945	0.45	Peak Stage
427.50	2.670	16.153	175.760		
428.00	2.736	17.504	244.230		
428.50	2.802	18.888	323.802		
429.00	2.869	20.306	414.783		
429.50	2.936	21.757	517.501		
430.00	3.005	23.243	632.293		

Detailed Discharge Table

Elevation	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000
420.00	0.000	0.000
420.50	0.000	0.000
421.00	0.000	0.000
421.50	0.000	0.000
422.00	0.000	0.000
422.50	0.000	0.000
423.00	0.000	0.000
423.50	0.000	0.000
424.00	0.000	0.000
424.50	0.000	0.000
425.00	0.000	0.000
425.50	2.491	2.491
426.00	33.633	33.633
426.50	71.155	71.155
427.00	118.128	118.128
427.50	175.760	175.760
428.00	244.230	244.230
428.50	323.802	323.802
429.00	414.783	414.783
429.50	517.501	517.501
430.00	632.293	632.293

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	117.000	0.333	0.000	0.000	81.000	F	234.51	27.391
	2	2.000	0.000	0.000	0.000	100.000	S	7.16	0.800
	Σ	**119.000**						**236.45**	**28.191**

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.240	200.00	22.00	0.9000	1.0000	2	16,080.1	552,414	406.65	279.15
	2	0.001	200.00	0.01	0.0010	1.0000	1	0.0	0	0.00	0.00
	Σ							**16,080.1**	**548,885**	**404.06**	**272.38**

Best Coal, Inc.
Narley Mine
P-3850
Basin 007
Stability Analysis

REAME (Rotational Equilibrium Analysis of Multilayered Embankments)

Implemented on the 16-bit Microcomputers C. F. Hains, Jr. and D. M. Hains
2301 22nd Ave.
Northport, AL 35476
(205)-339-6536

Best Coal, Inc. Narley Mine Basin 007 Static

Number of cases to be analyzed 1

Case Number 1

Number of boundary lines= 4
Number of points on boundary lines are: 2 2 3 7

On boundary line no. 1 Point no. and coordinates are:
1 .000 20.000 2 500.000 .000

On boundary line no. 2 Point no. and coordinates are:
1 200.000 15.000 2 340.000 9.400

On boundary line no. 3 Point no. and coordinates are:
1 .000 23.000 2 200.000 15.000 3 247.500 34.000

On boundary line no. 4 Point no. and coordinates are:
1 .000 34.000 2 247.500 34.000 3 257.000 37.800 4 269.000 37.800 5 320.320 17.272
6 340.000 9.400 7 500.000 3.000

Line no. and slope of each segment are:

1	-.040				
2	-.040				
3	-.040	.400			
4	.000	.400	.000	-.400	-.400	-.040

No. of radius control zones= 1 Plot or no plot= 1 No. of seepage cases= 1

Total no. of lines at bottom of radius control zones is: 1

For rad. cont. zone no. 1 Radius decrement= .000 No. of Circles= 5 Id no. for first circle=, 1
Line no.= 1 Begin pt. no.= 1 End pt. no.= 2

Soil no.	Cohesion	F. angle	Unit wt.
1	187.200	30.500	136.000
2	273.600	33.000	129.900
3	.000	.000	62.400

Seismic coefficient= .000 Min. depth of tallest slice= .000 Unit weight of water= 62.400

