MEPCO, Inc

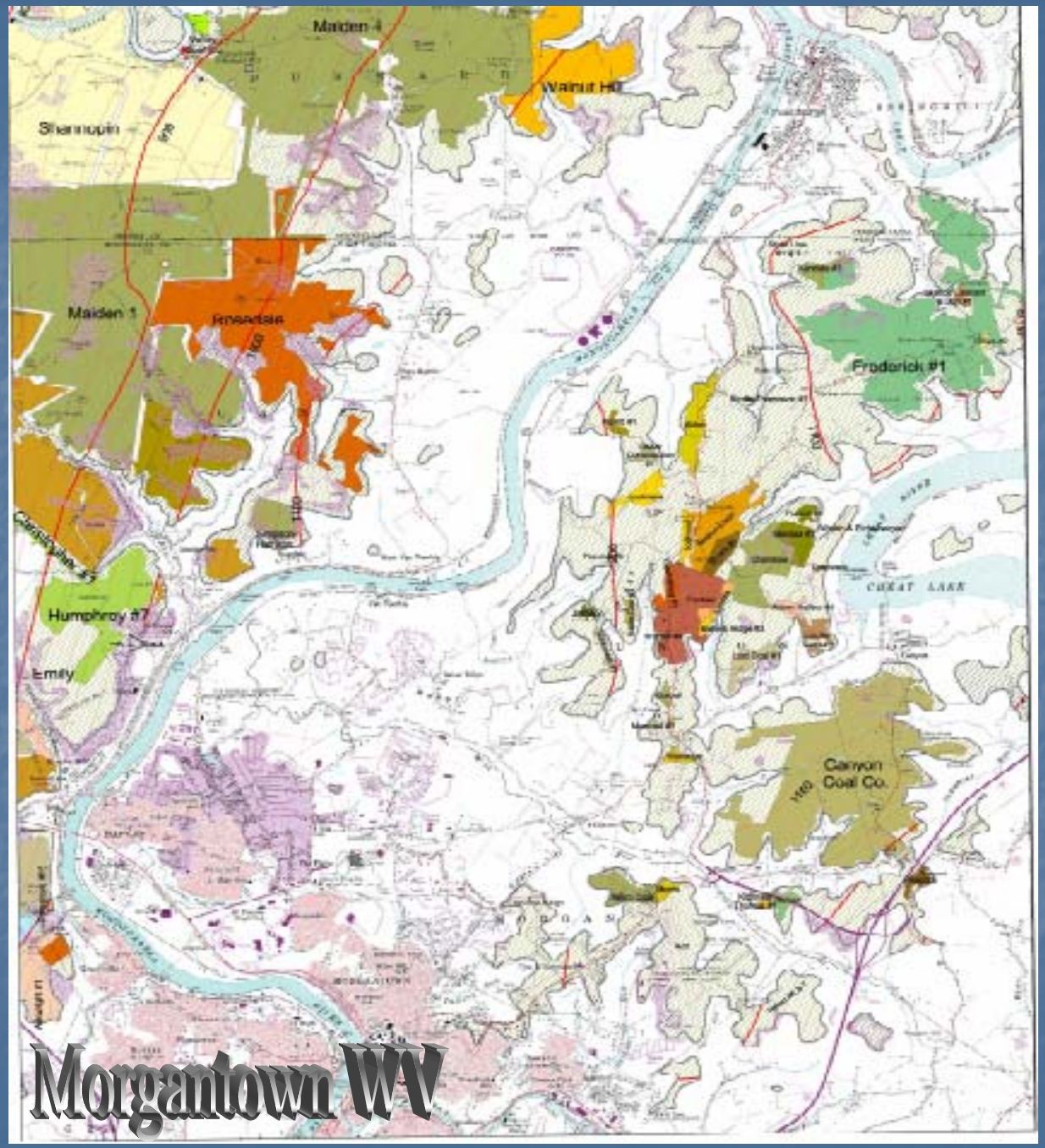
(Morgantown Energy Producing Company)

REUSE OF WATER FROM UNDERGROUND MINES FOR POWER GENERATION

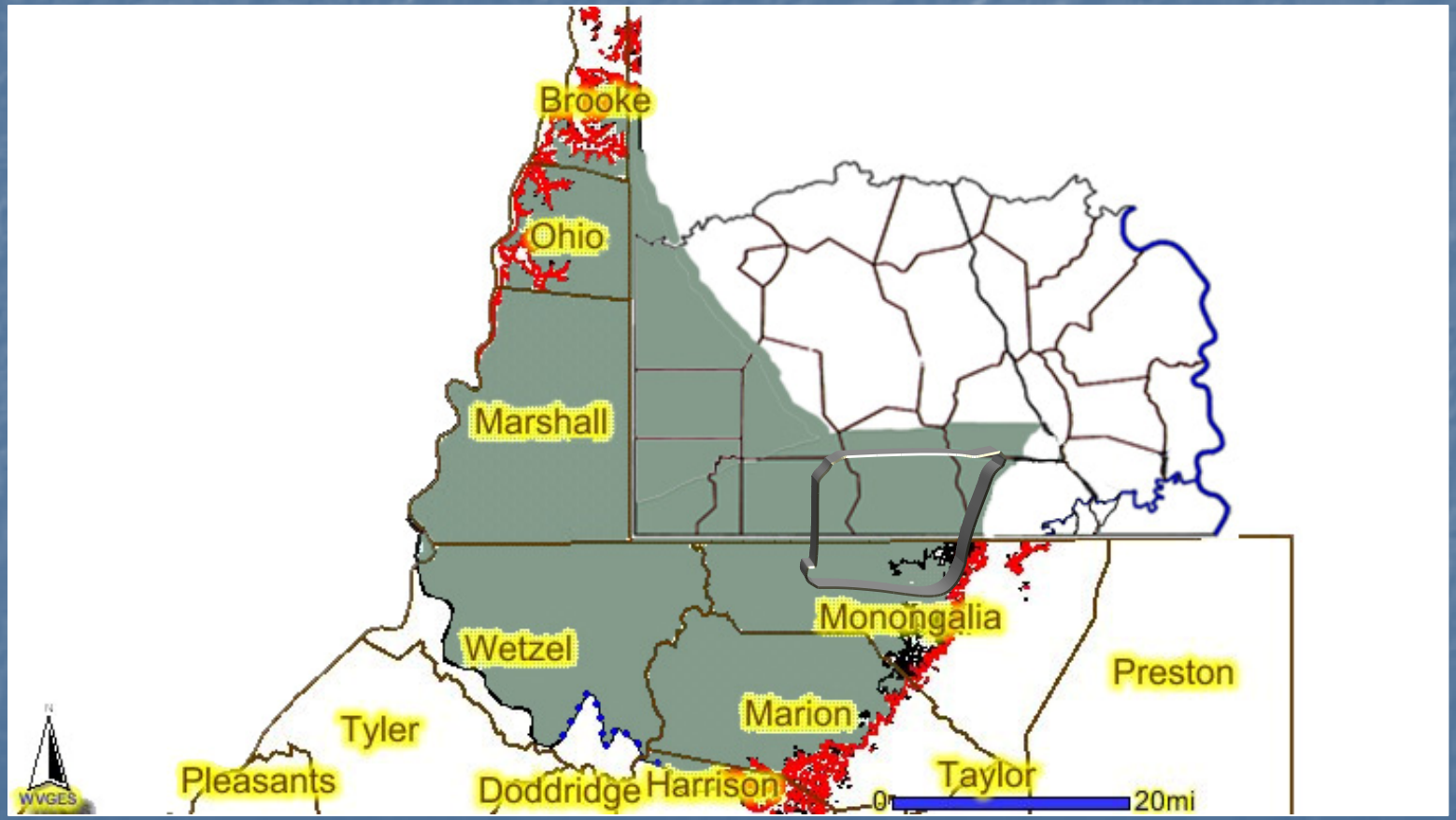
Surface Mine Drainage Task Force Symposium Presentation 4/19/2006

MEPCO, Inc.

