

POTENTIAL ENVIRONMENTAL IMPACTS DUE TO MINING RELATED ACTIVITIES



PENNDOT DISTRICT 2

CORRIDOR O
CLEARFIELD AND CENTRE COUNTIES

PREPARED BY
SKELLY AND LOY, INC.



PHYSIOGRAPHIC REGIONS



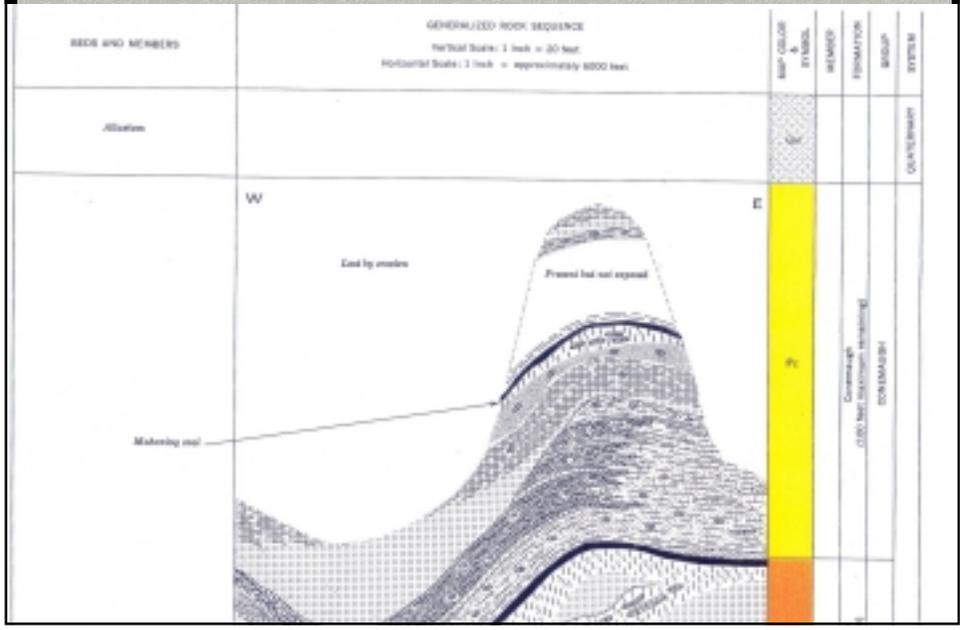
ALLEGHENY FRONT



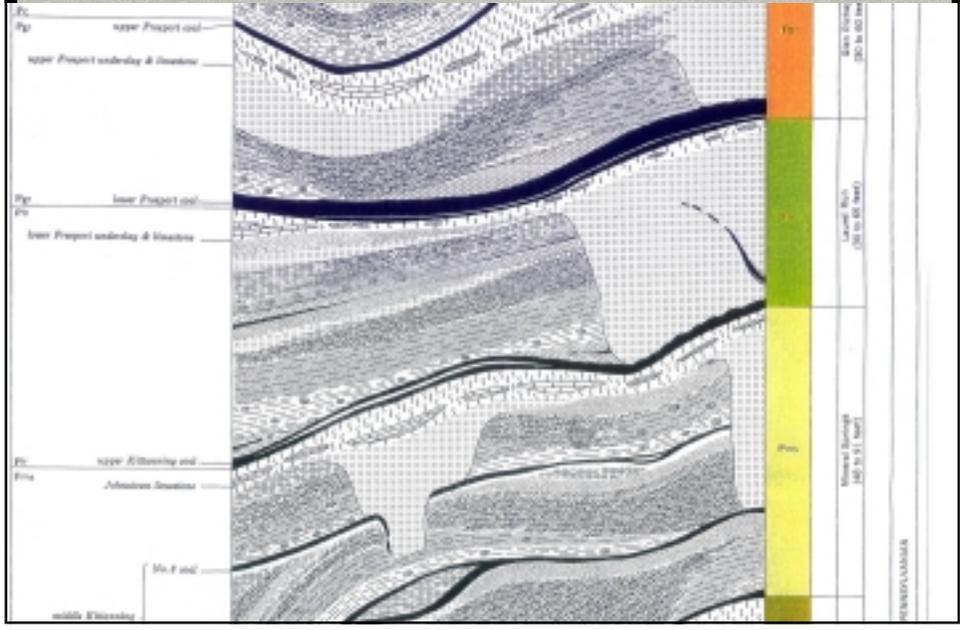