The factors of safety are determined by the SIMPLIFIED BISHOP method

```
NSPG= 1  NSRCH= 0  No. of slices= 10  No. of add. radii= 2

No. of points on water table for each case=   6

Under seepage condition 1point no. and          coordinates of water table are:
 1      .000    34.000    2  247.500    34.000    3  276.785    27.358    4  320.320    17.272    5  340.000     9.400
 6  500.000     3.000

point1=(   270.000,    59.000) point2=(   270.000,    39.000) point3=(   341.000,    39.000) NJ=    2 NI=    2
Automatic search will follow after grid with XINC=    10.000 and YINC=    10.000

At point (   270.000,    59.000) under seepage    1,the radius and the corresponding factor of safety are:
      49.760     7.939         44.053     8.809         38.346     9.080         32.638     9.432         26.931    10.284
Lowest factor of safety=     7.939 and occurs at radius  =     49.760


At point (   270.000,    49.000) under seepage    1,the radius and the corresponding factor of safety are:
      39.768     8.087         34.063     8.773         28.359     8.650         22.654     8.499         16.949     9.416
      26.457     8.487         24.556     8.446         20.752     8.601         18.851     8.762
Lowest factor of safety=     8.087 and occurs at radius  =     39.768


At point (   270.000,    39.000) under seepage    1,the radius and the corresponding factor of safety are:
      29.776     8.827         24.118     9.375         18.460     8.825         12.802     9.319          7.144    10.982
      22.232     8.961         20.346     8.862         16.574     8.805         14.688     9.134
Lowest factor of safety=     8.805 and occurs at radius  =     16.574


At point (   305.500,    59.000) under seepage    1,the radius and the corresponding factor of safety are:
      51.179     2.022         47.591     2.260         44.003     2.483         40.415     2.992         36.827     4.328
Lowest factor of safety=     2.022 and occurs at radius  =     51.179


At point (   305.500,    49.000) under seepage    1,the radius and the corresponding factor of safety are:
      41.187     2.092         37.741     2.369         34.294     2.615         30.848     3.132         27.401     4.544
Lowest factor of safety=     2.092 and occurs at radius  =     41.187


At point (   305.500,    39.000) under seepage    1,the radius and the corresponding factor of safety are:
      31.195     2.322         27.890     2.653         24.585     2.893         21.280     3.418         17.975     4.896
Lowest factor of safety=     2.322 and occurs at radius  =     31.195


At point (   341.000,    59.000) under seepage    1,the radius and the corresponding factor of safety are:
      52.598     2.640         51.363     2.893         50.128     3.378         48.893     4.467         47.659     7.868
Lowest factor of safety=     2.640 and occurs at radius  =     52.598


At point (   341.000,    49.000) under seepage    1,the radius and the corresponding factor of safety are:
      42.606     2.878         41.513     3.164         40.419     3.706         39.326     4.864         38.232     8.682
Lowest factor of safety=     2.878 and occurs at radius  =     42.606


At point (   341.000,    39.000) under seepage    1,the radius and the corresponding factor of safety are:
      32.614     3.215         31.662     3.547         30.710     4.190         29.758     5.560         28.806     9.877
Lowest factor of safety=     3.215 and occurs at radius  =     32.614
```

For piezometric line No. 1

At point (305.500, 59.000) ,RADIUS 51.179
the minimum factor of safety is 2.022

At point (305.500, 59.000) under seepage 1,the radius and the corresponding factor of safety are:
51.179 2.022 47.591 2.260 44.003 2.483 40.415 2.992 36.827 4.328
Lowest factor of safety= 2.022 and occurs at radius = 51.179

At point (315.500, 59.000) under seepage 1,the radius and the corresponding factor of safety are:
51.579 1.874 48.654 2.160 45.729 2.476 42.804 3.048 39.878 4.774
Lowest factor of safety= 1.874 and occurs at radius = 51.579

At point (325.500, 59.000) under seepage 1,the radius and the corresponding factor of safety are:
51.978 1.869 49.716 2.118 47.454 2.588 45.192 3.259 42.930 5.323
Lowest factor of safety= 1.869 and occurs at radius = 51.978

At point (335.500, 59.000) under seepage 1,the radius and the corresponding factor of safety are:
52.378 2.181 50.779 2.355 49.179 2.926 47.580 3.819 45.981 6.501
Lowest factor of safety= 2.181 and occurs at radius = 52.378

At point (325.500, 69.000) under seepage 1,the radius and the corresponding factor of safety are:
61.970 1.836 59.567 2.083 57.163 2.518 54.759 3.181 52.356 5.176
Lowest factor of safety= 1.836 and occurs at radius = 61.970

At point (325.500, 79.000) under seepage 1,the radius and the corresponding factor of safety are:
71.962 1.813 69.417 2.062 66.872 2.464 64.327 3.116 61.782 5.049
Lowest factor of safety= 1.813 and occurs at radius = 71.962

At point (325.500, 89.000) under seepage 1,the radius and the corresponding factor of safety are:
81.954 1.810 79.268 2.045 76.581 2.417 73.895 3.059 71.208 4.914
Lowest factor of safety= 1.810 and occurs at radius = 81.954

At point (325.500, 99.000) under seepage 1,the radius and the corresponding factor of safety are:
91.946 1.838 89.118 2.062 86.290 2.386 83.462 3.007 80.634 4.754
Lowest factor of safety= 1.838 and occurs at radius = 91.946

At point (335.500, 89.000) under seepage 1,the radius and the corresponding factor of safety are:
82.354 2.014 80.330 2.186 78.307 2.655 76.283 3.430 74.259 5.724
Lowest factor of safety= 2.014 and occurs at radius = 82.354

At point (315.500, 89.000) under seepage 1,the radius and the corresponding factor of safety are:
81.555 1.882 78.205 2.158 74.856 2.384 71.507 2.884 68.157 4.327
Lowest factor of safety= 1.882 and occurs at radius = 81.555

At point (328.000, 89.000) under seepage 1,the radius and the corresponding factor of safety are:
82.054 1.835 79.534 2.046 77.013 2.464 74.492 3.127 71.971 5.080