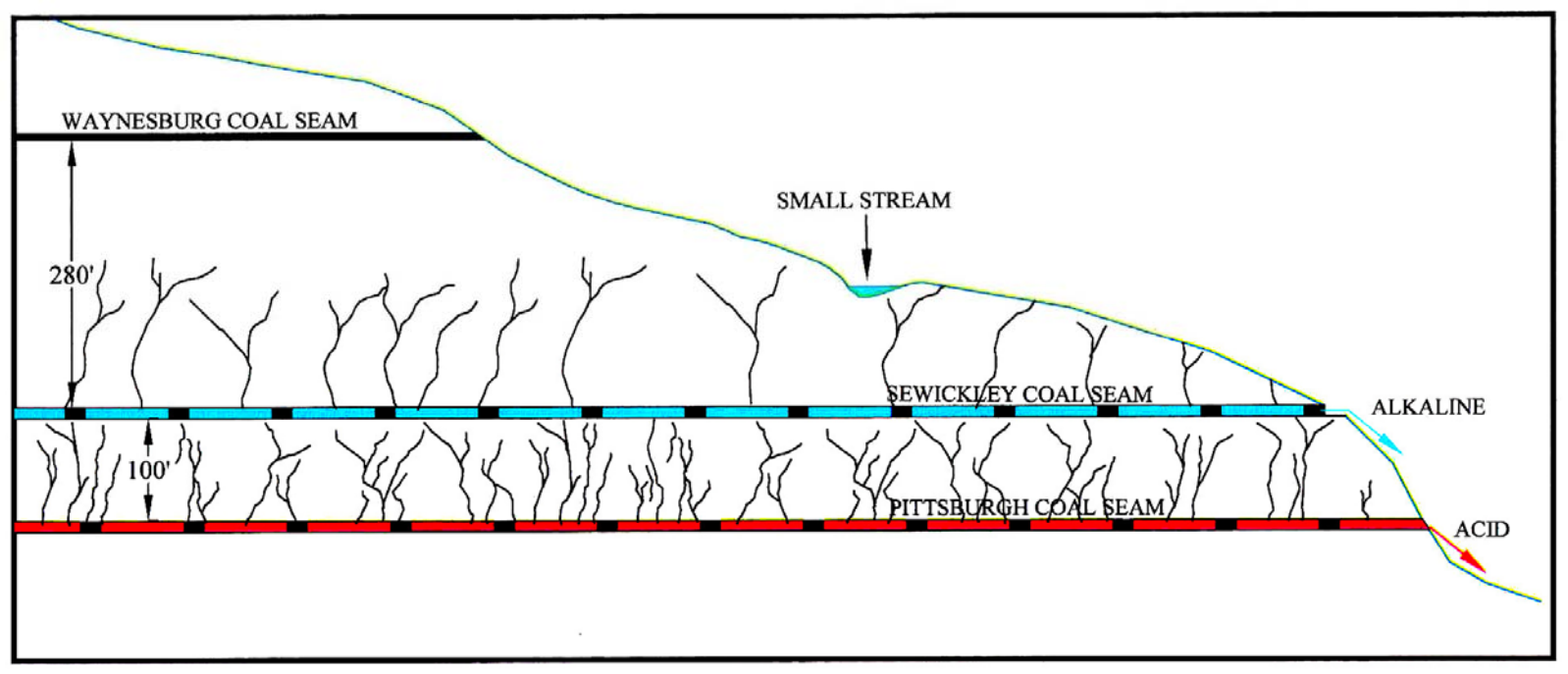
- History – Surface & Underground, Monongalia County WV & Greene County PA, several seams for 40+ years.
- Central Location – Maidsville WV– Historically Mined Primarily Sewickley & Redstone seams.


Maiden 4
Walnut Hill
Shannopin
Maiden 1
Innestar
Frederick #1
Humphrey #7
Emily
CHEAT LAKE
Canyon
Coal Co.
Morgantown WV

