

LIFE CYCLE OF AN IMPOUNDMENT - Rob Fork



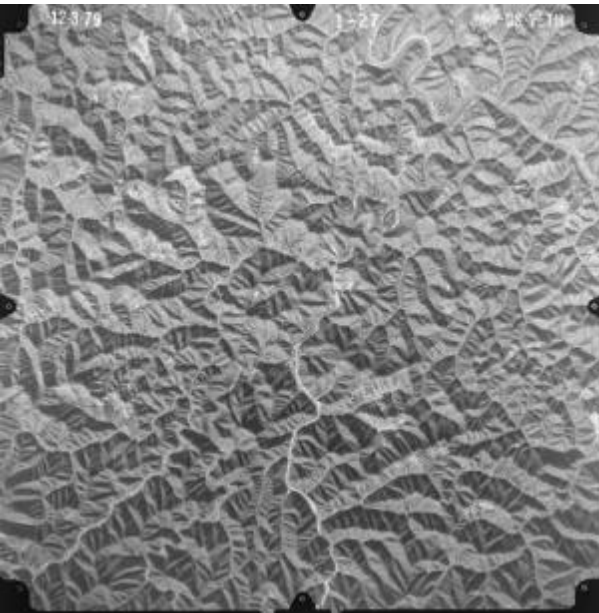
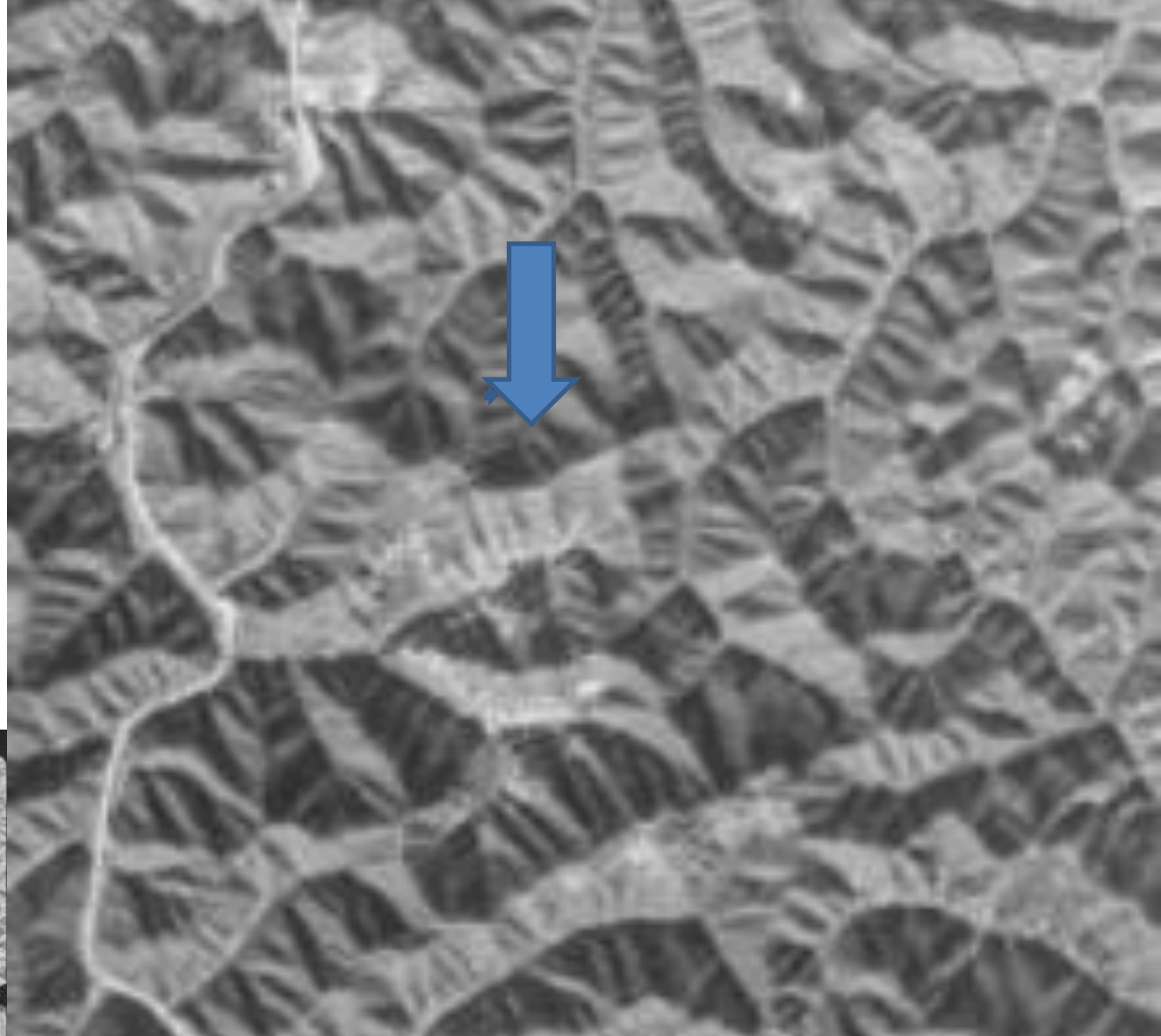
Steve Gardner, P.E.



Charlie Bishop, P.E.



**ROB FORK, PIKE COUNTY, KY
1979
BETH-ELKHORN CORP.
BETHLEHEM MINES CORP.**



Rob Fork Impoundment History

Approximate Dates	Company Name	Comments	LEGAL ID/KY SMCRA Permit
1975	Beth Elkhorn Corp.	D'Ap Retained to Design Impoundment	MSHA ID 15-14468
1984	Beth Elkhorn Corp.	Permit issued 9/13/1984	698-9004
1987	Beth Energy Mines Inc	Name Change	898-9018
1989	Mine 29 Mining & Processing Inc	Bethlehem Sells Property New Company	898-9051
1991	Sidewinder Mining Co	Kiscaden's- Overpermit after Bankruptcy	898-9054
1998	Quaker Coal Inc.	Acquires Operation	898-9087
2002	AEP KY Coal, LLC	Acquires Quaker Coal from Bankruptcy	898-9122
2005	CAM-KY LLC	Acquires from AEP KY Coal bankruptcy	898-9132
2006	CAM	Name Change	898-9141
2021	ARC KY Resources	Issued 3/17/2021 –transfer from CAM bankruptcy	898-9189



Project No. 75-827
June 1978

D'APPOLONIA
CONSULTING ENGINEERS, INC.