Lowest factor of safety= 1.835 and occurs at radius = 82.054

At point (323.000, 89.000) under seepage 1,the radius and the corresponding factor of safety are:

81.855	1.806	79.002	2.057	76.150	2.380	73.298	3.001	70.445	4.750

Lowest factor of safety= 1.806 and occurs at radius = 81.855

At point (320.500, 89.000) under seepage 1,the radius and the corresponding factor of safety are:

81.755	1.819	78.737	2.110	75.719	2.363	72.701	2.951	69.683	4.593

Lowest factor of safety= 1.819 and occurs at radius = 81.755

At point (323.000, 91.500) under seepage 1,the radius and the corresponding factor of safety are:

84.353	1.813	81.465	2.063	78.577	2.374	75.690	2.990	72.802	4.709

Lowest factor of safety= 1.813 and occurs at radius = 84.353

At point (323.000, 86.500) under seepage 1,the radius and the corresponding factor of safety are:

79.357	1.798	76.540	2.052	73.723	2.389	70.906	3.013	68.089	4.790

Lowest factor of safety= 1.798 and occurs at radius = 79.357

At point (323.000, 84.000) under seepage 1,the radius and the corresponding factor of safety are:

76.859	1.794	74.077	2.052	71.295	2.402	68.514	3.026	65.732	4.828

Lowest factor of safety= 1.794 and occurs at radius = 76.859

At point (323.000, 81.500) under seepage 1,the radius and the corresponding factor of safety are:

74.361	1.792	71.614	2.051	68.868	2.414	66.122	3.040	63.376	4.861

Lowest factor of safety= 1.792 and occurs at radius = 74.361

At point (323.000, 79.000) under seepage 1,the radius and the corresponding factor of safety are:

71.863	1.793	69.152	2.054	66.441	2.425	63.730	3.054	61.019	4.896

Lowest factor of safety= 1.793 and occurs at radius = 71.863

At point (325.500, 81.500) under seepage 1,the radius and the corresponding factor of safety are:

74.460	1.810	71.880	2.057	69.299	2.452	66.719	3.100	64.138	5.019

Lowest factor of safety= 1.810 and occurs at radius = 74.460

At point (320.500, 81.500) under seepage 1,the radius and the corresponding factor of safety are:

74.261	1.799	71.349	2.071	68.437	2.381	65.525	2.987	62.613	4.711

Lowest factor of safety= 1.799 and occurs at radius = 74.261

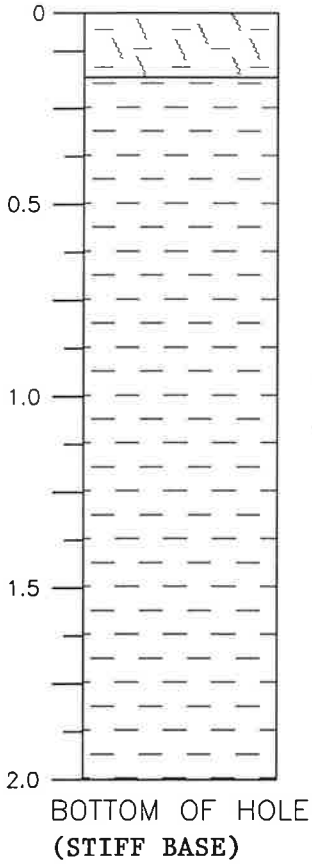
For piezometric line No. 1

At point (323.000, 81.500) ,RADIUS 74.361
the minimum factor of safety is 1.792

Cross section in distorted scale. Numerals indicate boundary line no.
If there area more than 10 bound. lines, alphabets will then be used. P indicates
Piezometric line. If a portion of Piezometric line coincides with
the ground or another boundary line, only the ground or boundary
line will be shown. X indicates intersection of two boundary
lines. * indicates failure surface.
The minimum factor of safety is 1.792

```
4.000E+01 X+++++++++X+++++++++X+++++++++X+++++++++X+++++++++X
          +    +                                          +
          +    +                                          +
          +    +               44                         +
          +    +                                          +
3.600E+01 X    X    +         + *       +         +       X
          +    +                                          +
          +    +                                          +
          +    444444444444444X                           +
          +    +                                          +
3.200E+01 X    X    +         +         +         +       X
          +    +                 4                        +
          +    +               P                          +
          +    +                                          +
          +    +                                          +
2.800E+01 X    X    +         +         +         +       X
          +    +                P                         +
          +    +                                          +
          +    +                                          +
          +    +                   4                      +
2.400E+01 X    X    +        3+  P      +         +       X
          +    33                                         +
          +    + 3                                        +
          +    +  3                                       +
          +    +   33            *P                       +
2.000E+01 X    X1   +3        +         +         +       X
          +    + 1    3                                   +
          +    +  1    33                                 +
          +    +   1     3         4                      +
          +    +    11    3                               +
1.600E+01 X    X    + 1    3  +         +         +       X
          +    +       1    X2                            +
          +    +        1     2                           +
          +    +         11    2                          +
          +    +           1    2                         +
1.200E+01 X    X    +       1 +  2*     +         +       X
          +    +            1    2                        +
          +    +              11   2                      +
          +    +                1   X4                    +
          +    +                 1    4                   +
8.000E+00 X    X    +         +   1*   4+         +       X
          +    +                   11   4                 +
          +    +                     1   44               +
          +    +                      1    4              +
          +    +                       1    4             +
4.000E+00 X    X    +         +         11   4    +       X
          +    +                          1   4           +
          +    +                           1              +
          +    +                            1             +
          +    +                             1            +
 .000E+00 X+++++++++X+++++++++X+++++++++X+++++1+++X+++++++++X
```