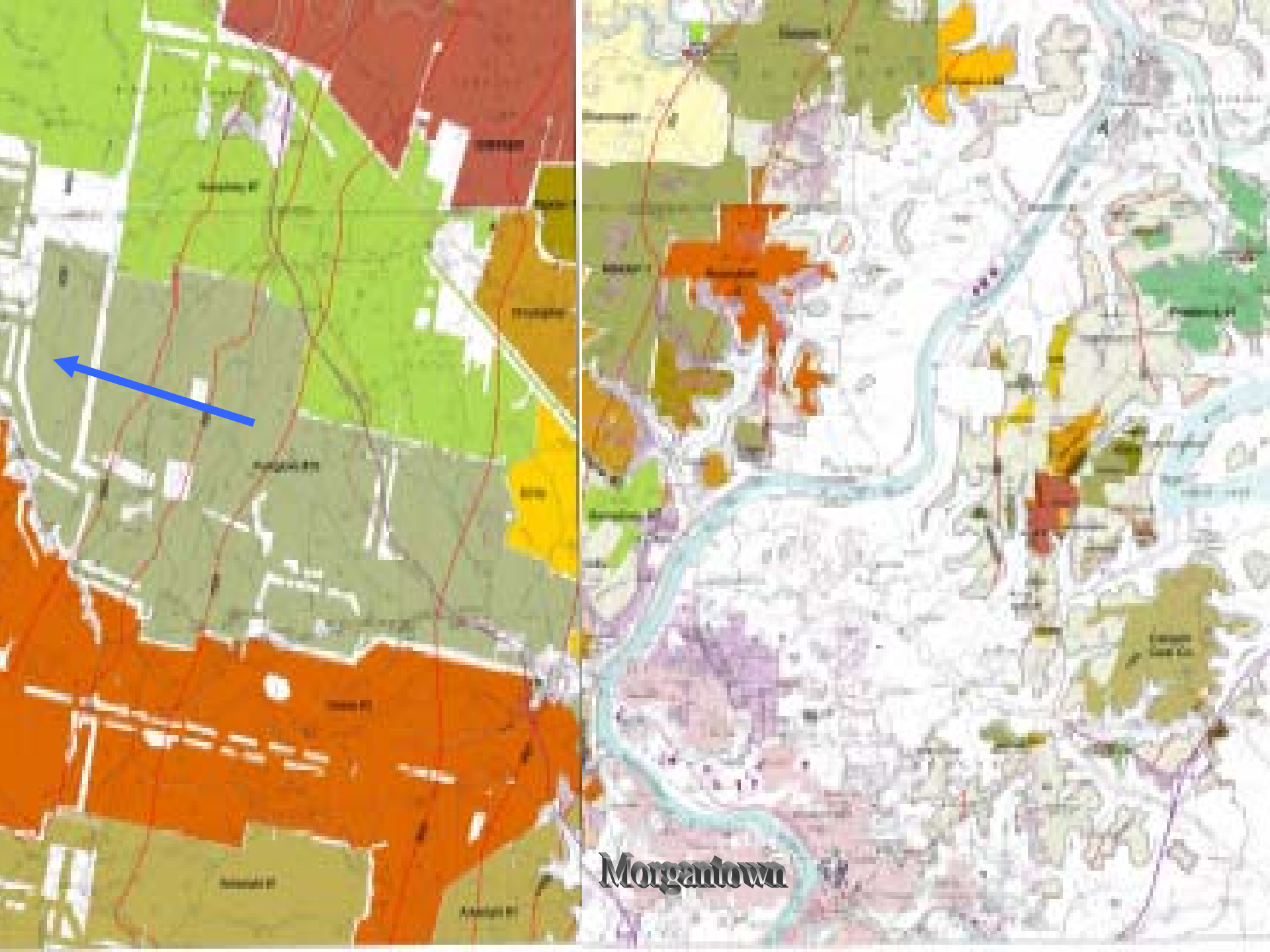
Sewickley Seam Resource



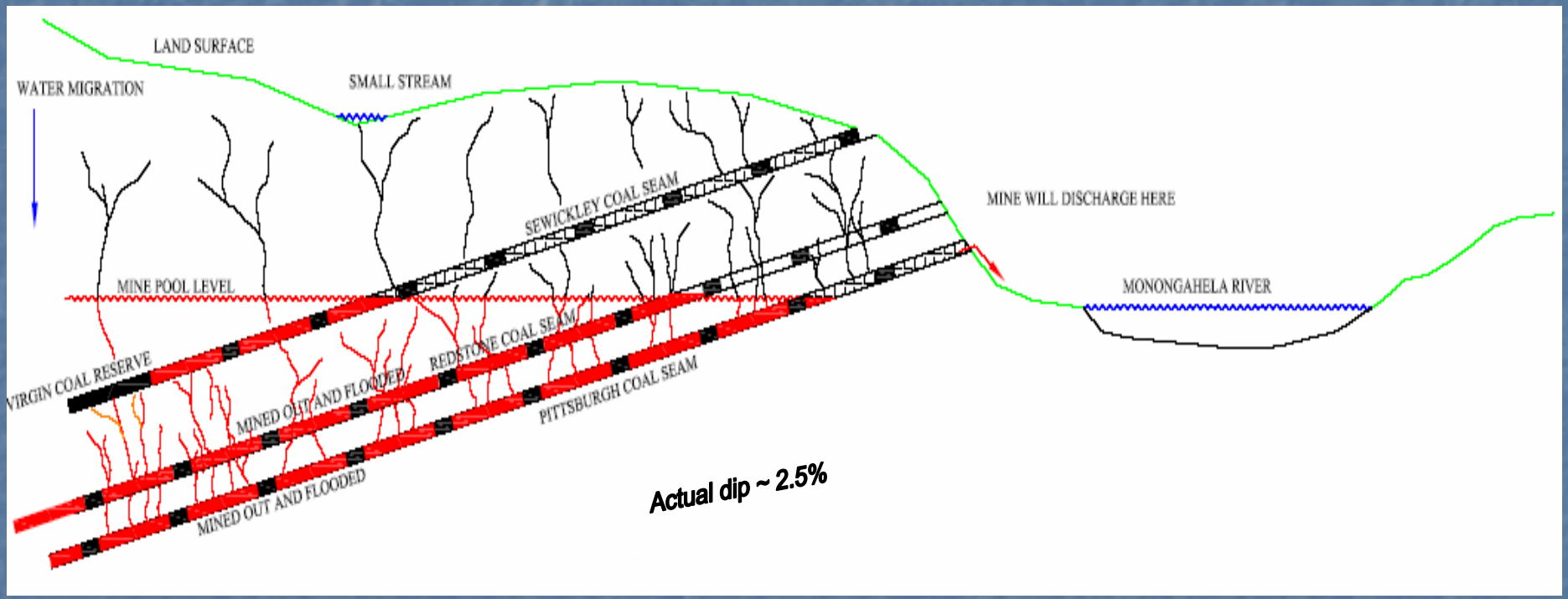
Local Underground Minable Coal Seams
(above drainage & level simulation)



- Sewickley seam is 4 feet thick – alkaline environment
- Redstone Seam is 5 feet thick – alkaline environment
- Pittsburgh seam is 7 feet thick – acid producing
- Shallow mine = water infiltration

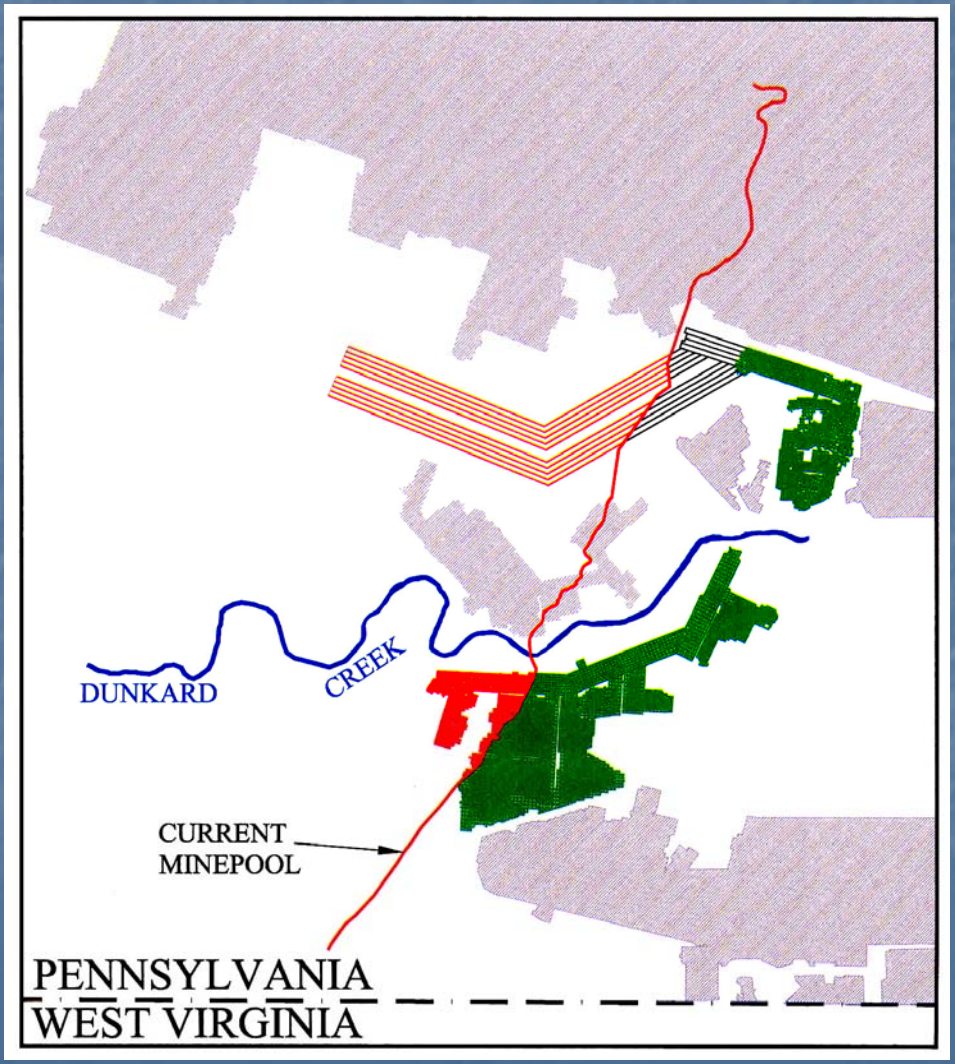

Morgantown

Effects of Rising Pittsburgh Mine Pool on overlying seams



Crafts Run (Redstone) & Dooley Run (Sewickley)

