US Department of Energy
National Energy Technology Laboratory

Watershed Science & Technology Program

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Clean Water Team Leader

WATERSHED SCIENCE & TECHNOLOGY PROGRAM

3 MAJOR RESEARCH AREAS

- CHARACTERIZATION
- POLLUTION PREVENTION
- WATER TREATMENT

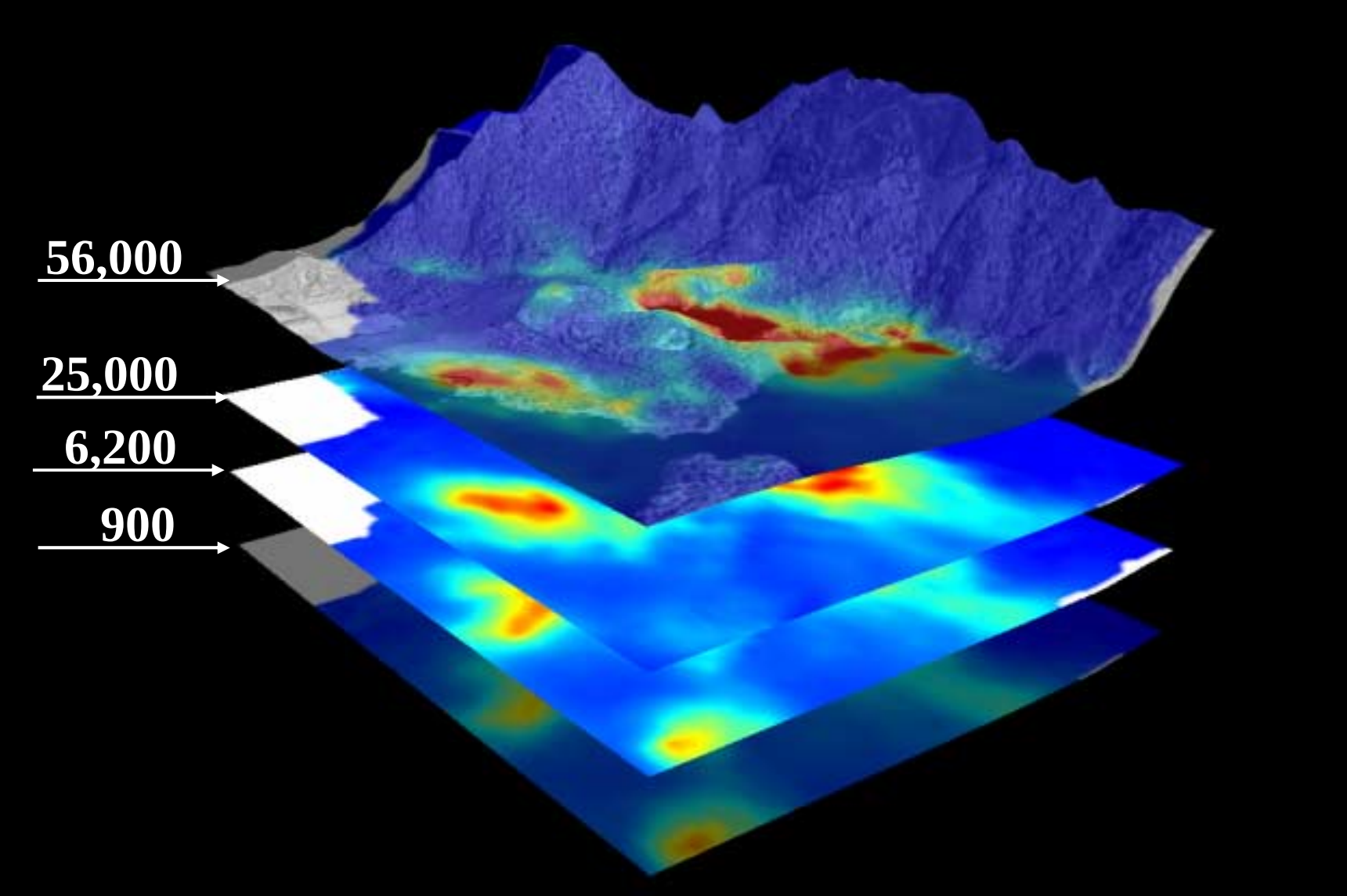
AIRBORNE CHARACTERIZATION

Thermal Infrared

Very Low Frequency

Magnetometry

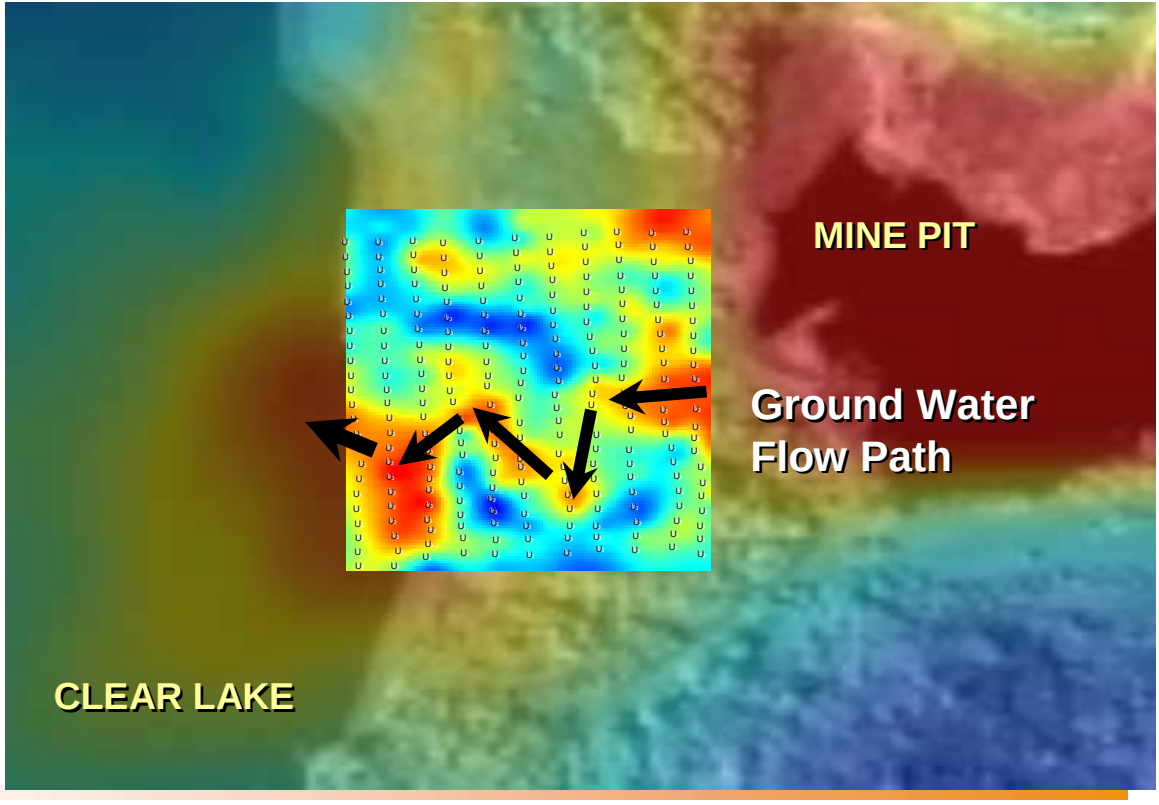
Terrain Conductivity


56,000
25,000
6,200
900

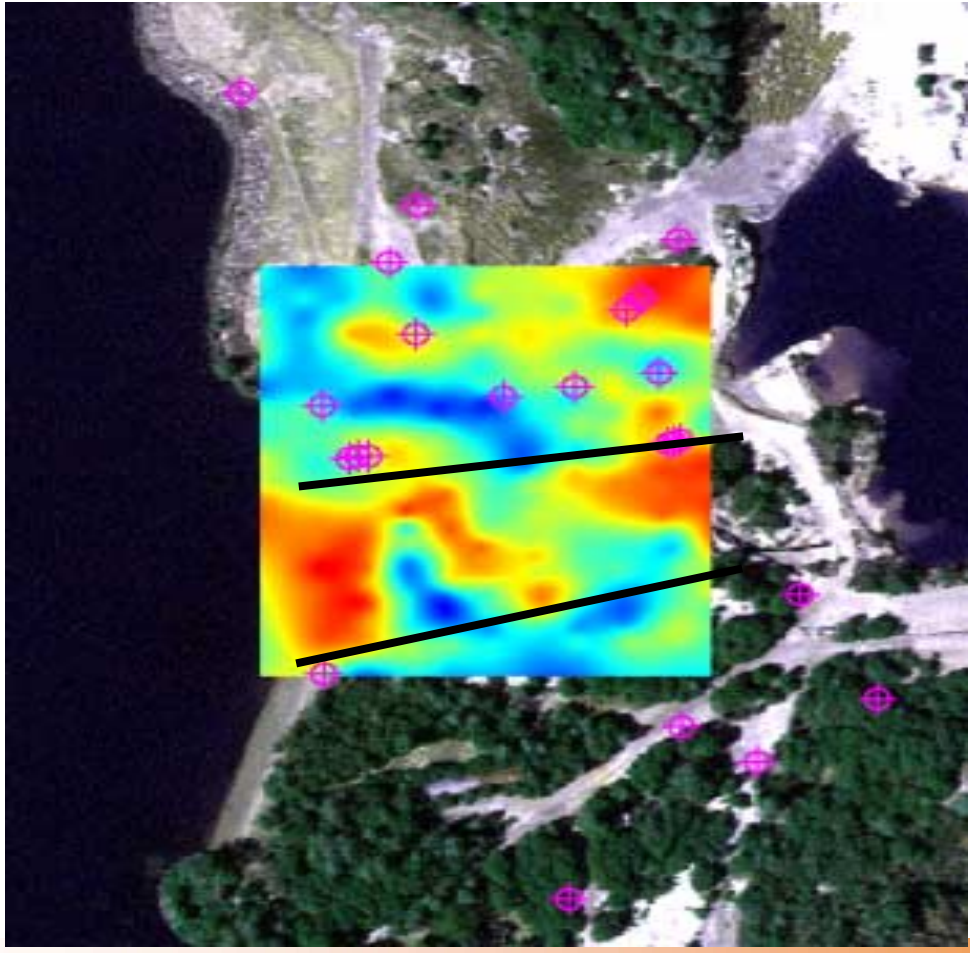
Mapping Contaminated Subsurface Plumes at the Sulfur Banks Super Fund Site