Best Coal, Inc.
Narley Mine
P-3850
Soil Classification



INTERVAL:	DESCRIPTION:
0 – 0.2'	Surface Material, Silt & Clay, Some Organics
0.2' – 2'	Tan – Brown, Silty – Clay, Some Shale Fragments

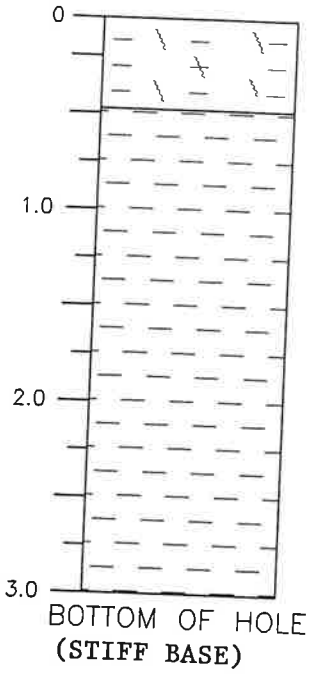
DRILL HOLE: B–1

PERC ENGINEERING CO., INC.
1806 Highway 78 West Jasper, Alabama 35501
P.O. Box 1712 Jasper, Alabama 35502
(205) 384-5553 Office (205) 384-8491 Fax

Best Coal, Inc.
Narley Mine
P-3850
Basin 004 Foundation
Lithologic Description

DRAWN BY: P.T.O. DWG. NAME: BCNMLD04	DATE: 3–3–04
APPROVED BY: S.R.I.	SCALE: 1" = 0.50'

D:\PTO\SRI\BCNMLD04.dwg 1.13.14



INTERVAL:	DESCRIPTION:
0 – 0.4'	Surface Material, Brown Silt, Trace of Clay, Some Organics
0.4' – 3'	Brown – Dark Gray, Silty – Sandy Clay

DRILL HOLE: B-2

PERC ENGINEERING CO., INC.
1609 Highway 78 West Jasper, Alabama 35501
P.O. Box 1712 Jasper, Alabama 35503
(205) 384-5553 Office (205) 384-8491 Fax

Best Coal, Inc.
Narley Mine
P-3850
Basin 007 Foundation
Lithologic Description

DRAWN BY:	P.T.O.	DATE:	3-3-04
DWG. NAME:	BCNMLD07		
APPROVED BY:	S.R.I.	SCALE:	1" = 0.50'

D:\PTO\SRI\BCNMLD07.dwg 4 13:22

Best Coal, Inc.
Narley Mine
P-3850

STABILITY ANALYSIS DATA

METHODOLOGY

The static and dynamic loading stability analyses were performed using the Simplified Bishop Method. The computer program used was the REAME Slope Stability Program as developed by Dr. Yang H. Huang, P.E. of the University of Kentucky.

SOIL CLASSIFICATION UNITS

The soil types (soil classifications) to be used in the construction of the embankment structures of Basin 004 (GC) and Basin 007 (SM) and the soil types (soil classifications) of the material between the proposed embankments and stiff base of Basin 004 (SM) and Basin 007 (SC-SM) were sampled and analyzed by PERC Engineering Co., Inc. The soil properties used in the stability analysis (ML) type soils, were taken from the U.S. Department of the Interior Bureau of Reclamation Design of Small Dams.*

SOIL PROPERTIES

	UNIFIED CLASS	COHESION (PSF)	ANGLE OF INT. FRICTION	DESIGN DENSITY (PCF)
Dam Material Basin 004	GC	115.2	24.2	129.9
Dam Material Basin 007	SM	270.3	33.0	129.9
Foundation Basin 004	SM	270.3	33.0	132.1
Foundation Basin 007	SC-SM	187.2	30.5	136.0

*United States Department of Interior Bureau of Reclamation Design of Small Dams page 137.