Shannopin Mine Pool
Impact Area In Sewickley Coal Seam



Titus Mine

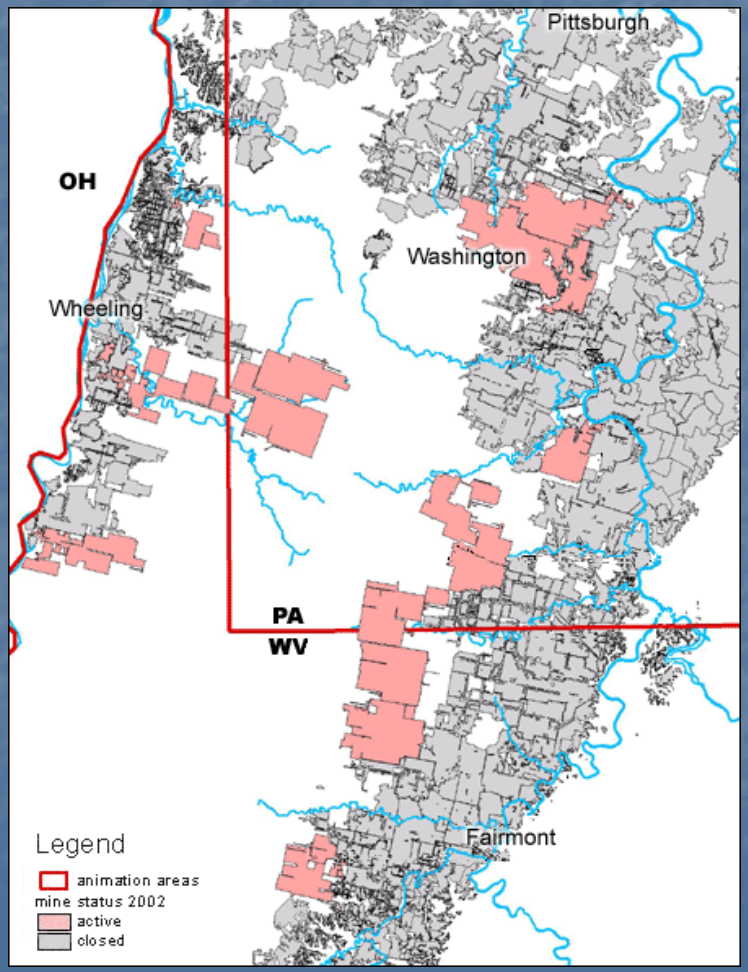
Dooley Run Mine

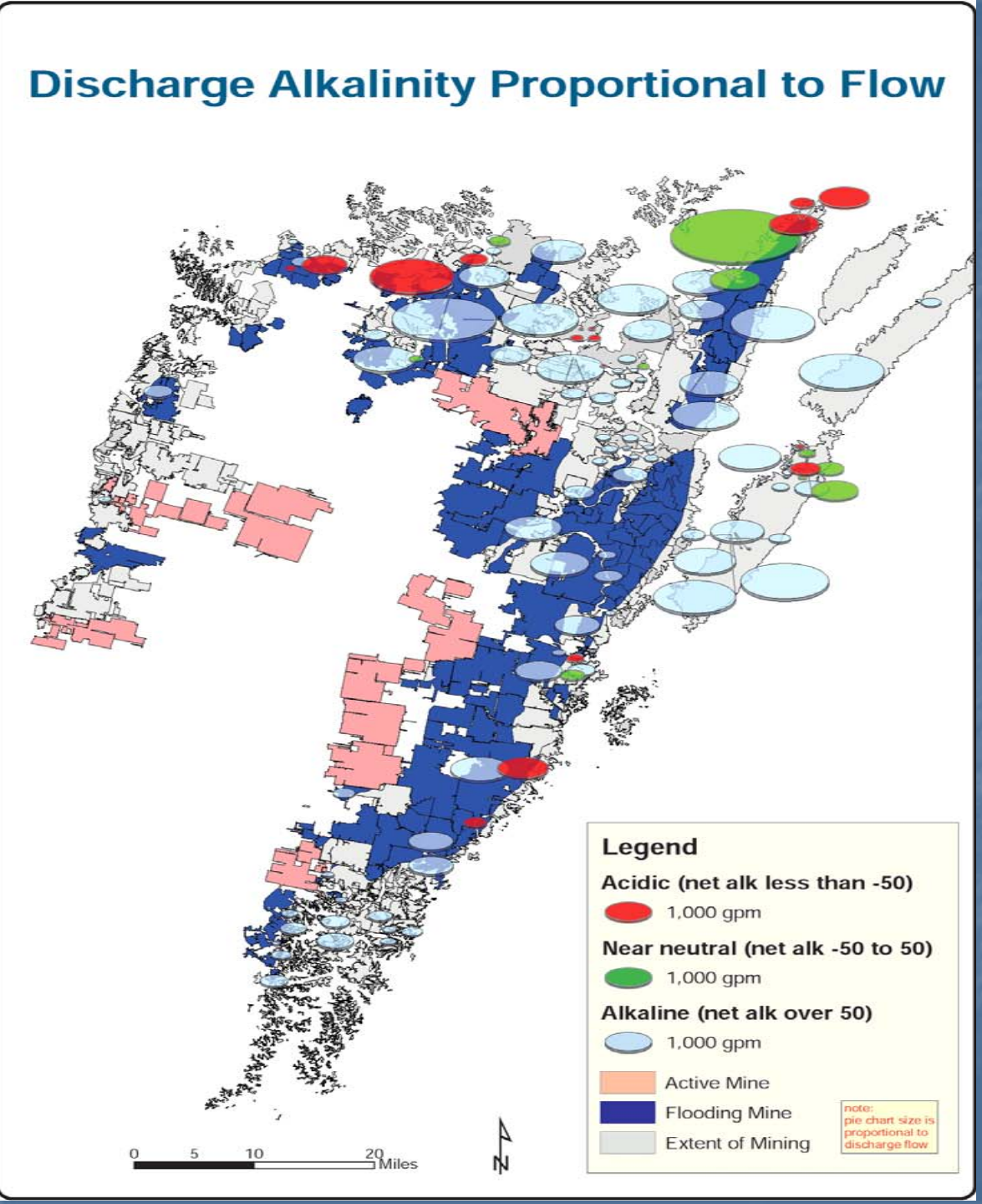
- Redstone seam mines closed now. 30 feet above Pittsburgh seam. Last Redstone mine – Crafts Run Mine – encountered Pittsburgh water of abandoned Maiden mine in 1995.
- Several attempts to handle Pittsburgh mine pool water without sufficient data & long term plan proved unsuccessful. Crafts Run began retreat mining in 2000
- In 2000 Dooley Run Mine – Sewickley seam – encountered water from underlying abandoned Shannopin mine.
- Mepco began seeking additional technical assistance