ALLEGHENY PLATEAU



STRATIGRAPHIC COLUMN



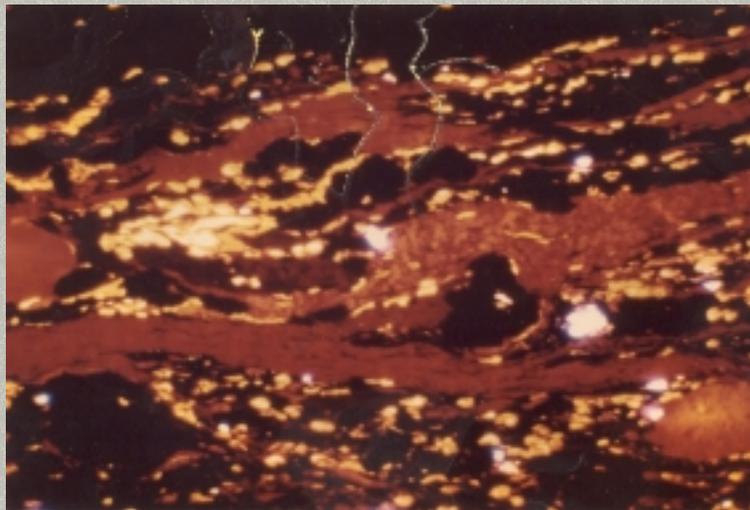
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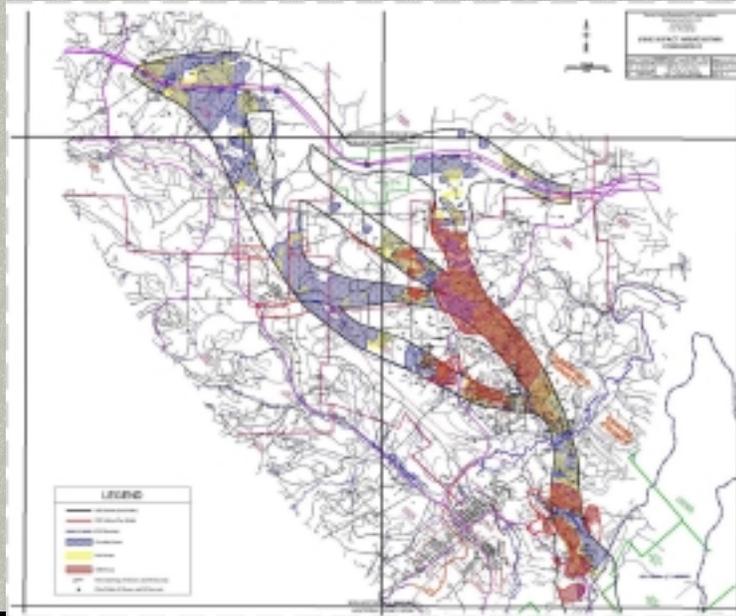
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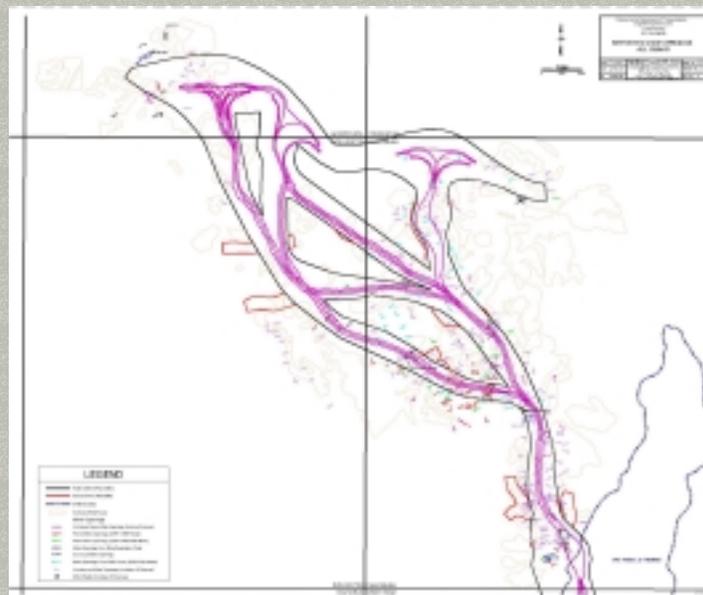
Thin Section of Coal



