“Getting Out of the Pits”
Investigating Ohio’s Coal Mine Hazards

Ohio Department of Natural Resources
Chris Gordon - Ohio Geological Survey
Tim Jackson - Mineral Resources Mgmt.
Ohio Geological Survey

- Houses almost 5,000 mine maps
- Manages underground mine data
- AUMIRA project; ODOT
- IMS Update

Abandoned Mine Locator website
Scanned Image of Abandoned Underground Detailed Mine Map

Scanning of Images Provided by The Office of Surface Mining (OSM)
Ohio Department of Transportation

- AUMIRA project
- Mile-marker GIS points
- Field application
- Overburden Application Tool
ABANDONED-UNDERGROUND MINE INVENTORY and RISK ASSESSMENT (AUMIRA)

ODOT requirements:

- Field maps for ODOT’s twelve districts depicting the location of AUM’s, mined-out areas, entry points, and mine point locations that underlie all state routes, federal routes, and interstate highways within a 500 foot buffer of AUM’s and mined-out areas.

- To indicate points of intersection and coordinates of such points where all roadways intersected buffer areas, mine polygons, and mine-out areas.

- To provide geo-referenced images of mine workings on maps.
GIS Analysis
Overburden Application

Interstate Highway

Bedrock Contour

Structural Contour

Digitized Line

Mine

Digital Elevation Model
## Captured Data Output

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Overburden Application

Profile of Mine-Surface Relation

- Elevation (ft.)
- Surface Elev.
- Bedrock Elev.
- Mine Elev.

500 ft. Interval
IMS Update

- Improve interface
- Georeferenced mine images
- Orthophotography
- Coalbed-specific identification
Mineral Resources Management

- Abandoned Mine Lands program
- On-site Investigations
- Emergency Program

I-70 subsidence, 1995
Ohio’s Underground Mine Hazards

Case Studies
Ohio’s Underground Mine Hazards
Case Study #1
Tunnel Hill Road
Ohio’s Underground Mine Hazards

- Tunnel Hill Road
- Two lane county highway
- Connects New Lexington & Crooksville
Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards

- Tunnel Hill Road
- Connects New Lexington & Crooksville

- Road patched at 3:00 p.m.
- Road collapsed at 5:00 p.m.
Ohio’s Underground Mine Hazards

Safety First
Ohio’s Underground Mine Hazards

- Tunnel Hill Road
- Connects New Lexington & Crooksville
- Road patched at 3:00
- Road collapsed at 5:00

- Road temporarily closed
Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards

- Tunnel Hill Road
- Connects New Lexington & Crooksville
- Road patched at 3:00
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- Office research - mines in the vicinity
- And two past projects
Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards

- Tunnel Hill Road
- Connects New Lexington & Crooksville
- Road patched at 3:00
- Road collapsed at 5:00
- Road temporarily closed
- Office research - mines in the vicinity
  - And two past projects

- Exploratory drilling needed
Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards
### Ohio’s Underground Mine Hazards

#### Subsurface Profile

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<td>Gray silt shale</td>
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#### Sample 

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#### ODNR Mineral Resources Management

Address: 130 South State Street, Columbus, OH 43215
Phone: 614-644-6563
Ohio’s Underground Mine Hazards

• CONSTRUCTION:
  • Stabilizing about a length of 60 feet
  • 10 borings drilling to a depth of 31 feet
  • Placed in the field (~ 15 feet alternating)
  • Casing to keep holes from collapsing
  • Inject grout 200 CYD (500 psi 10 inch slump)
  • Engineers estimate $26, 220.00
Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards

• CONSTRUCTION:
  • Some borings collapsing before casing
  • No large open mine voids
  • Mine void filled with water & gob
  • Grout takes not as high as estimated
  • Project cost $14,067.75
Ohio’s Underground Mine Hazards

- Time Frame
  - 4-3-2003 @ 5:00 p.m. Subsidence occurred
  - 4-4-2003 - Complaint received
  - 4-4-2003 - Field visit
  - 4-7-2003 to 4-8-2003 - Exploratory Drilling
  - 4-11-2003 - Design completed
  - 4-16-2003 - Construction start
  - 4-18-2003 - Construction Completed
Ohio’s Underground Mine Hazards

Case Study #2
Halsey Subsidence
Ohio’s Underground Mine Hazards

- Subsidence in a field - big deal !?!?
- Another, another, another -
- Hey - What’s this by the road?
Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards

- Subsidence in a field - big deal !?!
- Another, another, another -
- Hey - What’s this by the road?

- **Office Research**
  - No MAPPED mines in vicinity
  - Lots of projects
Ohio’s Underground Mine Hazards

- Subsidence in a field - big deal !?!?
- Another , another, another -
- Hey - What’s this by the road
- Office Research

No drilling needed
Yea - We can reach it with a track hoe
Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards
• Not on road but in close proximity

• Small diameter - It doesn’t look like much

• Must know the area & history
Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards

Construction:
Excavate & Backfill
Ohio’s Underground Mine Hazards
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Ohio’s Underground Mine Hazards
Ohio’s Underground Mine Hazards

- **Construction**
  - Stabilize **TWO** subsidences
  - Excavation - 6 ft X 6 ft on the mine floor
  - Lined with filter fabric
  - Place type “C” stone
  - Mix in #57 stone
  - Cover with filter fabric
  - Site restore
  - Engineers estimate - $7,291.00
Ohio’s Underground Mine Hazards

• Engineers Estimate

• Stabilizing TWO subsidences
• Excavation - 340 CYD
• Filter Fabric - 400 SYD
• Type “C” stone - 22 Tons
• Type #57 stone - 22 Stone
• Engineers estimate - $7,291.00
Ohio’s Underground Mine Hazards