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SURFACE MINING
COMMISSION

Best Coal, Inc.
Narley Mine
P-3850

STABILITY ANALYSIS DATA

(Continued)

DESIGN DATA

1) Design Density = 95% of the standard proctor maximum density.
2) Embankment top width: 12.0'.
3) Freeboard minimum = 10% of structure (from top of embankment to normal pool level).
4) Safety factors for embankment of Basin 004 with 3.0 H:1V slopes, front and back.
5) Safety factors for embankment of Basin 007 with 2.5H:1V slopes, front and back.
6) Basin 004 design height = 18.8 ft.
7) Basin 007 design height = 22.8 ft.
8) DMIN = 0.00
9) All design heights are measured from the top of the embankment to the toe of the upstream slope.

SAFETY FACTORS

BASIN NUMBER	STATIC SAFETY FACTOR
004	1.3
007	1.8

FOUNDATIONS AND ABUTMENTS

The foundation and abutments area will be inspected for visible structural deficiencies after clearing and grubbing, and if found they will be treated using sound engineering practices.

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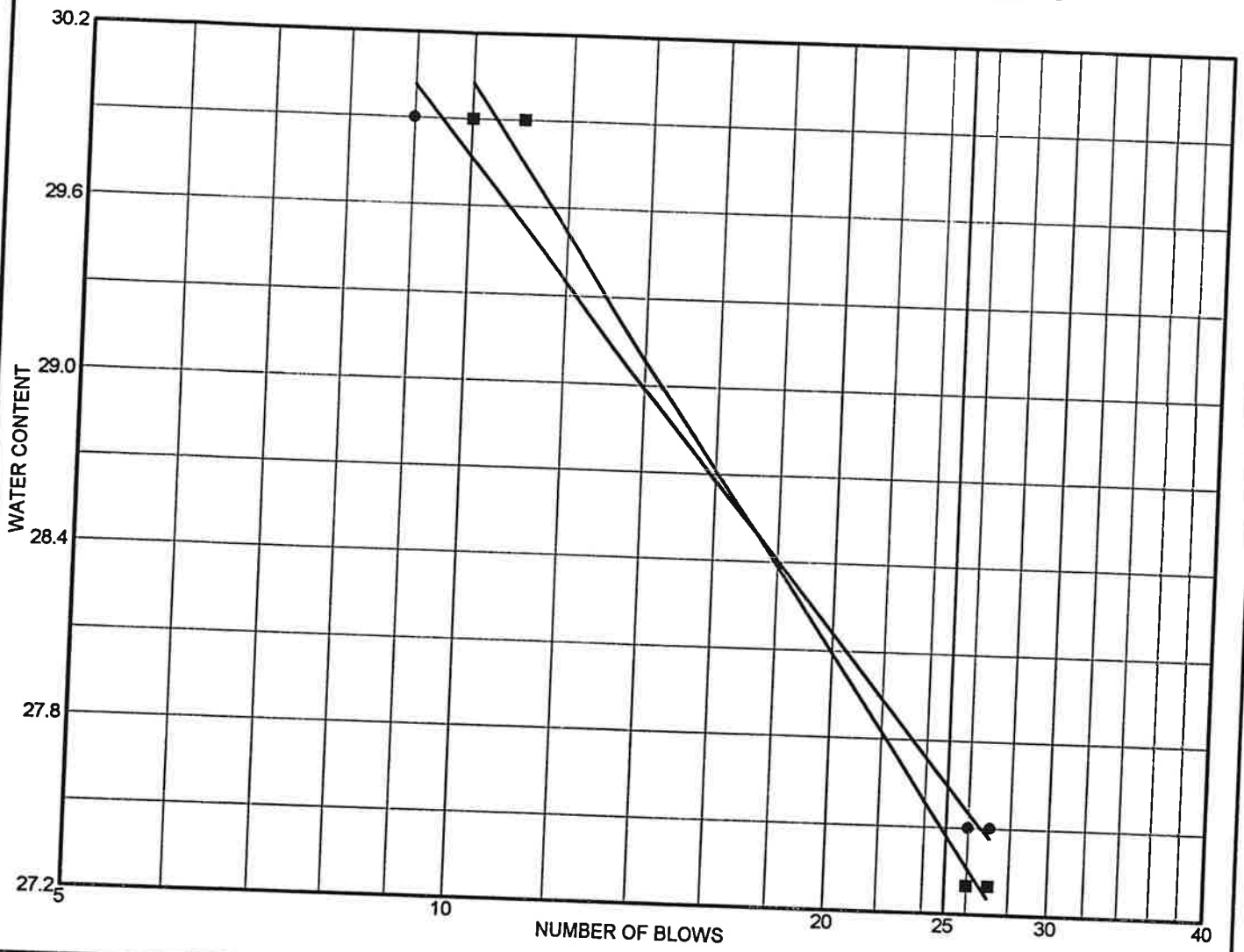
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gravelly lean clay with sand	28	21	7	34.15	22.6	GC
■	Silty sand with gravel	27	22	5	51.67	34.3	SM

Project No. **Client:** Best Coal Inc.