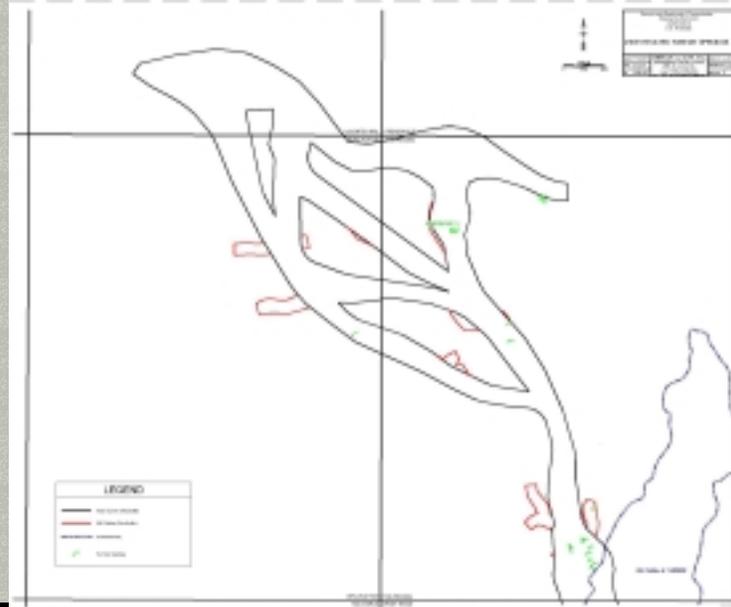
MINING IMPACTS



MINE OPENINGS



HABITAT OPENINGS



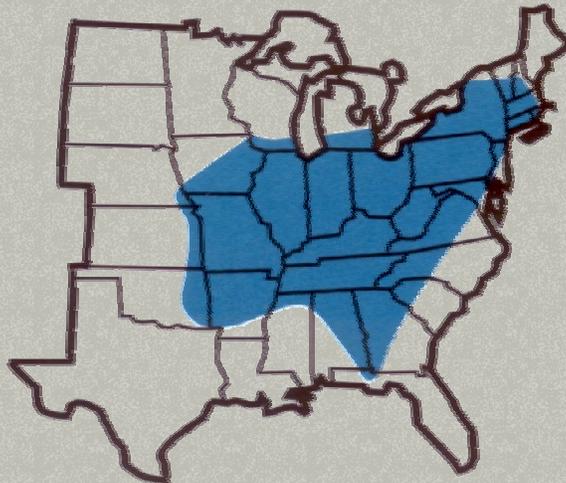
THREATENED AND ENDANGERED SPECIES

- With an abandoned mine opening and reported T&E Species in area, a survey has to be made. With T&E bats, a **bat-gate** has to be installed.