Pittsburgh Mine Pool Research

- Technical & Data Assistance from:
  - West Virginia Water Research Institute
  - West Virginia University
  - National Research Center for Coal and Energy (NRCCE)
  - Paul Ziemkiewicz, Director
  - Joe Donovan, Associate Professor Geology
  - Bruce Leavitt, Consulting Hydrogeologist
- NRCCE studying the Mon Basin mine flooding problem
  - MEPCO studying the closed Pittsburgh seam mines in Maidsville WV area

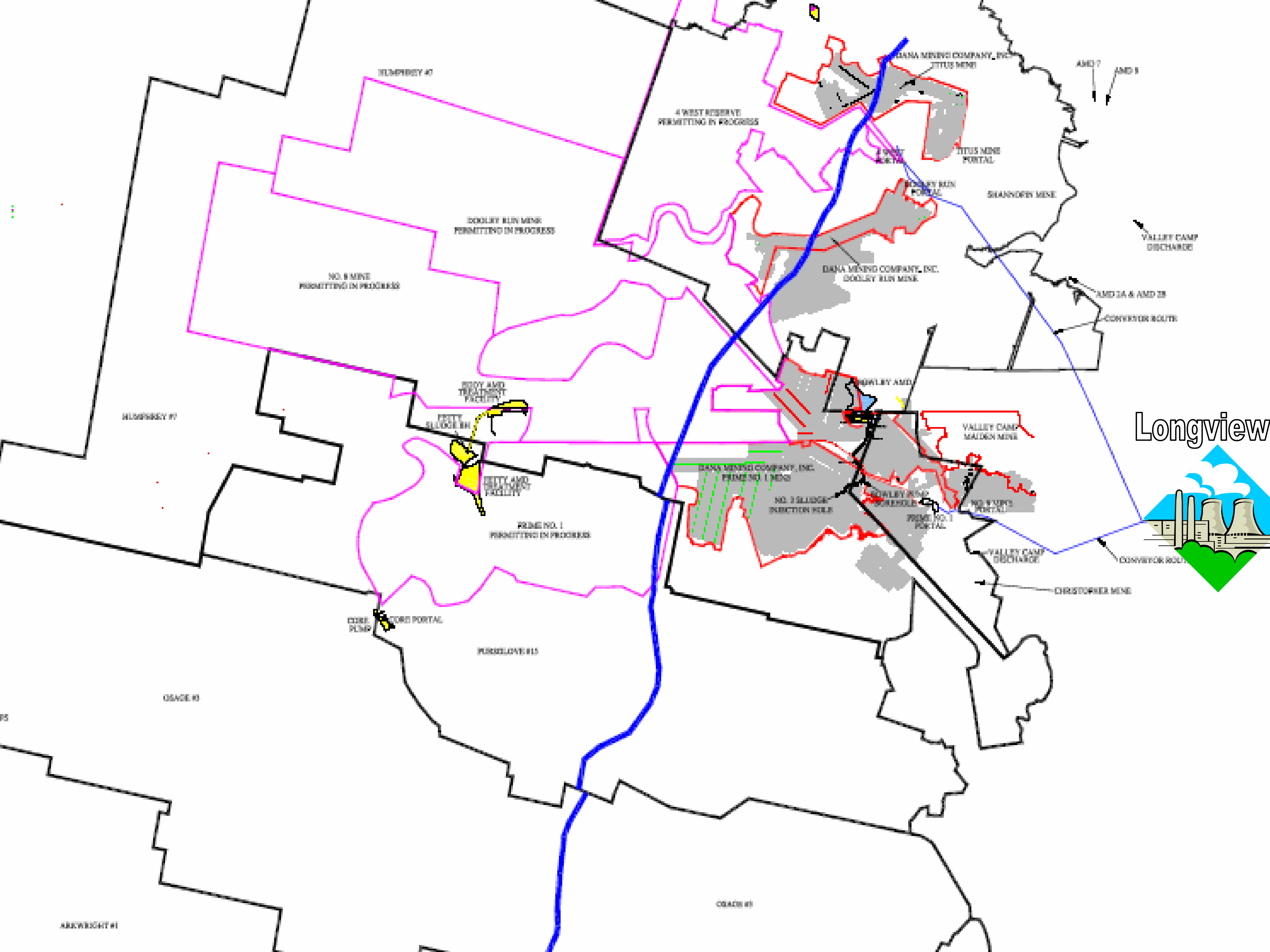
Pittsburgh Seam Basin



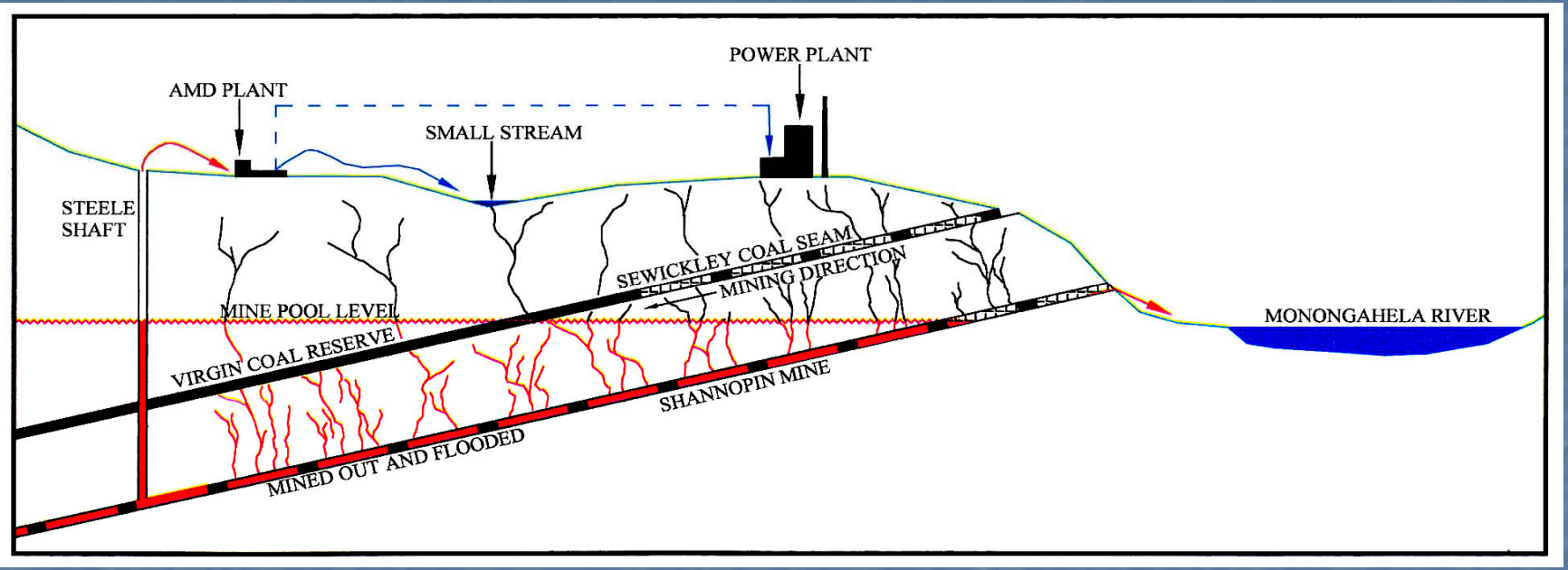


Location and alkalinity of mine discharges with known chemical character.