Project: BASIN 004

BASIN 004

● **Location:** Narley Mine

■ **Location:** Narley Mine

Remarks:

● DAM MATERIAL

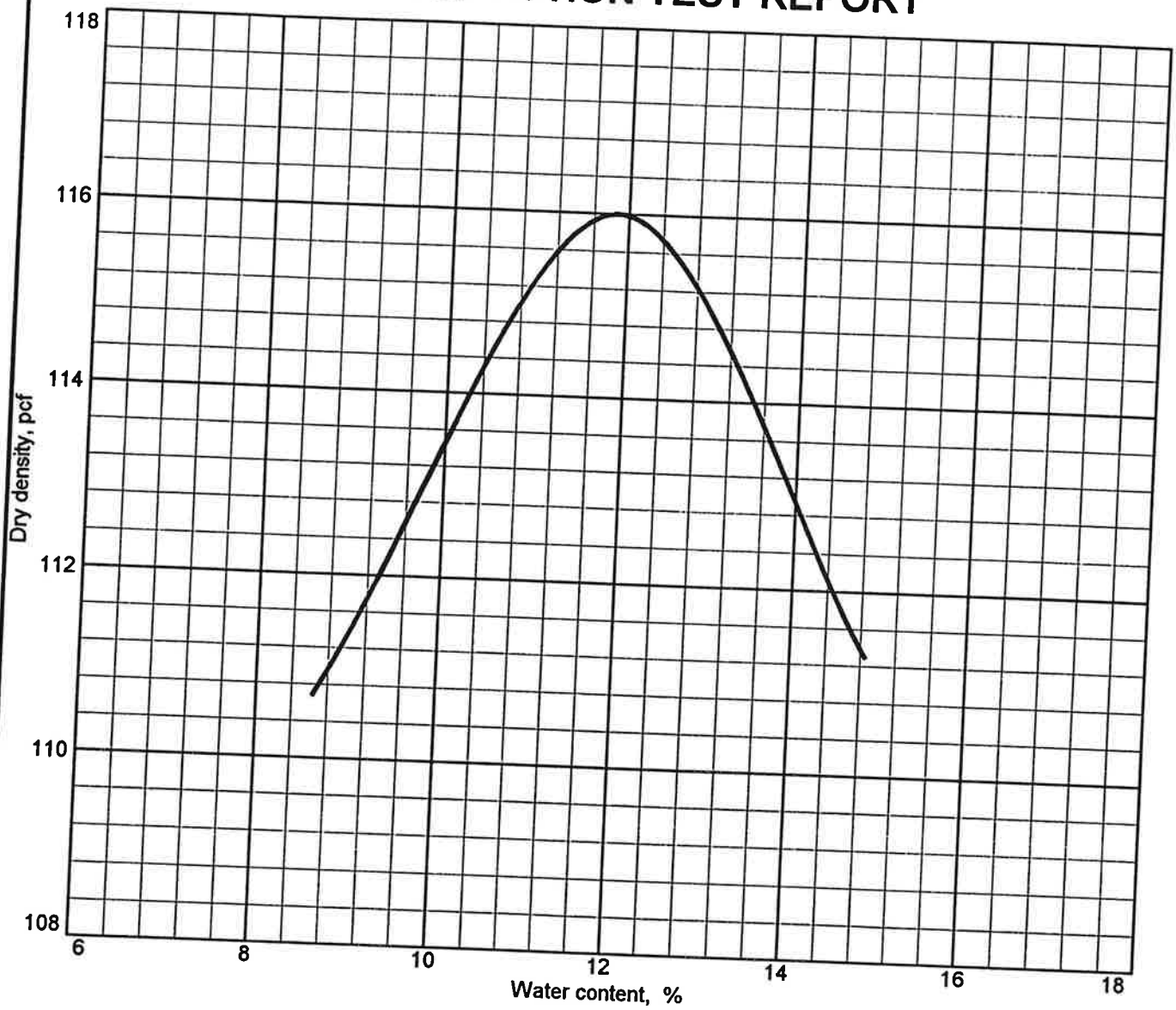
■ FOUNDATION MATERIAL

LIQUID AND PLASTIC LIMITS TEST REPORT

PERC ENGINEERING CO., INC.