TYPICAL HABITAT OPENING



Indiana Bat (*Myotis Sodalis*) Range Map



Indiana Bat



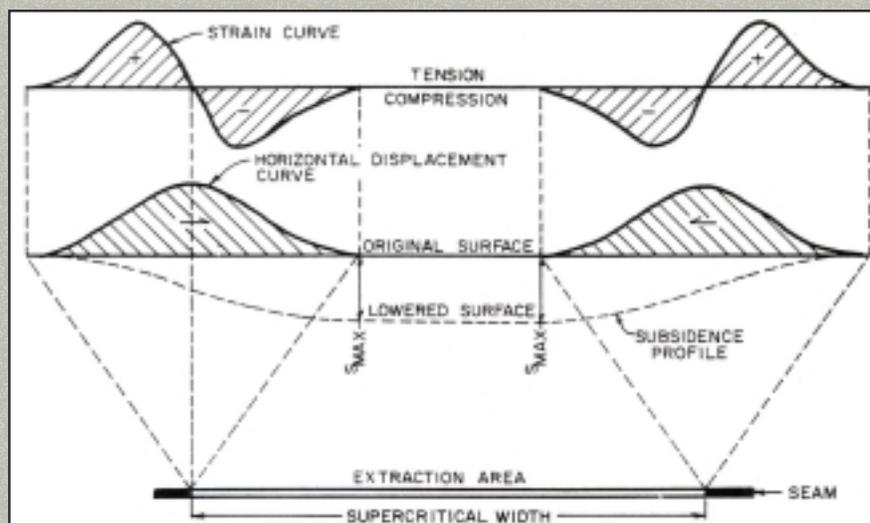
BAT GATE



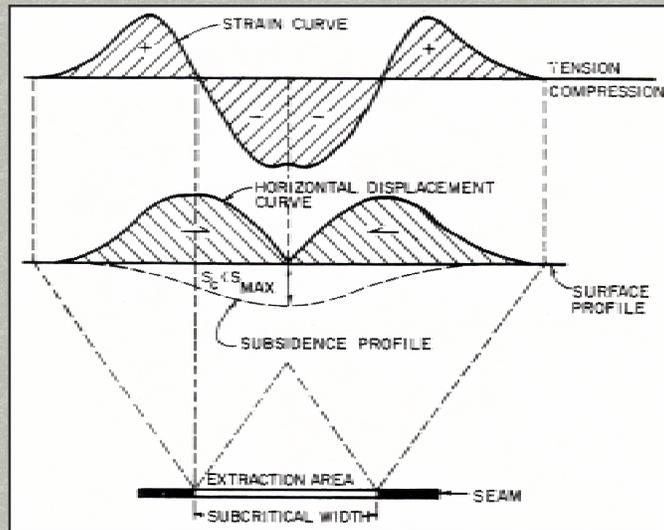
SUBSIDENCE SIZE AND SHAPE

- Surface Slope
- Seam Thickness
- Dip of Seam
- Extracted Width
- Overburden Thickness
- Weathering of OB and Pillars
- Overburden Lithology
 - Which Determines Strength, INT Friction Angle, and Caved Rock Density

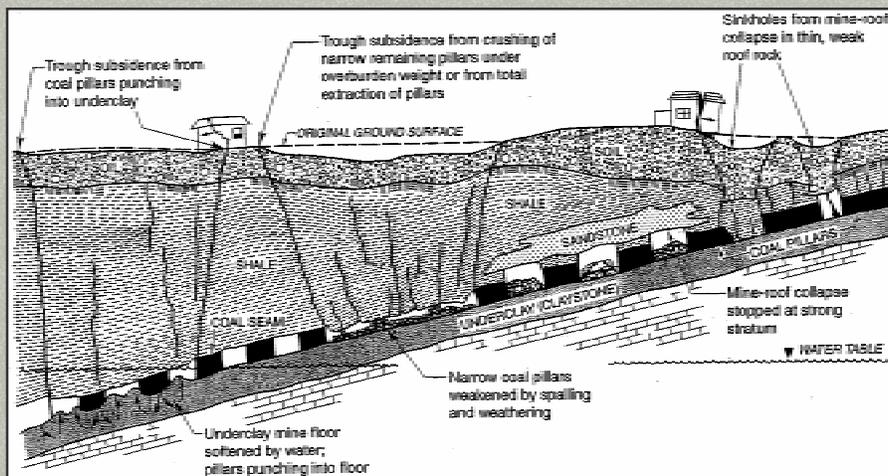
HORIZONTAL DISPLACEMENT AND STRAIN RELATED TO SUBSIDENCE PROFILE SUPERCritical