Report

Future Coal Refuse Disposal Plan

**Beth-Elkhorn Mine No. 29
Pike County, Kentucky**

Bethlehem Mines Corporation
Beth-Elkhorn Division
Jenkins, Kentucky

REPORT

**MODIFIED CONSTRUCTION PLANS
DESIGN OF STAGES I, ~~IA~~, II, III AND IV**

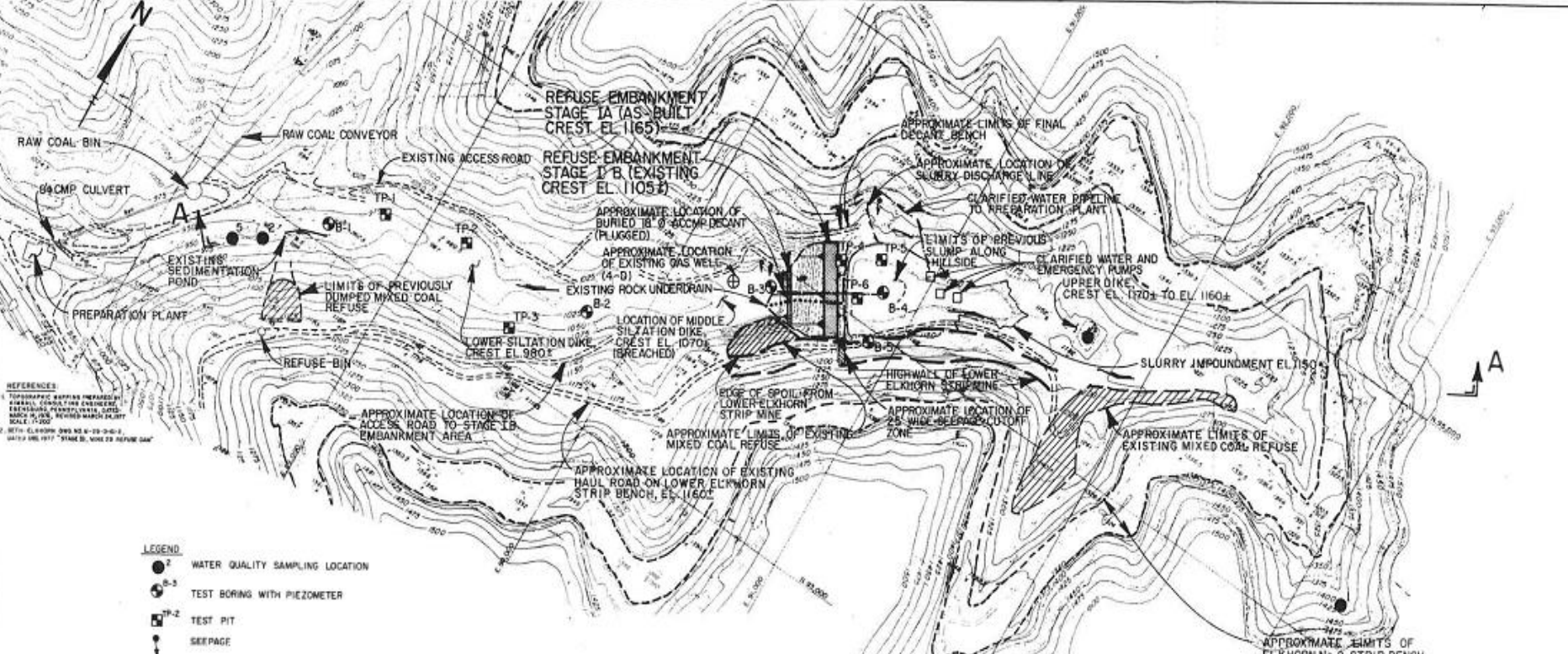
**COAL REFUSE DISPOSAL FACILITY
MINE NO. 29**

**BETHENERGY MINES INC.
SOUTHERN DIVISION
JENKINS, KENTUCKY**

PROJECT NO. 87-04-54
JULY, 1987



ALMES & ASSOCIATES INC.
CONSULTING ENGINEERS

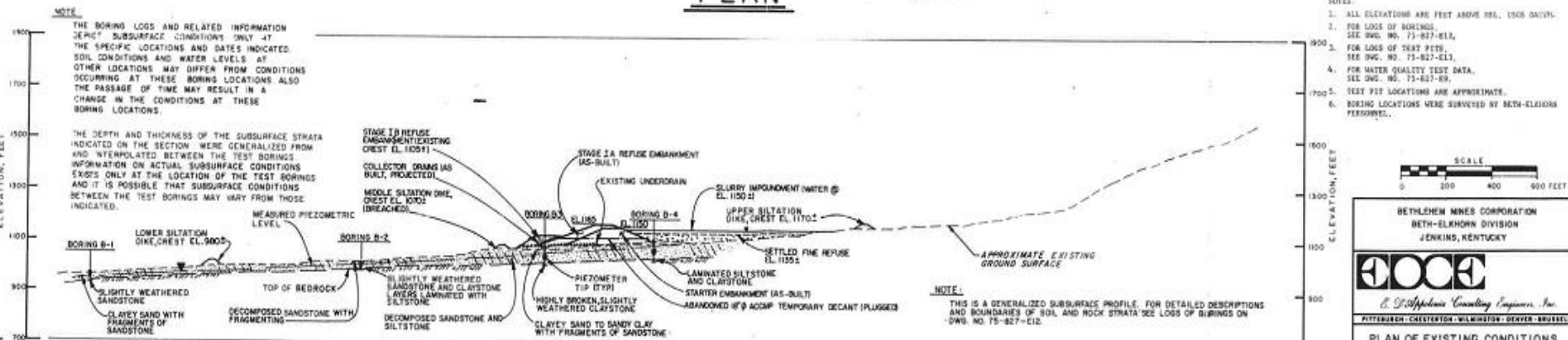


REFERENCES:
 TOPOGRAPHIC MAPS IN PARTIAL
 CANCELLED CONTOUR EMBANKMENT
 EXISTING MIXED COAL REFUSE
 SCALE: 1"=200'
 © BETH ELKHORN DIVISION, 1977. STAGE 1B, 1978. STAGE 1A, 1977. REFUSE DAM.

- LEGEND**
- WATER QUALITY SAMPLING LOCATION
 - B-3 TEST BORING WITH PIEZOMETER
 - TP-2 TEST PIT
 - ⬇ SEEPAGE

PLAN OF EXISTING CONDITIONS 1979

PLAN



SECTION A-A

- NOTES**
1. ALL ELEVATIONS ARE FEET ABOVE SEA LEVEL, USCS DATUM.
 2. FOR LOGS OF BORINGS, SEE DWG. NO. 73-827-612.
 3. FOR LOGS OF TEST PITS, SEE DWG. NO. 73-827-613.
 4. FOR WATER QUALITY TEST DATA, SEE DWG. NO. 73-827-69.
 5. TEST PIT LOCATIONS ARE APPROXIMATE.
 6. BORING LOCATIONS WERE SURVEYED BY BATHY-ELEVATIONS PERFORMED.