Figure

COMPACTION TEST REPORT



Test specification: ASTM D 698-91 Procedure C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
	GC-GM				28	7	18.1	22.6

TEST RESULTS

Maximum dry density = 116.0 pcf

Optimum moisture = 11.9 %

MATERIAL DESCRIPTION

Gravelly lean clay with sand

Project No.

Client: Best Coal Inc.

Project: BASIN 004

Location: Narley Mine

Date: 02-25-2004

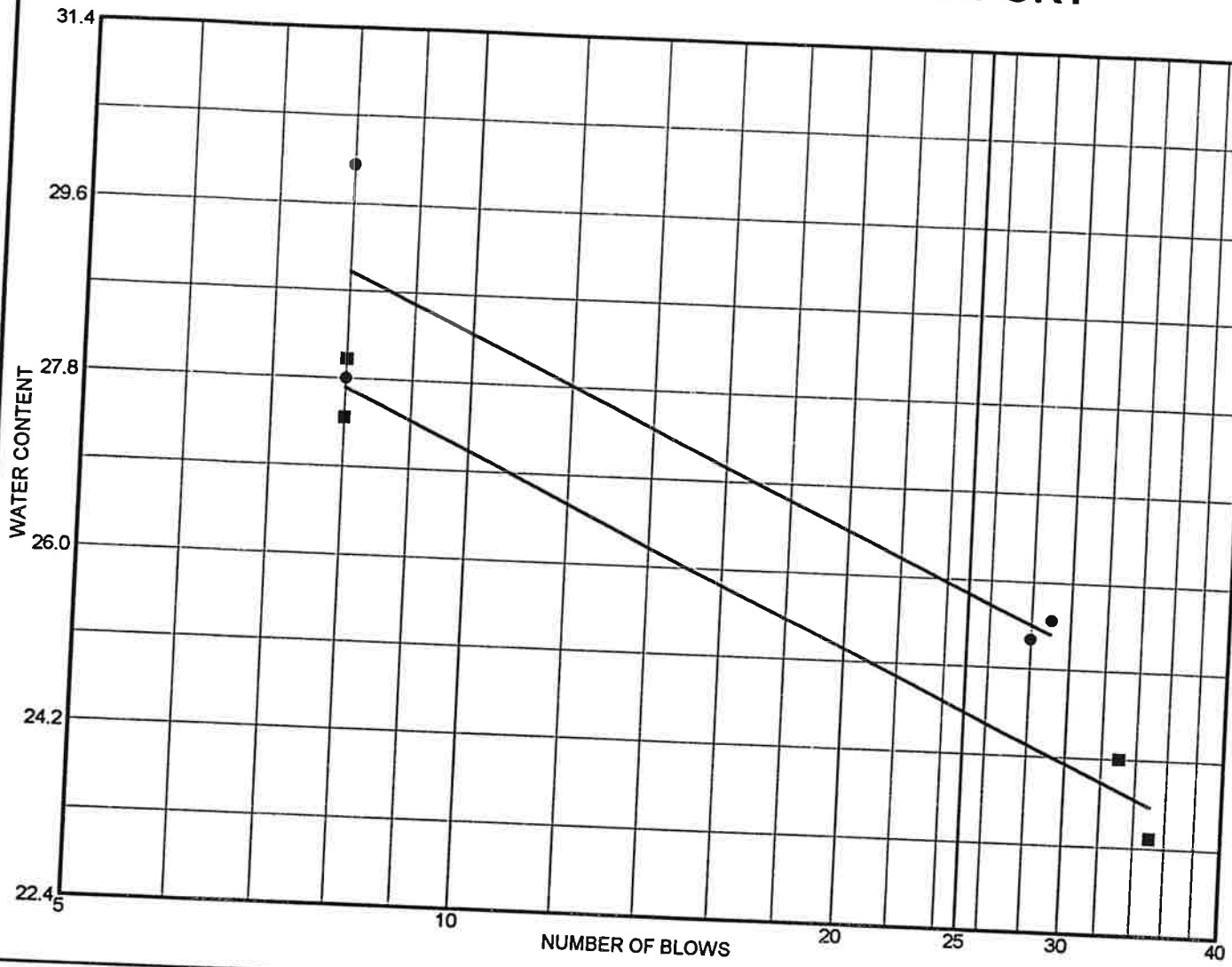
Remarks:

COMPACTION TEST REPORT

PERC ENGINEERING CO., INC.

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gravelly lean clay with sand	26	22	4	86.75	44.3	SM
■	Silty sand with gravel	25	21	4	63.66	48.2	SC-SM

Project No.