HORIZONTAL DISPLACEMENT AND STRAIN RELATED TO SUBSIDENCE PROFILE SUBCRITICAL



VARIOUS SUBSIDENCE PHENOMENON



From Geology of PA CH Shultz

TYPICAL DEEP MINE RELATED OPENING



SINKHOLE VICINITY OF PORTAL



PATTERNED GROUND WITH SINKHOLE REMEDIATION



CHRYSLER FILL METHOD



FLYASH USAGE



FLYASH USAGE



MINE FIRE AT THE OUTCROP



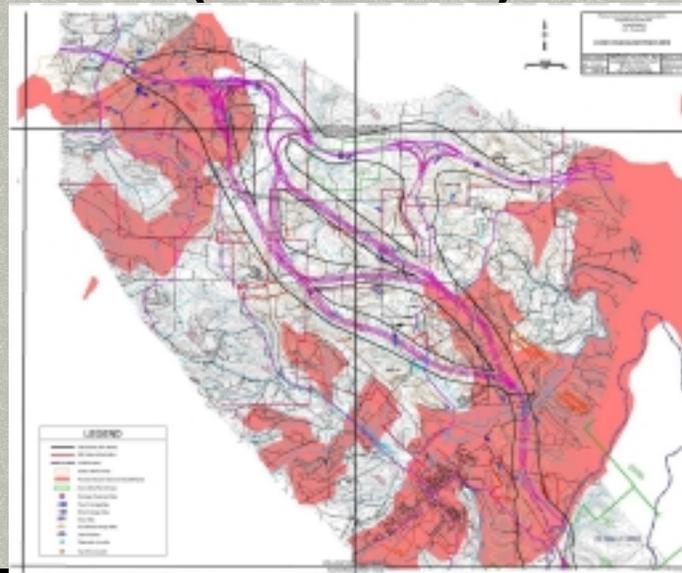
GROUT PUMP



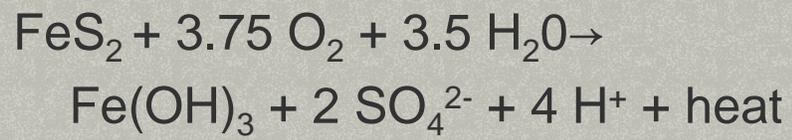
MIXING EQUIPMENT



MINE DRAINAGE (SCARLIFT)



OXIDATION OF PYRITE



U.S. 322 AT PHILIPSBURG, PA



ARTESIAN DISCHARGE FROM DEEP MINE



ARD KILL ZONE



“A” SEAM PORTAL



KILL ZONE DOWNSTREAM FROM PORTAL



CONCLUSIONS FOR CORRIDOR O

ENVIRONMENTAL IMPACTS
DUE TO DEEP MINING

T&E

- **Bat-gates If Needed**

SUBSIDENCE

- Avoid
- If Shallow, Excavate Incidentally
- Backflush (Acceptable Waste Materials)
- Low Pressure Grout (Hi Cal Flyash)

ACID DRAINAGE

- Avoid Seeps and Flows
- Eliminate Toxic Strata From Fill
- Add Alkalinity to Acid Fill
- Seal Barriers and Portals
- Passive Treatment of Seeps

OTHER ISSUES

- Waste Disposal
- Mine Fires
- Mineral Ownership