BETHLEHEM MINES CORPORATION
 BETH-ELKHORN DIVISION
 JENKINS, KENTUCKY



PITTSBURGH-CHESTER/ST. WILMINGTON-DEKALB-BRUSSELL

PLAN OF EXISTING CONDITIONS

MINE NO. 29 COAL REFUSE DISPOSAL FACILITY
 MINE COUNTY, KENTUCKY

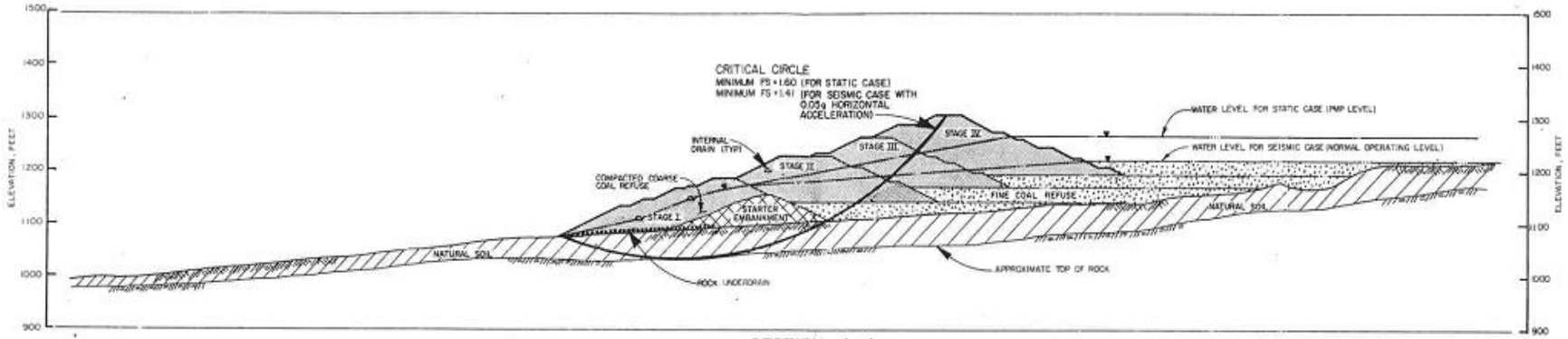
DRAWN BY	M.E.L.	3-27-78	DESIGNED BY	73-827-E11
CHECKED BY	J.S.	5-11-78	FIGURE NO.	3
APPROVED BY	J.S.	3/27/78		



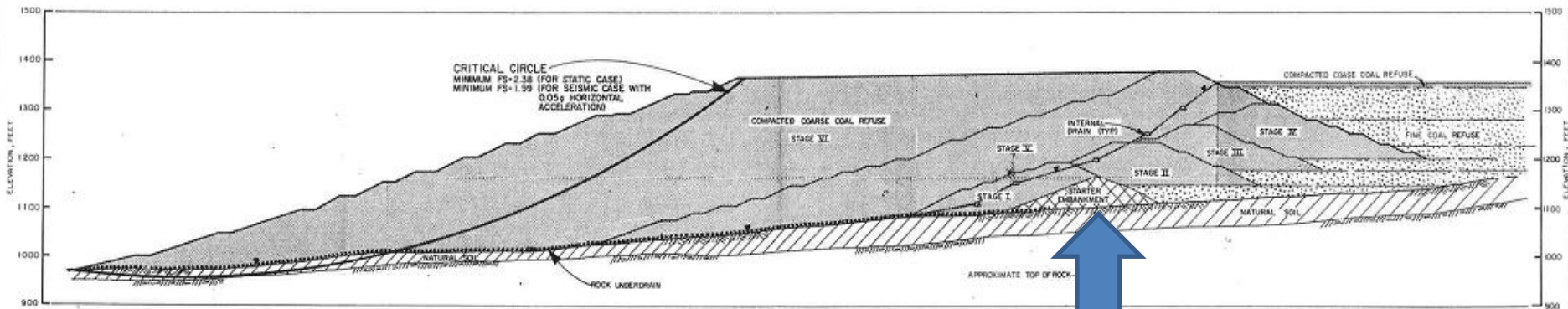
Handwritten signature: R. J. ...

"We Will Build The Future"

SLOPE STABILITY ANALYSIS – ABANDONMENT 1979



SECTION A-A
END OF STAGE IV
(FOR PLAN AND LOCATION SEE DWG. NO. 75-827-E21)



SECTION A-A
ABANDONMENT
(FOR PLAN AND LOCATION SEE DWG. NO. 75-827-E23)

MATERIAL PROPERTIES USED IN STABILITY ANALYSES

MATERIAL	TOTAL UNIT WEIGHT (PCF)	EFFECTIVE SHEAR STRENGTH PARAMETERS	
		FRICTION ANGLE (DEGREES)	COHESION (PSF)
COARSE COAL REFUSE	120	35	0
FINE COAL REFUSE	80	25/15 ⁽¹⁾	0
NATURAL SOIL ⁽²⁾	134	33	0
COMPACTED NATURAL SOIL BY STARTER EMBANMENT	134	34	100

⁽¹⁾ FOR DESCRIPTION OF NATURAL SOILS, SEE DRAWINGS 75-827-E12 AND E13.
⁽²⁾ A FRICTION ANGLE OF 25 DEGREES WAS USED IN THE STATIC ANALYSES AND 15 DEGREES IN THE SEISMIC ANALYSES.

NOTES

- ALL ELEVATIONS ARE FEET ABOVE MSL, USGS DATUM.
- THE STABILITY ANALYSES WERE PERFORMED USING A COMPUTERIZED VERSION OF BISHOP'S SIMPLIFIED METHOD OF SLICES.
- FIELD MEASURED LEVELS USED IN THE ANALYSES ARE SHOWN ON EACH SECTION.
- MATERIAL PROPERTIES USED IN THE SLOPE STABILITY ANALYSES ARE BASED ON FIELD AND LABORATORY TEST DATA AND PREVIOUS TEST RESULTS FOR SIMILAR MATERIALS.
- FOR THE STARTER AND STAGE I EMBANMENTS, PREVIOUS ANALYSES CLEARED FROM D'APPROPRIATE, JULY 31, 1978, "DESIGN PLANS AND SPECIFICATIONS, STARTER EMBANMENT CONSTRUCTION AND STAGE I DISPOSAL" YIELDED THE FOLLOWING RESULTS:

	SAFETY FACTOR OF SAFETY	
	STATIC CASE	SEISMIC CASE
STARTER EMBANMENT	1.42	1.23
STAGE I	2.12	1.84



Rly ch

BETHLEHEM MINES CORPORATION
BETH - ELKHORN DIVISION
JENKINS, KENTUCKY

DOCS

J. D. Applegate Consulting Engineers, Inc.

ATTENTION: CHESTER/ELKHORN/SEWER OPERATIONS

SLOPE STABILITY ANALYSES

MINE NO. 20 COAL REFUSE DISPOSAL FACILITY
FIVE COUNTY, KENTUCKY

DESIGNED BY: JJA 2-27-78	DRAWING NO.: 75-827-E29
CHECKED BY: PBS 6-16-78	FIGURE NO.
APPROVED BY: RCM 6-16-78	18

APRIL 2000 - QUAKER COAL



Image U.S. Geological Survey

Google E

BREAKTHROUGH PREVENTION PLAN PLANNING & DESIGN



PERSPECTIVE

- **MINING HISTORY**
- **JULY 2001 and QUAKER COAL CO.**
- **DUE DILIGENCE and the ROB FORK IMPOUNDMENT SITUATION**
- **REGULATORY and PUBLIC PERCEPTION – POST MARTIN CO.**
- **POTENTIAL FOR SIGNIFICANT BREAKTHROUGH**
- **REGULATORY APPROVALS REQUIRED, and TIMING OF THESE**
- **COST IMPLICATIONS to AEP's REORG. PLAN without ROB FORK**

