Coal and Water Resources

- The Good
- The Bad
- The Ugly

March 9, 2006

Water Resources
Coal Extraction
Energy Production
Coal and Water Resources

Operations, Dust Suppression

- Slurry Pond
- Prep Plant
- Power Plant

Blackwater
Cleaning
Cooling
Temperature

Erosion, Brownwater, Sediment, pH

Watershed
Coal Mine
Stream-Wildlife Habitat
Mt Top

400 gpm
Thermal Power Plants

- Most burn coal to create steam for turbines and electric generation
- National use 100 trillion gallons per year
- Some individual plants use 2 billion gallons per day
- Once through and closed loop cooling
- Kentucky 3,254 mgd (3/4 closed loop)
- Source of mercury
Historical Perspective

- Underground Mining Methods
  - Room and Pillar (50%)
  - Mineral Rights Purchased from Land Owners
  - Subsidence Possible, Minimal Visual Change
Historical Perspective

- **Surface Mining**
  - Area/Contour/Auger Mining
  - Exposed Highwall, Spoil Material
  - Vegetation Removed, Major Surface Changes
East Tennessee: Multiple Seams, Contour Strip Mines
Federal Water Programs

• **Clean Water Act (1972)**
  - Section 305(b) - Statewide Stream Assessment
  - Section 303(d) - Total Maximum Daily Load
  - Section 401 - Water Quality Certification
  - Section 402 - National Pollution Discharge Elimination System (KPDES) - point discharges
  - Section 404 - Regulates placement of fill materials in stream

• **Endangered Species Act (1973)**

• **Fish and Wildlife Coordination Act (1934)**

• **Surface Mining Control and Reclamation Act (1977)**
Clean Water Act - Section 404

- Regulates the discharge of dredged or fill materials into waters of the United States (rivers, lakes, streams, wetlands)
- Fills for commercial/residential development
- Water resource projects (dams and levees)
- Infrastructure (highways and airports)
- Coal Mining
- Wetland Conversion (for farming or forestry)
Clean Water Act - Section 404

- Permits
  - General
  - Individual

- Mitigation sequence
  - Taking steps to avoid impacts to waters of the United States where practical
  - Minimizing potential impacts to waters of the United States
  - Providing compensation for any remaining, unavoidable impacts through activities that replace the aquatic resource functional values lost or impaired by the project
Current 404 Program Administration

- U.S. Army Corps of Engineers
  - 4 different districts in Kentucky
  - Letcher County in 3 districts
- U.S. Environmental Protection Agency
  - Region IV (Atlanta)
- Inconsistencies in implementation
- Time delays and economic burden
- Considering state assumption of program
Surface Mining Control and Reclamation Act of 1977

- SMCRA (Control Mining Activities)
  - Reclamation to Approximate Original Contour
  - Sedimentation Ponds - surface water quality
  - Revegetation (control erosion)
  - Minimize impacts to ground water
  - Post mining land use
Federal Agencies

- U.S. Office of Surface Mining
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- U.S. Department of Labor
  - Mine Safety and Health Administration
State Agencies

- Department for Natural Resources
  - Division of Mine Permits
  - Division of Mine Reclamation and Enforcement
  - Division of Abandoned Mine Lands
- Department for Environmental Protection
  - Division of Water
- Department of Fish & Wildlife Resources
  - Division of Enforcement
Surface Mine Permits

- **General Permit** from the KY Division of Mine Permits
  - Instream surface water monitoring plan
  - Quarterly report
  - Q, TDS, TSS, pH, Fe, Mg, S, Ac, Ak
  - Sedimentation Ponds

- **KPDES Permit** from the Kentucky Division of Water for all point discharges
  - Quarterly Discharge Monitoring Report (DMR)

- Both the General mining permit and the KPDES discharge permit are enforced by the KY Division of Mine Reclamation and Enforcement

- 404 Permit for fills (USACE)
- 401 Permit for fills (KYDOW)
Mountaintop Removal

- Equal or Higher Post-mining Use
- Variance from Restoring to Approximate Original Contour
- Level Plateau or Gently Rolling Surface (No Highwalls Left)
- Valley fills
- Stable/Protected Discharge Channels
- Industrial, Commercial, Agricultural, Residential, Public Facility (Recreational)
Coal and Water Resources

Coal Mine

Watershed

2,400 mi of streams

Operations, Dust Suppression

Water

Prep Plant

Slurry Pond

Blackwater

Cleaning

Cooling

Temperature

Erosion, Brownwater, Sediment, pH

2200 sq mi
Controversial Issues

• Use of sequential mining to avoid the regulatory requirements of MTR
• Violation of Section 404 of the Clean Water Act (hazardous materials)
• Violation of the 100 foot buffer zone
Encroachment of MTR on landowners and small communities

Hazards associated with:
- Landslides
- Blasting/flying rock
- Coal trucks
Destruction of streams and associated habitat

Between 1985 & 2001
724 miles of streams buried
Therefore, nothing in SMRCRA “shall be construed as superseding, amending, modifying, or repealing” the Clean Water Act or “any rule or regulation promulgated thereunder.”

The primary goal of the CWA is “to restore and maintain the chemical, physical and biological integrity of the nation’s waters.” The Act prohibits the disruption of areas within 100 feet of streams by coal mining activities, unless a CWA Section 404 permit and a 401 Water Quality Certification are obtained.