Client: Best Coal Inc.

Project: BASIN 007

BASIN 007

● **Location:** Narley Mine

■ **Location:** Narley Mine

Remarks:

● DAM MATERIAL

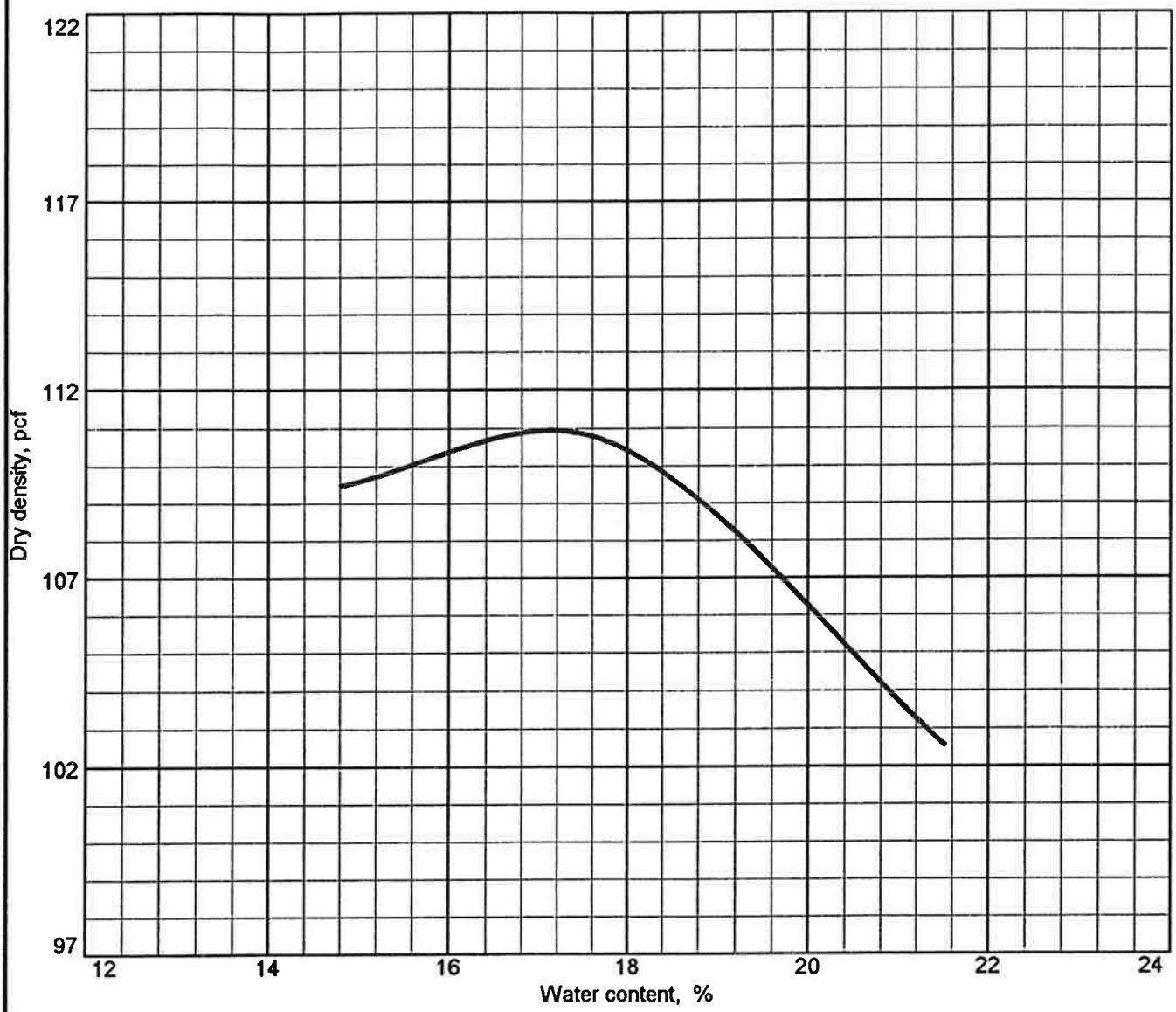
■ FOUNDATION MATERIAL

LIQUID AND PLASTIC LIMITS TEST REPORT

PERC ENGINEERING CO., INC.

Figure

COMPACTION TEST REPORT



Test specification: AASHTO T 180 Method B Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	SM				26	4	3.4	44.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 110.9 pcf Optimum moisture = 17.1 %	Gravelly lean clay with sand

Project No. **Client:** Best Coal Inc.

Project: BASIN 007

Date: 02-25-2004

- **Location:** Narley Mine

Remarks:

COMPACTION TEST REPORT

PERC ENGINEERING CO., INC.

Figure