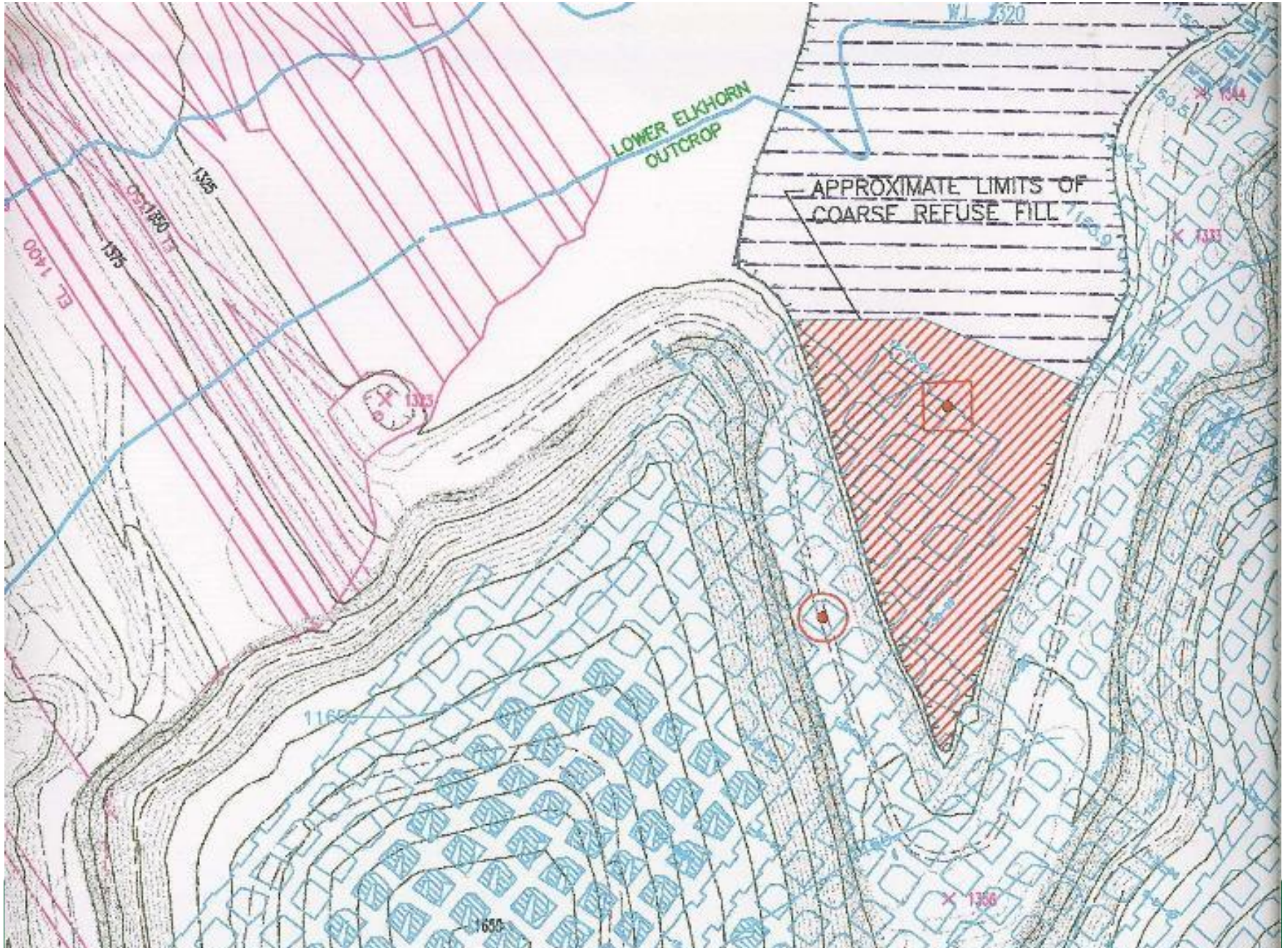


ALTERNATIVES ANALYSIS for ROB FORK IMPOUNDMENT

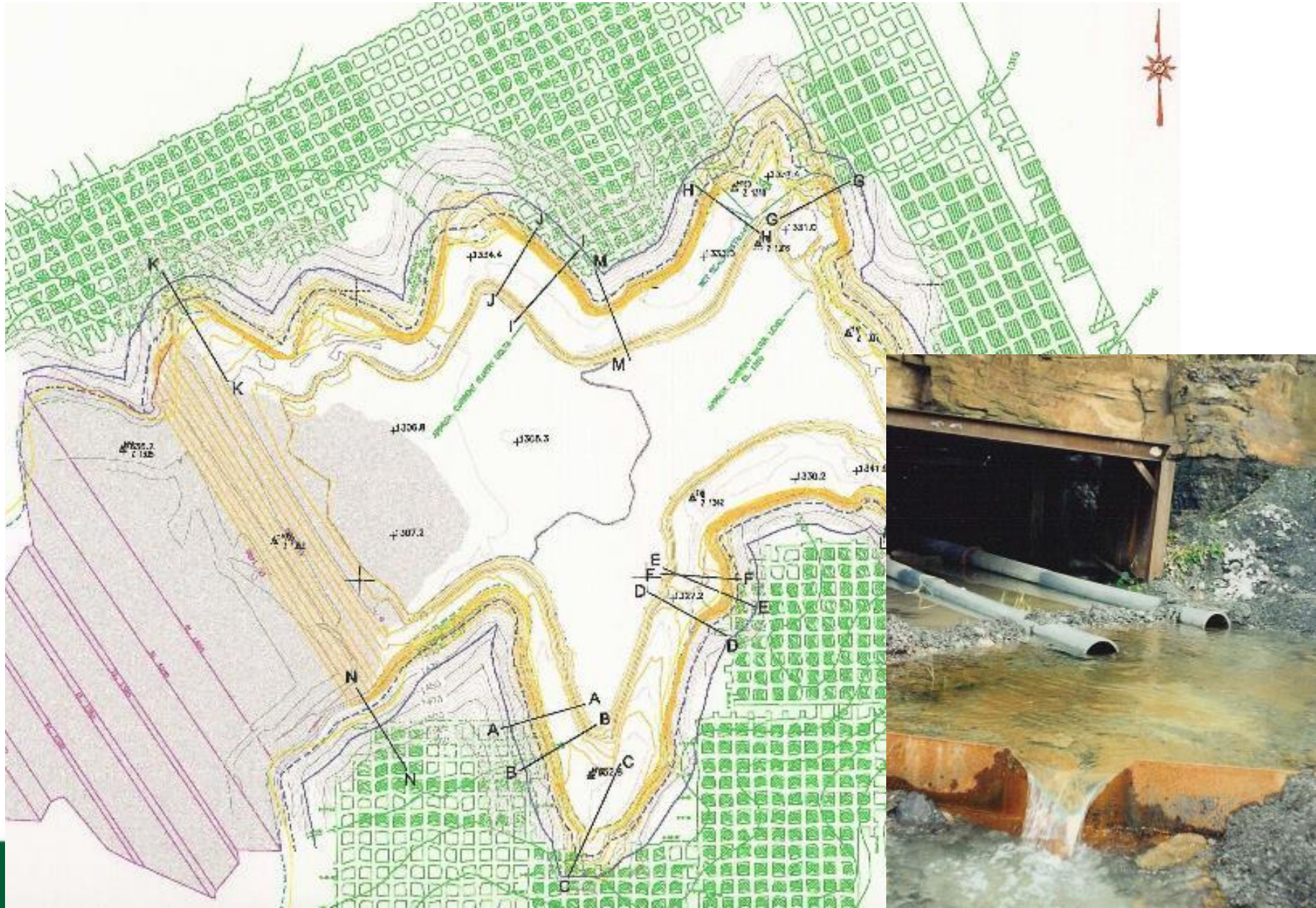
- **FILTER PRESSES and PERMIT COMBINED FILL DISPOSAL**
- **PURCHASE and PERMIT A NEW IMPOUNDMENT SITE**
- **DEVELOP A PLAN TO “SAVE” and EXTEND LIFE of ROB FORK**
- **OCTOBER 2001 PLANNING – COMPANY & CONSULTANTS**
- **WHAT WOULD IT TAKE FOR REG. APPROVALS and PEACE of MIND?**
- **INTERNAL DRAIN CONCEPT DEVELOPED**
- **AEP TAKEOVER of QUAKER – NOV. 1 2001**
- **PLANS SUBMITTED – DEC. 2001**
- **PHASE 1 APPROVAL – FEB. 2002 –to ELEV. 1330**