OSM has proposed changing rule to “prevent damage to the extent possible using the best technology currently available.”
Coal Slurry Impoundments

- Hundreds of impoundments
  - 700 nationally
  - 200 built over old mine works
    - Martin County
- No emergency response plans in KY

http://www.coalimpoundment.com/
Buffalo Creek Disaster

- Operated by Pittston Coal Company
- On February 26, 1972 after intense rainfall, upper dam fails, releasing 132 million gallons of black water through valley below
- 125 dead
- 1,100 injured
- 4,000 homeless

http://www.wvculture.org/history/buffcreek/bctitle.html
Buffalo Creek Disaster
Martin County Disaster

- October 11, 2000
- 70 acre coal slurry lake with a capacity of 2 billion gallons broke through to an underlying old mine works and discharged 250 million gallons of blackwater into Coldwater Creek and Wolf Creek all the way down and into the Tug Fork of the Big Sandy River
- $3.25 million KY fine, $50K federal fine
- $40 million cleanup
Black Water

- Water Mixed with Coal Refuse
- Substandard Water Discharge
  - Fine Coal Refuse
  - Rock and Clay
  - Flocculants (coal washing process)
  - Can range from highly colored water, to soupy slurry, to semi-solid sludge consistency
  - Commonly stored in impoundments
    - Potential failure of dams or leakage through works
Blackwater
KY Blackwater Task Force

Black Water Findings

• Aesthetic Impacts
• Habitat Destruction
• Smothering of Organisms
• Non Toxic – metals content similar to soils in Kentucky (> stream sediments in E Ky)
• Drinking Water Supply Disruption
  - Surface Water Supplies (treatment)
Black Water Recommendations

- Spill reporting protocols.
- Monthly pipeline inspection.
- Buried pipeline identification
- Pipeline construction/installation.
- Supervised maintenance of sediment ponds.
- Prohibition of clean out operations during storm events.
- Identification of underground workings.
- Alternatives to traditional coal waste disposal
- Breakthrough analysis for slurry ponds
- Emergency action plans for impoundments
Abandoned Mine Lands

- Kentucky’s AML inventory
  - 400,000 citizens within 1 mile of an AML hazard
  - 32,000 feet unclaimed highwall
  - 1,500 acres of mudslides
  - 1,500 open mine portals
  - 9,000 acres of flood impacts

- AML Trust Fund (Balance $1.5 billion)
  - Kentucky Contributions: $875 million
  - Kentucky Receipts: $317 million
    - Annual receipts: $17 million
    - KY Balance $120 million
    - 30% of funds can be used for waterline projects
Kentucky Reclamation Projects

• Ketchup Lake
  - Hopkins County
    • 300,000,000 gallons of acidic water
    • Cleanup received the 2000 OSM National Award

• Rock Creek
  - McCreary County
    • Kentucky Wild River
    • Section from White Oak Branch to Big South Fork of the Cumberland dead due to AMD
Ketchup Lake

http://www.aml.ky.gov/projects
Bright orange-colored water is a tell-tale sign of acid mine drainage. The orange color is caused by ferric hydroxide (Fe(OH)₃) or "yellow-boy" precipitating out of the water. This unsightly, slimy solid smothers aquatic plants and animals.
When water emerges from the mine, it reacts with the oxygen in the air or dissolved in the stream and deposits iron, manganese, and aluminum on rocks and the stream bed. Aluminum precipitates (the whitish coating on the rock) lowers water quality and kills aquatic life (fish, insects, etc.).
Environmental Quality Commission

• September 2005
  - All day long hearing in Frankfort
  - Evening hearing in Prestonsburg
Consensus Issues

- Release funds from Federal Fund to Kentucky for AML projects
- Institute emergency action plans for all slurry impoundments
- Implement recommendations of the Blackwater Task Force
- Encouragement of reforestation practices
- Implement recommendations of the KY 404 Task Force
- Implement pending recommendations of the EQC
Kentucky Reforestation Initiative

• The Kentucky Reforestation Initiative began in 1995 as a cooperative effort between the Department for Surface Mining Reclamation and Enforcement (DSMRE), the University of Kentucky and the Environmental Quality Commission to promote reforestation by requiring the planting of high-value hardwood species on mined lands. The DSMRE changed its name to the Division of Mine Reclamation and Enforcement (DMRE) in 2004.
TYPICAL RECLAMATION PRACTICES AT STARFIRE MINE
SIGNS OF OVERCOMPACTATION
TREE GROWTH AND RECLAMATION TECHNIQUE

(BURGER AND TORBERT, 1992)
The Good

- Coal mining provides resources for energy production in support of the US economy.
- Coal mines can provide underground reservoirs for water supply.
- MTM can provide flat real estate for economic development in eastern KY.
- Reforestation research has demonstrated that hardwoods can be grown in mine reclamation areas.
- Although they cause significant environmental impacts, blackwater discharges do not appear to be “toxic.”
The Ugly

• MTM destroys mountains and the associated natural beauty.
• Blackwater events can destroy stream habitat and the natural beauty of the steam.
• Acid mine drainage can lead to iron precipitation on stream backs leaving an ugly orange coating.
The Bad

- MTM can wreck havoc on the landscape and peoples lives.
- Valley fills can destroy important biological habitat.
- The issue tends to polarize communities.
- The recommendations of the BWTF have not yet been implemented.
- The federal government is holding back millions of dollars in the AML trust fund.
Questions?