Underground Mines in south Monongahela Basin

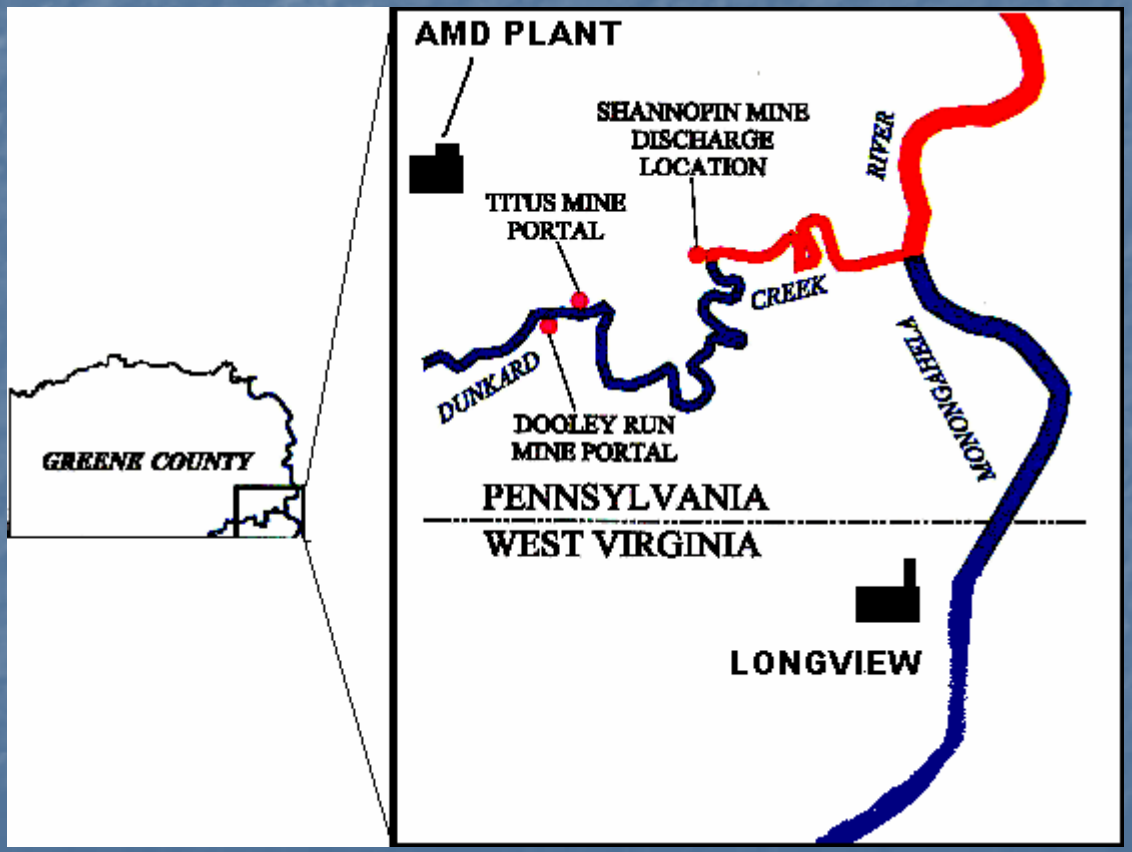

HUMPHREY #7
DANA MINING COMPANY, INC.
TITUS MINE
AMD 7
AMD 8
4 WEST RESERVE
PERMITTING IN PROGRESS
TITUS MINE
PORTAL
SHANNOPIN MINE
DOOLEY RUN MINE
PERMITTING IN PROGRESS
NO. 8 MINE
PERMITTING IN PROGRESS
VALLEY CAMP
DISCHARGE
DANA MINING COMPANY, INC.
DOOLEY RUN MINE
AMD 2A & AMD 2B
CONVEYOR ROUTE
PETTY AMD
TREATMENT
FACILITY
HUMPHREY #7
VALLEY CAMP
MAIDEN MINE
Longview
DANA MINING COMPANY, INC.
PRIME NO. 1 MINE
PETTY AMD
TREATMENT
FACILITY
NO. 3 SLUDGE
INJECTION HOLE
PRIME NO. 1
PERMITTING IN PROGRESS
PRIME NO. 1
PORTAL
VALLEY CAMP
DISCHARGE
CONVEYOR ROUTE
CHRISTOPHER MINE
CORE
PUMP
CORE PORTAL
PURSGLOVE #15
OSAGE #3
OSAGE #3
ARKWRIGHT #1

2001 MEPCO & Genpower began Studying Power Plant Concept



- Sufficient Sewickley coal reserves for life of power plant
- Mepco needs to dewater abandoned mines & power plant needs water supply
- Sufficient water supply for life of power plant
- Proposed Longview 600 MW power plant