Lower Elkhorn Coal Bed



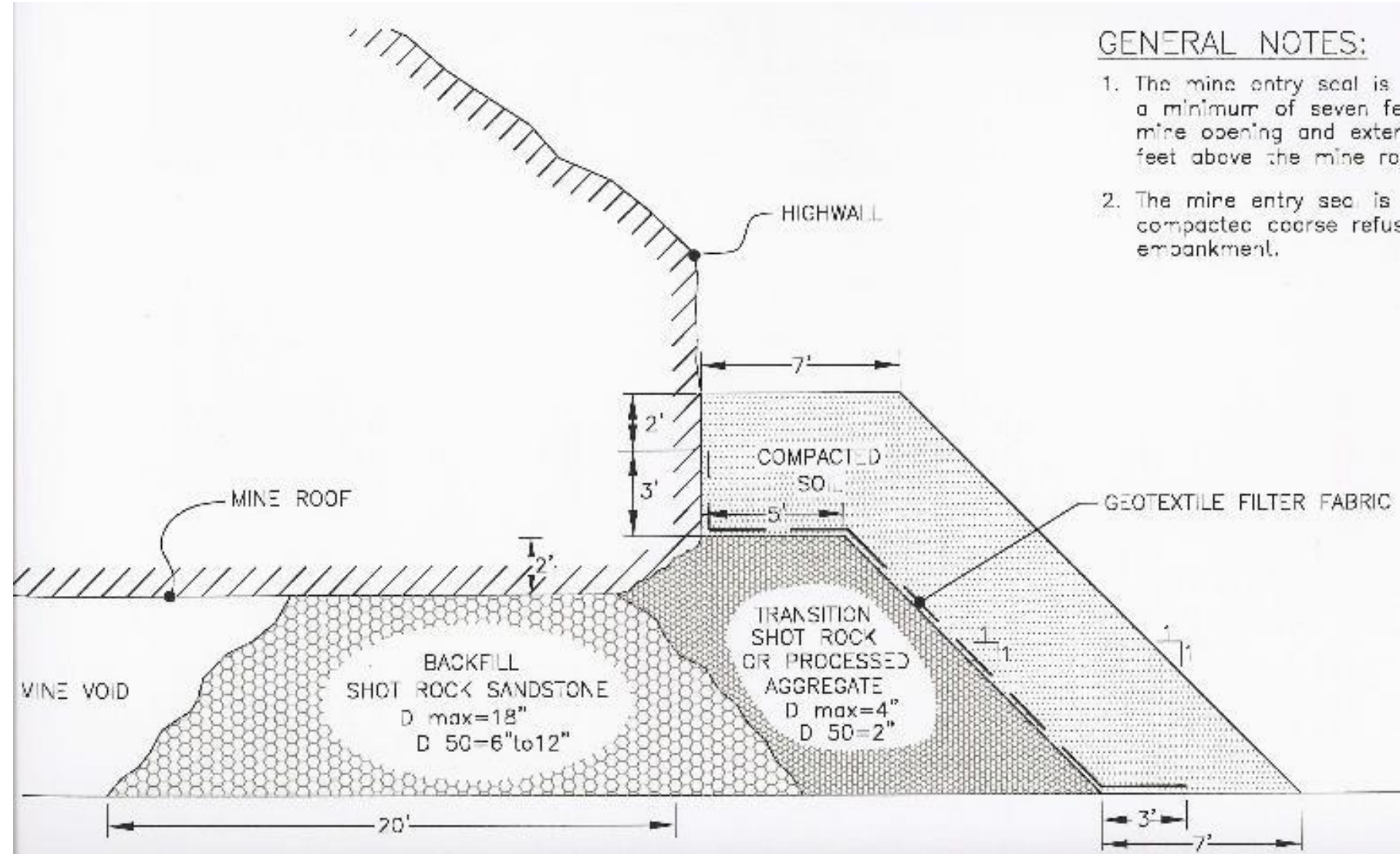
Elkhorn No. 2 Coal Bed

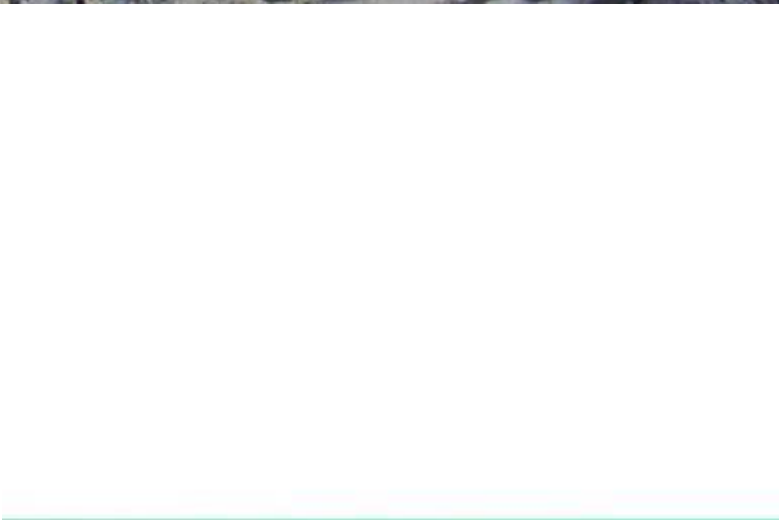


Mine Entry Seal

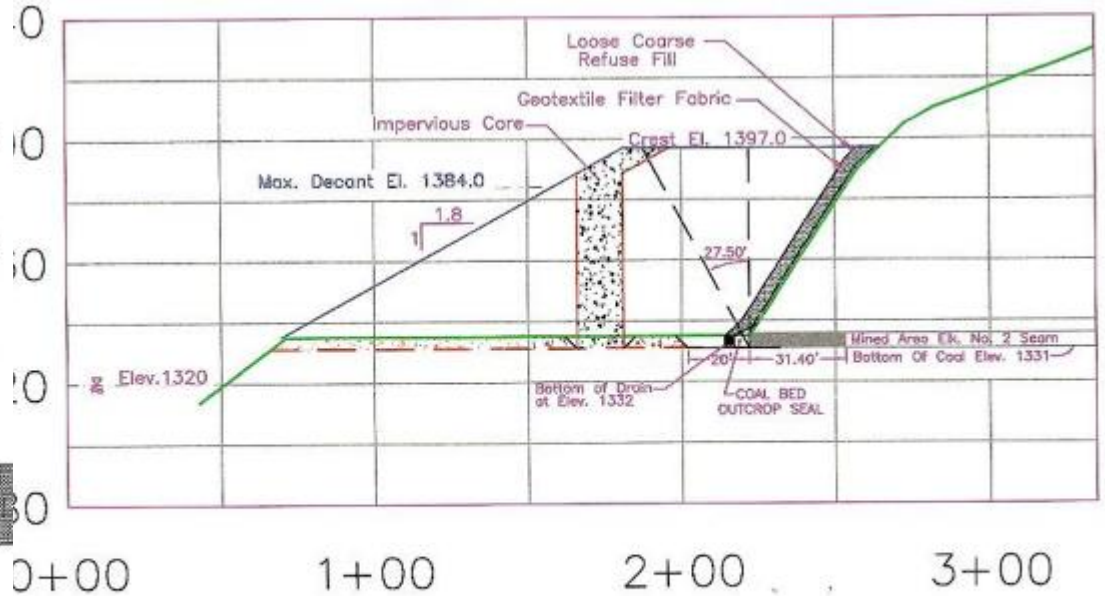
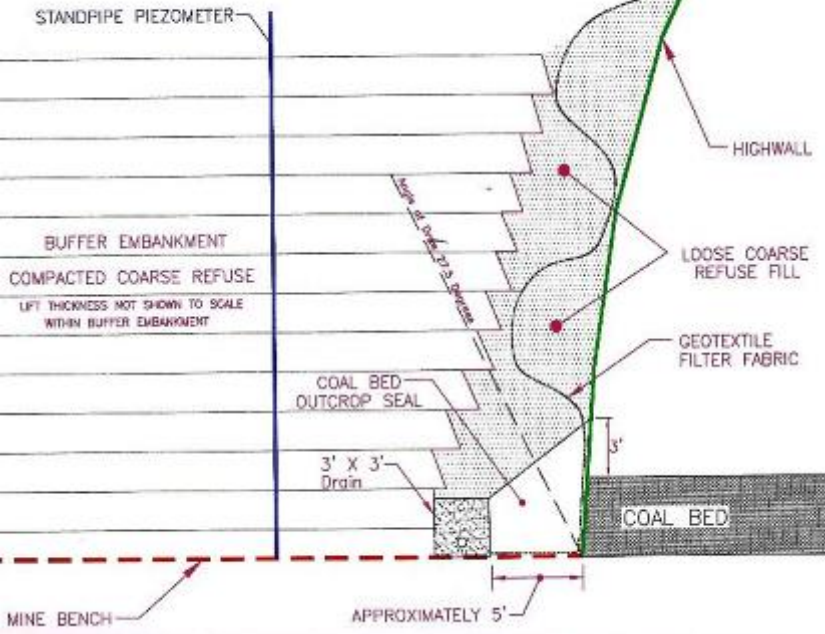
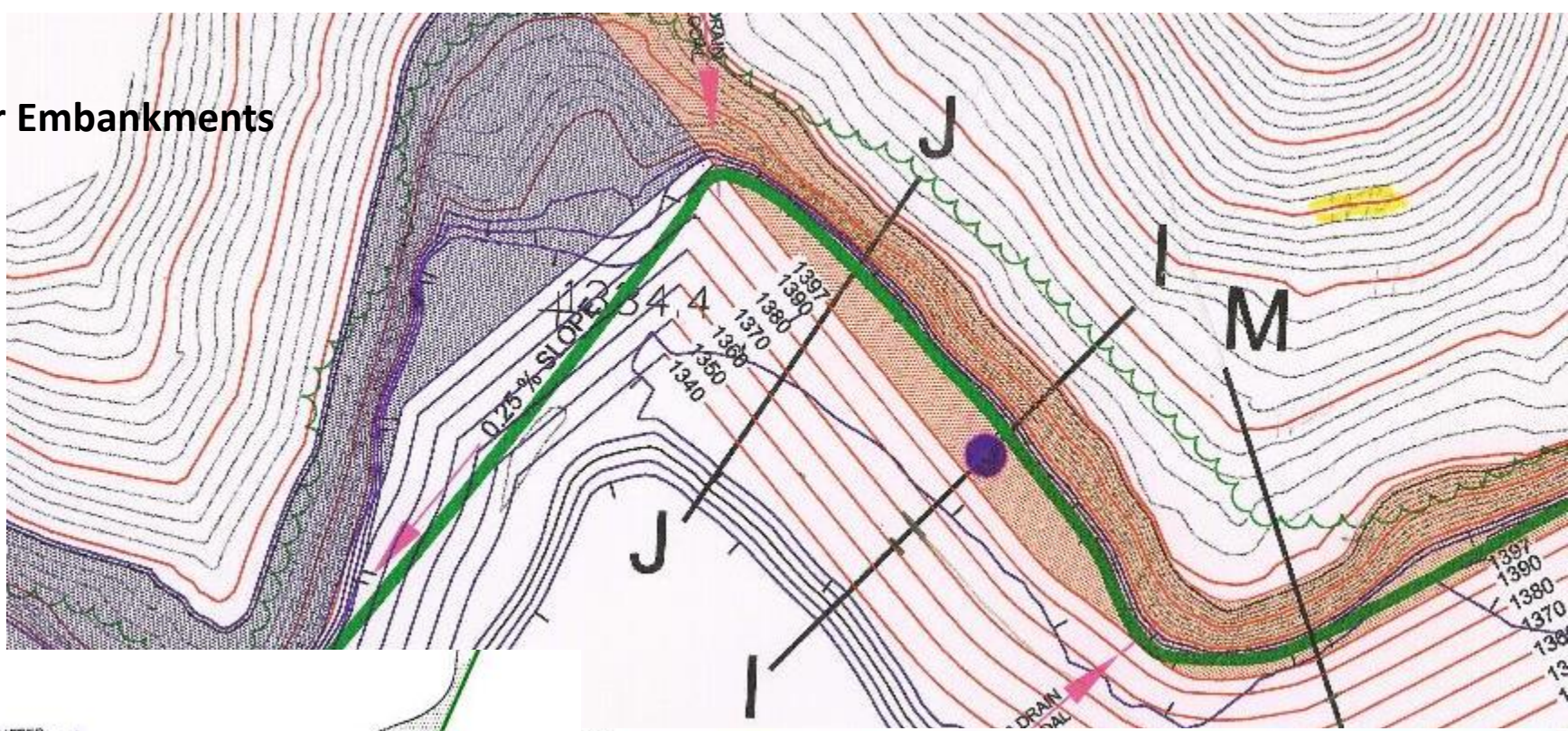
GENERAL NOTES:

1. The mine entry seal is a minimum of seven feet above the mine opening and extends a minimum of seven feet above the mine roof.
2. The mine entry seal is compacted coarse refuse embankment.





Buffer Embankments



Impervious Bentonite Core



Internal Drain



Internal Drain Outlet



AUGUST 2010



August 2001

- Impoundment Pool Elevation 1318 ft.
- Elkhorn No. 2 Elevation 1320 ft.
- Lower Elkhorn Elevation 1160 ft.

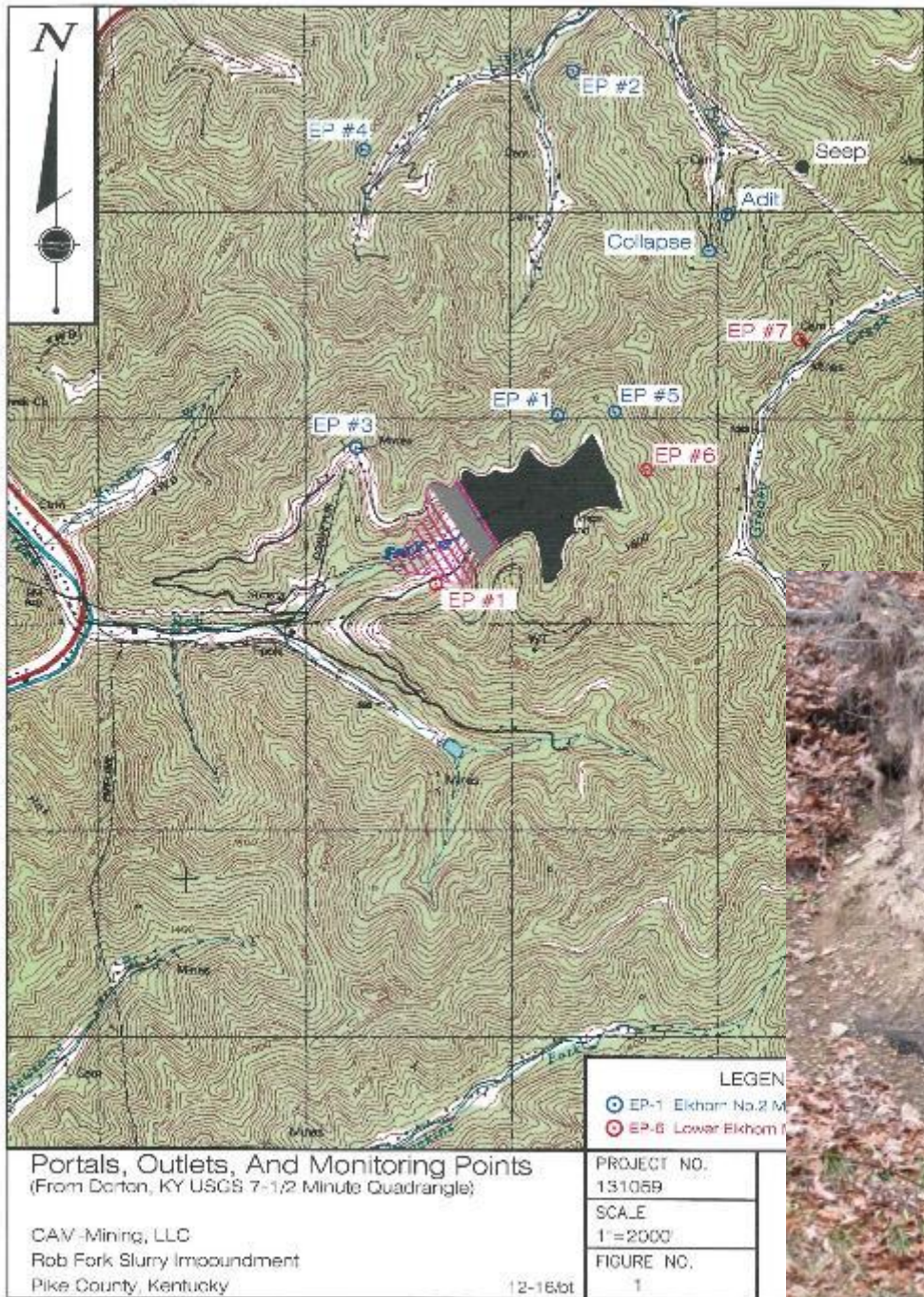
APRIL 2, 2009

- Dam Crest Elevation 1400 ft.
- Decant Spillway Inlet Elevation 1381 ft.
- Impoundment Pool Elevation 1368 ft.
- Buffer Embankment Crest Elev.^(*) 1369 ft.
- Elkhorn No. 2 Elevation 1320 ft.
- Lower Elkhorn Elevation 1160 ft.