Ground Conductivity

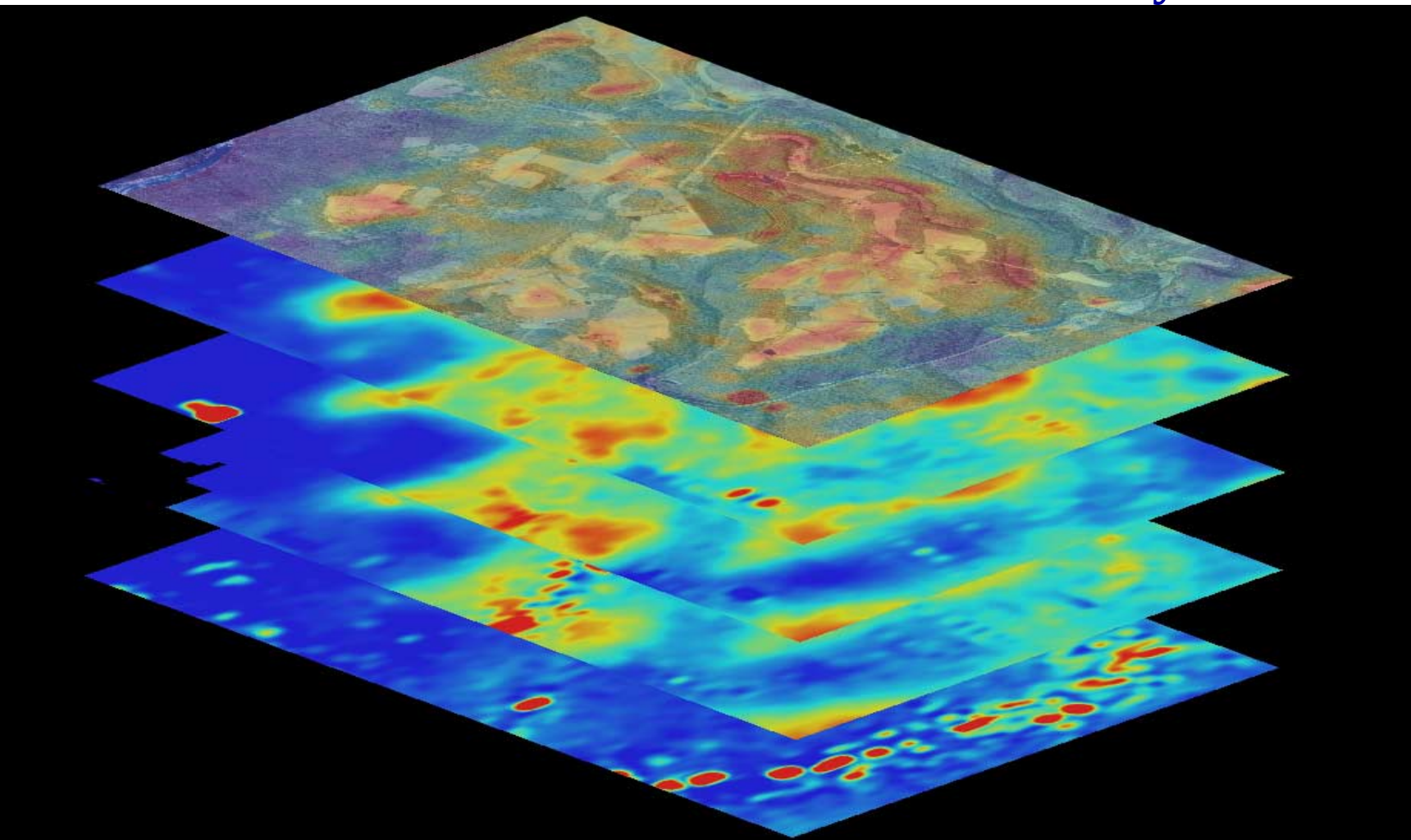
140 Ft Depth