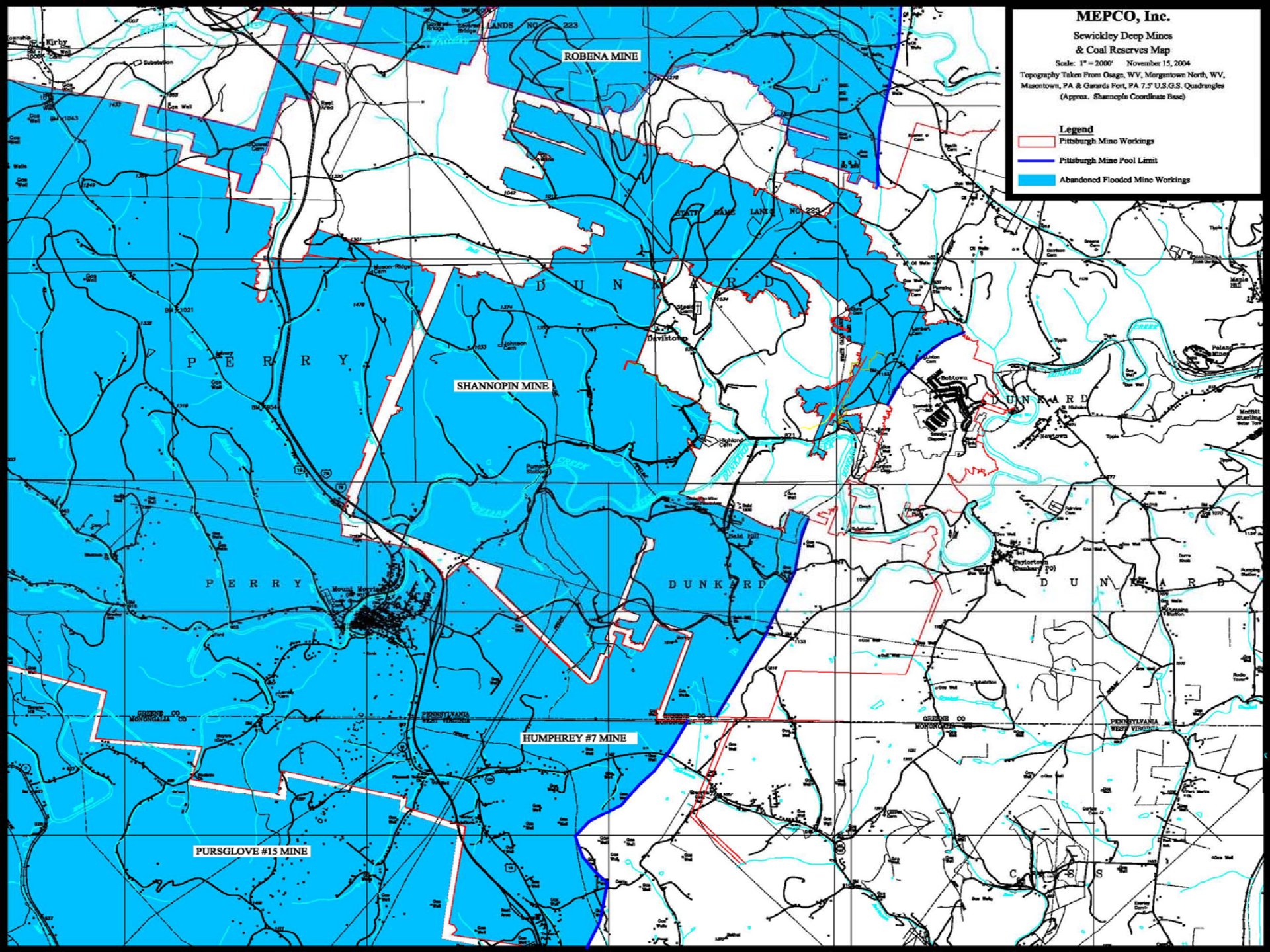
Project Location



Longview

- 600 MW Scrubbed Supercritical PC Boiler
- 2MM tons per year Raw ROM Sewickley Coal
- 5,500 GPM Water Consumption – 100% treated Pittsburgh mine AMD

- 2002 Rising Shannopin pool floods portions of Dooley Run & affects ventilation system. MEPCO closes Dooley Run Mine.
- Genpower applies for permits for Longview Power Station – estimated six years to fully develop project.
- MEPCO needs financial assistance with water long before Longview is financed or operational.


MEPCO, Inc.
Sewickley Deep Mines
& Coal Reserves Map
Scale: 1" = 2000' November 15, 2004
Topography Taken From Osage, WV, Morgantown North, WV, Masontown, PA & Garards Fort, PA 7.5' U.S.G.S. Quadrangles
(Approx. Shannopin Coordinate Base)
Legend
Pittsburgh Mine Workings
Pittsburgh Mine Pool Limit
Abandoned Flooded Mine Workings
ROBENA MINE
SHANNOPIN MINE
HUMPHREY #7 MINE
PURSGLOVE #15 MINE
PERRY
DUNKARD
STATE LINE LANDS NO. 223
GREENE CO
MONONGALIA CO
PENNSYLVANIA
WEST VIRGINIA

- 2003 MEPCO makes presentation to PA DEP to partner the dewatering of Shannopin
- What's at stake for Pennsylvania?

Shannopin Water Quality

Project WV 173: Shannopin Mine

The Shannopin mine (8200 acres) was mined from the 1950's until 1993 by the Shannopin Mining Company, Bobtown PA. It closed in 1993 and is currently in bond forfeiture status with PADEP. The most likely discharge point for this water would be the main portal near Bobtown (818 feet elevation), on the northwest side of Dunkard Creek and about 20 feet above it. If discharge occurs unabated, it would go directly into the creek. The estimated discharge flow is about 800 gpm. Its water level rise has shown seasonality, and the future flow rate of its discharge may also fluctuate seasonally.

While no accurate estimate of the chemistry of early discharge water is available, the flow from the mine for the first few years is expected to be very high in iron and of pH.

pH	4.02	Eh	343
DO(mg/L)	<0.5	SC(microsiemens/cm)	20400
Temp(C)	17.9	Field Alkalinity	<0.3
Na(mg/L)	3427	K(mg/L)	13.8
Si(mg/L)	33.1	Fe(mg/L)	4082
Mn(mg/L)	35.4	Al(mg/L)	200
Ca(mg/L)	396	Mg(mg/L)	760
S0 4 (mg/L)	20935	Cl 2 (mg/L)	53
F(mg/L)	2.57	NO(mg/L as N)	30.05

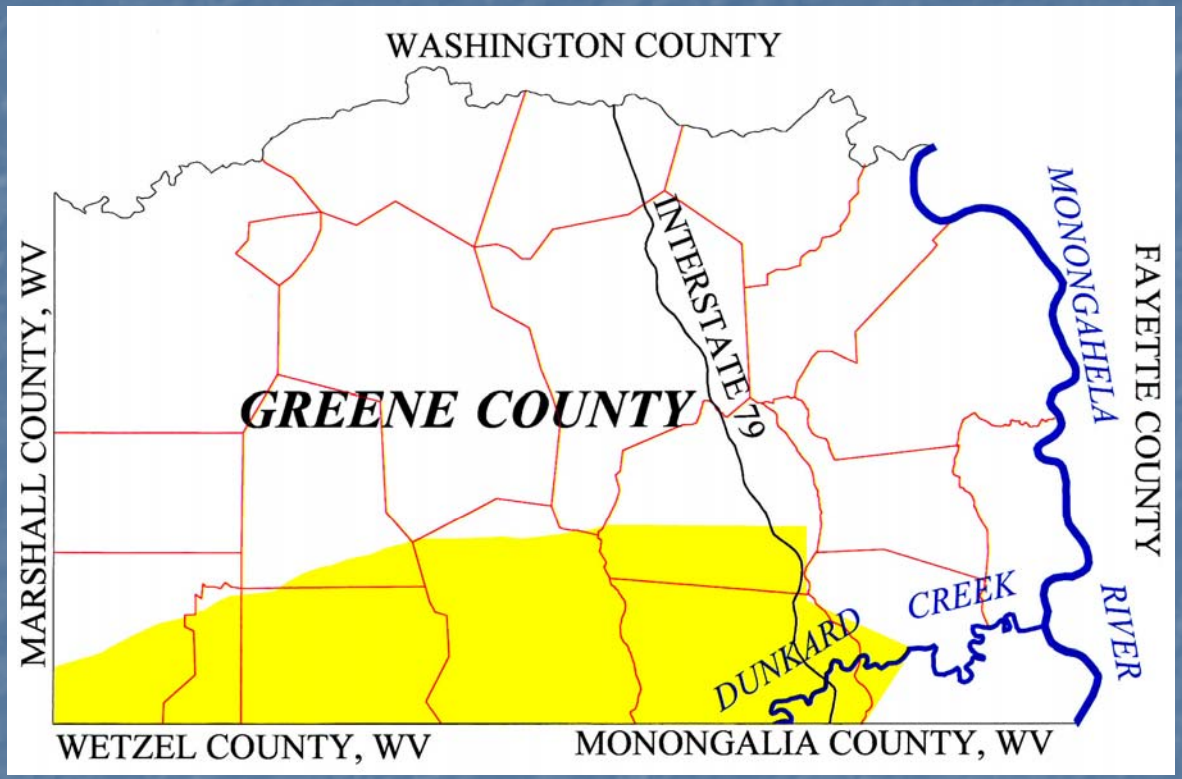
If Shannopin Discharges It Will Negatively Affect:

- Dunkard Creek
- Monongahela River
- Local municipal water authorities
- Businesses using water from the Monongahela River for industrial purposes

Economic Impacts To Commonwealth If Shannopin Fully Floods & Discharges:

- $1,200,000 capital investment for partial treatment plant (no precipitate retention)
- $800,000/year operational costs – neutralization only
- $????/year – municipal water authority support
- $????/year – industrial impact
- $????/year – recreation impact
- $????/year – aquatic impact
- $550,000/year – lost mineral property tax
- $25,000,000/year – lost revenue from Dana

Mineable Sewickley Coal Reserves Greene County PA



400 million recoverable tons of coal

Financial Consequences To Pennsylvania If Sewickley Coal Seam Is Flooded

- Greene County, its municipalities, and its school districts stand to lose $550,000/year in property tax revenue
- The Pennsylvania economy will lose $25,000,000/year of current gross revenue
- Loss of more than 10 billion dollars of potential gross revenue
- Loss of more than 2.5 billion dollars of potential payroll

How Pennsylvania Partnered with MEPCO (Dana Mining Company of PA, Inc.)

- Partnered with Dana to lessen financial burdens of both parties
- Quickly processed AMD plant permit applications
- Provided effluent limit flexibility – the effluent limits protect the environment while being realistically achievable & financially feasible
- Liability issues – Perpetual treatment

MEPCO, Genpower, & PADEP partner to dewater Shannopin – Phase I

- Governor Rendell
  - PA DEP Secretary Kathleen McGinty
  - PA DEP Deputy Secretary Scott Roberts
- Mepco & Genpower formed Non-Profit 501C3
- PA DEP provided grants
- PA (PENNVEST) provided financing
- 3,500 GPM Steele Shaft Plant financed & commenced construction December 2003
- Plant operational June 2004 – Mepco pays operational costs

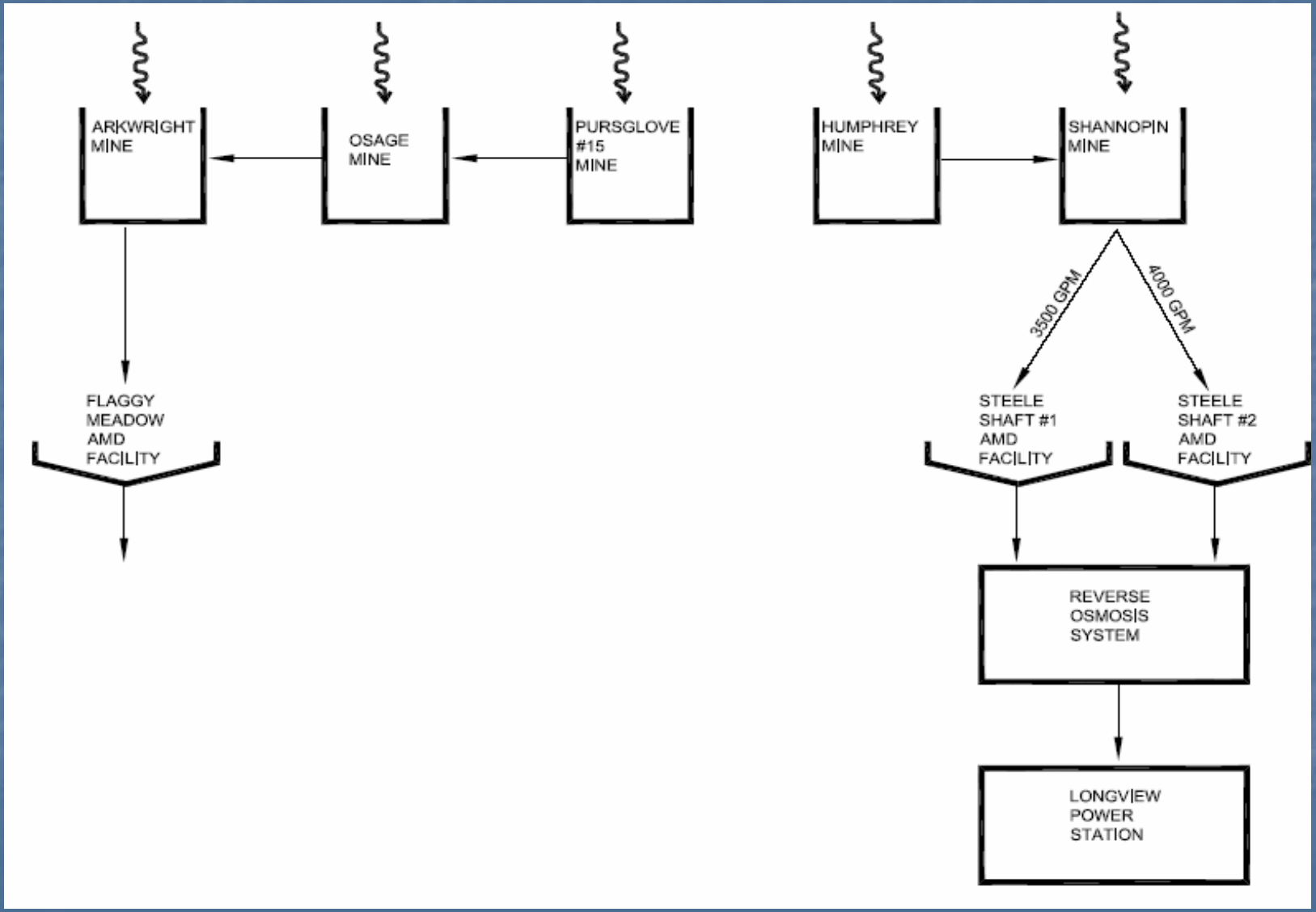
Mepco & Consol Partner – Phase II

- Dewatering of closed Consol Mines frees up Consol Sewickley Coal Reserves for Mepco to mine
- Consol has a financial partner for it's water treatment obligations
- Longview turns water treatment liabilities into an asset

Longview Reverse Osmosis (RO) System Phase III

- RO quality (demineralized) water needed at Longview for boiler make-up and cooling tower operation
- High water quality for cooling maximizes water consumption by allowing multiple cycles through the cooling tower
- Longview to be "zero discharge" for plant process water
- Treatment to be a combination of microfiltration and RO via differential pressure across a membrane

Flow Diagram (Phase III)



Current Status

- Phase I – Steele Shaft AMD treatment plant (3,500 gpm)
  - operational since June 2004

- Phase II – Second AMD treatment plant (4,000 gpm)
  - financing & construction contracts being negotiated
  - construction begins 3rd quarter 2006
  - estimated operational commencement date April 2007

- Longview has either applied for or received all permits. Some are in the appeal process

- Longview Ground Breaking – approx. Jan 2007 – 40 month build process.
  - Longview constructs & begins operating Phase III

- Longview begins consuming coal and water in 2010.