^(*) Mapping December 26, 2008



INSPECTION PROCESS





SEPT. 2020 CAM TRANSITION TO ARC KENTUCKY



IMPOUNDMENTS IN LIMBO

Lexington Herald Leader:

**Regulators: Environmental violations remain at coal mines of bankrupt KY producer
BY BILL ESTEP AND LIZ MOOMEY FEBRUARY 12, 2021, 01:30 PM**

- IN KENTUCKY ALONE THERE ARE 230 IMPOUNDMENTS ON 102+/- OPERATIONS
- OF THOSE HALF ARE IN BANKRUPTCY, HAVE BEEN IN BANKRUPTCY OR QUESTIONABLE FINANCIAL STATUS
- CONCERNS? FLOODING ISSUES?
- FUTURE OPPORTUNITIES?





U.S. DEPARTMENT OF **ENERGY**

Department of Energy

DOE Awards \$19 Million for Initiatives to Produce Rare Earth Elements and Critical Minerals

APRIL 29, 2021

WASHINGTON, D.C. — The U.S. Department of Energy (DOE) today awarded \$19 million for 13 projects in traditionally fossil fuel-producing communities across the country to support production of rare earth elements and critical minerals vital to the manufacturing of batteries, magnets, and other components important to the clean energy economy. Facing persistent shortages in domestic supply, the U.S. has been forced to rely on imported materials, leaving clean energy technology production at greater risk of disruption.



INSIDE MSHA:

The Formative Years of the Mine Safety and Health Administration

By David A. Zegeer, PE

with Shannon Lamkin, MSLS.

Edited by Steve Gardner, PE, SME-RM

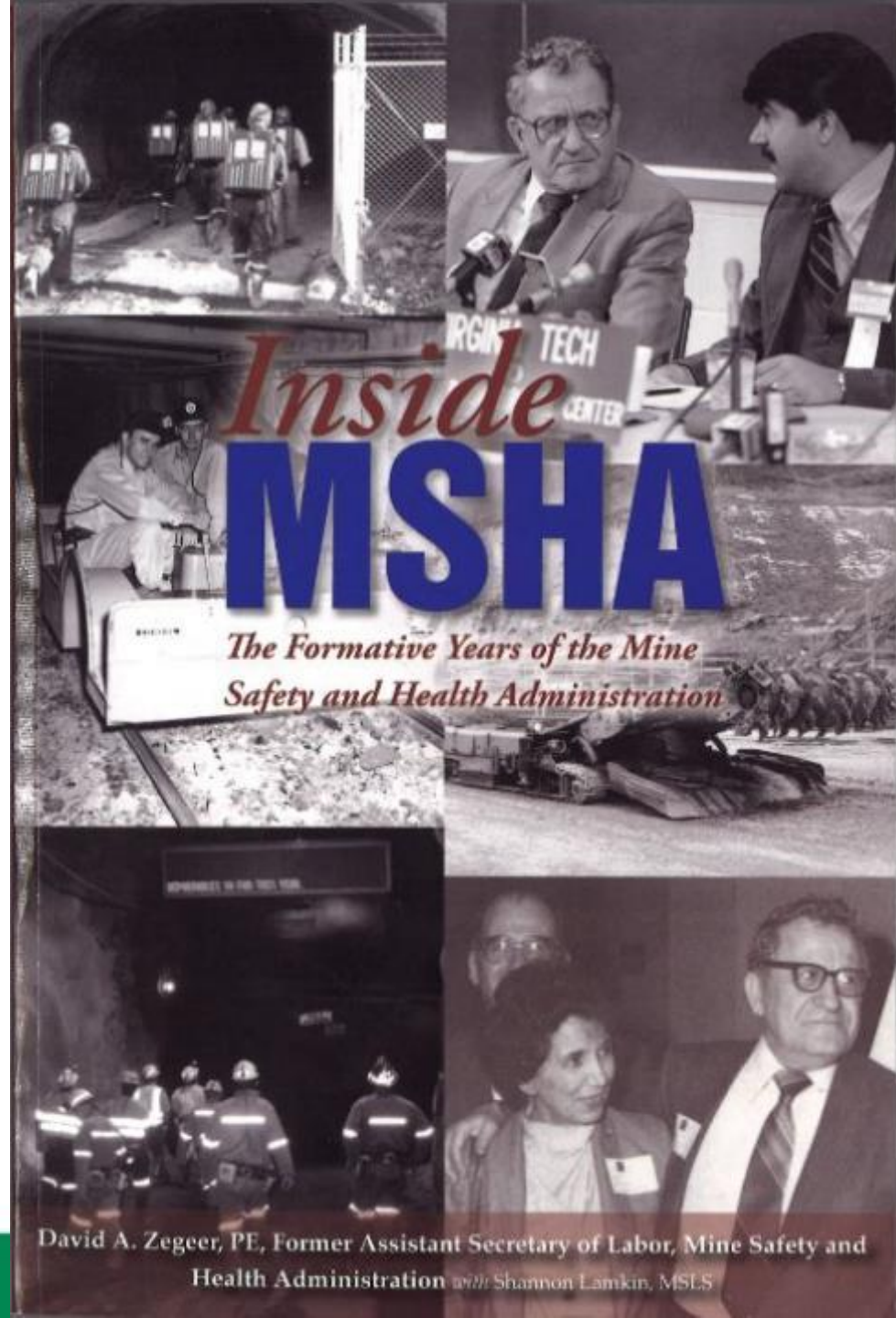
To order copies of INSIDE MSHA

Go to www.davezegeer.com.

Proceeds benefit the David A. Zegeer

Mine Health & Safety Scholarship at

The University of Kentucky



David A. Zegeer, PE, Former Assistant Secretary of Labor, Mine Safety and Health Administration with Shannon Lamkin, MSLS