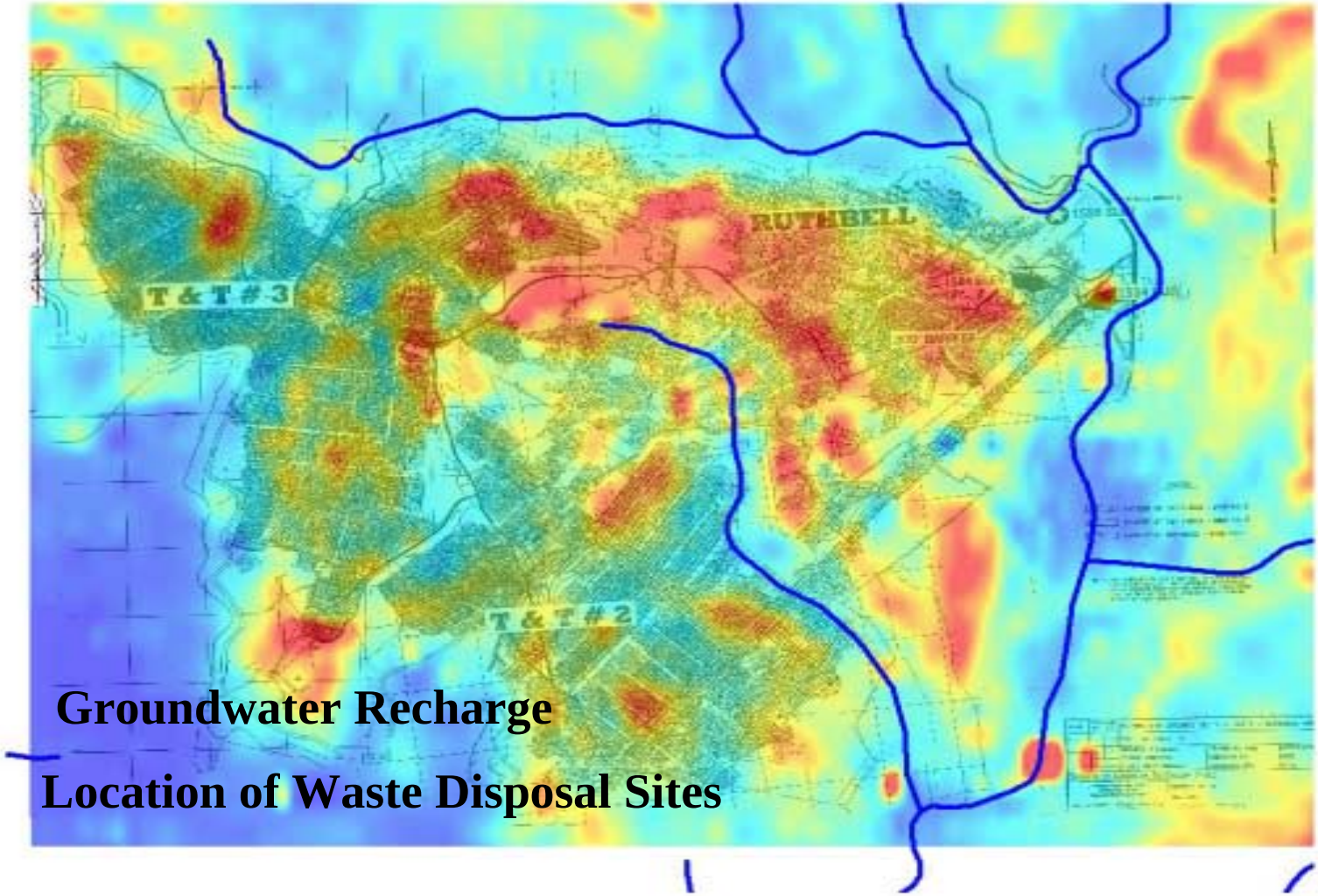
MONITORING WELLS



