GIS-based Coal Resources Maps
as Infrastructure Development Planning Tools

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West Virginia Geological & Economic Survey
Morgantown, West Virginia
Coal and Coal Mining in West Virginia 101

- Pennsylvanian-age, coal-bearing rocks in 49 of 55 counties
- About 117 named coal beds, 60-65 minable
- From 1883-2004 over 12.6 billion tons mined
- About 100,000 abandoned underground mines
- Annually there are about 270 active underground mines and 200 surface mines
Interstates and other Major Roads in Coal-bearing Areas of West Virginia
Coal Bed Mapping Project

State-funded effort to create a 1:24,000-scale GIS-based inventory of coal in West Virginia
Coal Resource Maps in a GIS Environment

- Vector format structural contour and outcrop maps
- Grid format models of variation in bed thickness
  - Total bed thickness
  - Net coal thickness
  - Amount of partings expressed as percentage of total bed thickness
Coal Resource Maps in a GIS Environment

• Mined areas in polygon format
  – Underground
  – Surface
  – Auger
  – Highwall

• Other supporting maps
  – Control points
  – Bed discontinuities
Strengths of GIS

• Attach info to map elements
• Readily change scales
• Mix and match data and maps
• Perform complex analyses and create derivative products
• Results in a highly dynamic system
Stratigraphic Data

• Collect, input, verify, edit, and correlate point source data
  – Core logs
  – Geophysical logs
  – Surface measured sections
  – Coal sections and elevations from mine maps
  – Coal analyses
Core Logs

POWELLTON

BECKWITH
Stratigraphic Cross Section
Compiling Underground Mined Areas

- Goal: Create as complete and accurate compilations of underground mined areas as possible
- Scope of task: estimated 100,000 abandoned mines in WV
Problems

• Difficulty in locating mines (usually small mines)
• Missing maps of mines
• Uncertain if possess final map
• Uncertain about accuracy of workings (older maps)
No. 2 Gas Coal, Raleigh County

- Outerop
- Underground Mine
- Auger Mine
- Surface Mine
- Unmined Coal
- Eroded Area

Structure Contours
<table>
<thead>
<tr>
<th>Rec</th>
<th>Mine Type</th>
<th>Aperture Card Number</th>
<th>Mine Name</th>
<th>Company Name</th>
<th>Permit Number</th>
<th>Comment</th>
<th>Map Date</th>
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<td>Underground Mine</td>
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<td>LOW GAP NO 2</td>
<td>MARFORK COAL CO</td>
<td>U-3004-94</td>
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<td>1998</td>
<td>[polygon]</td>
<td>729</td>
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Underground mining compilation to June 30, 2005:
- Worked on 53 beds in 31 counties
- Compilation complete in 13 counties
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Application to Transportation

- Assessment of subsidence potential
- Assessment of mine water hazards
- Assessment of potential coal recovery during construction
I-79 at Star City Exit and Pittsburgh coal outcrop
Pittsburgh Coal Structure
Sewickley Mining
Sewickley Overburden
Sewickley Thickness

33--44''
44--55''
55--66''
Progress to Date

- Mapping completed for 42 beds in 9.5 counties
- Currently proceeding across SW West Virginia
Scanned Images of West Virginia Mine Maps Available Online

WVGES Releases Publication of Oil and Gas Well Data