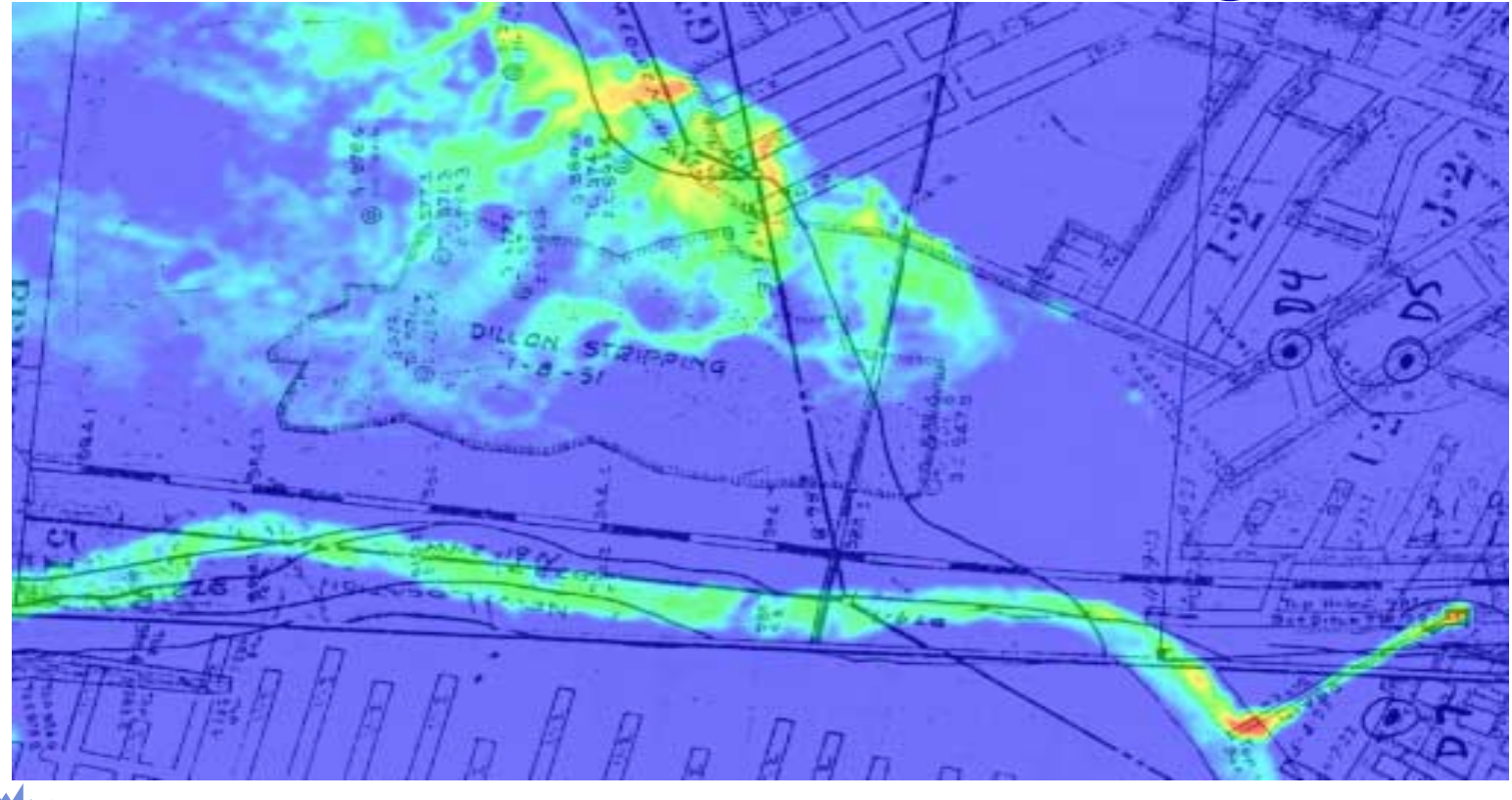
T&T Mine Site – Stacked Conductivity Levels



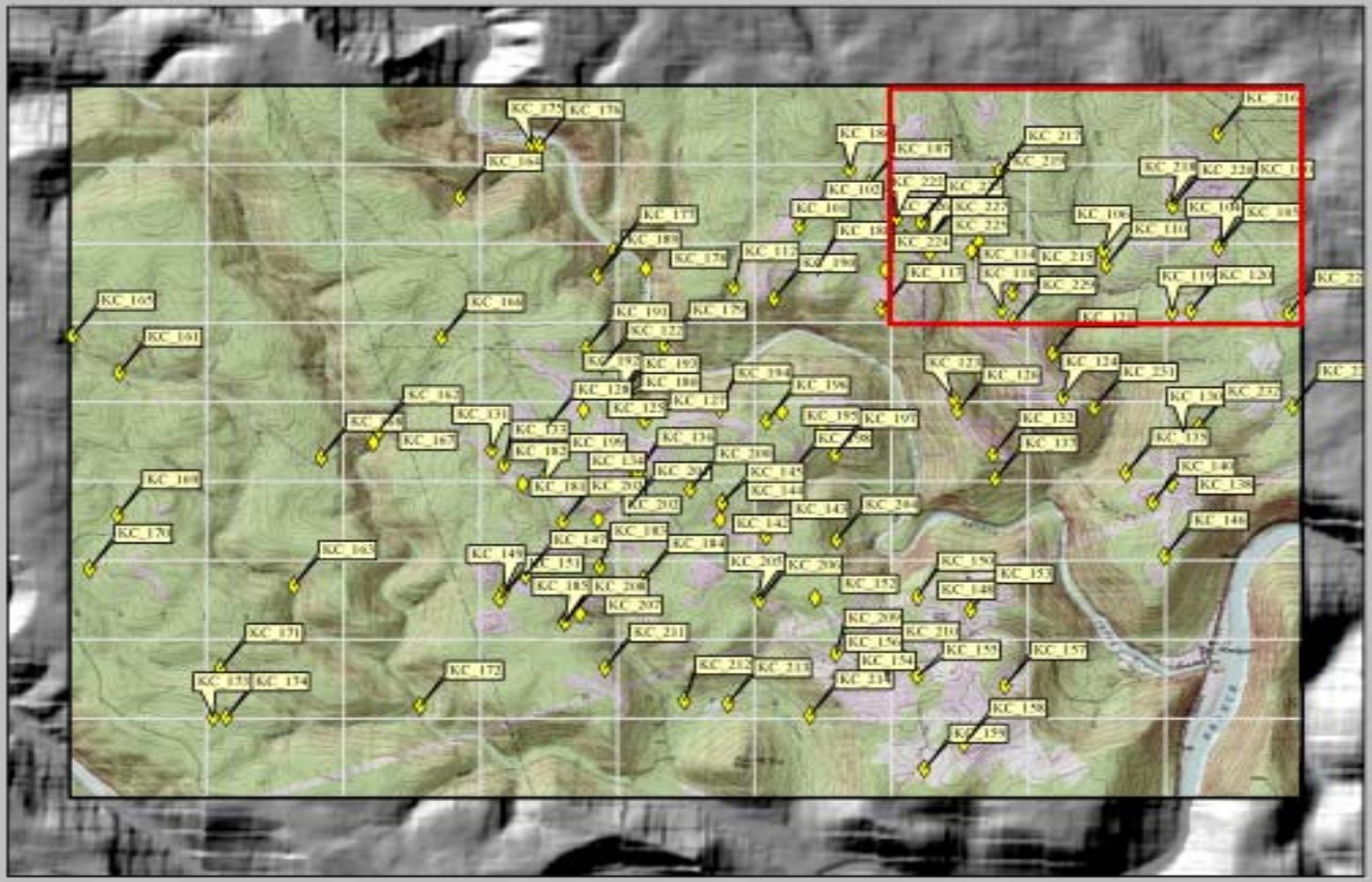
T&T Mine Site — Stream Overlay



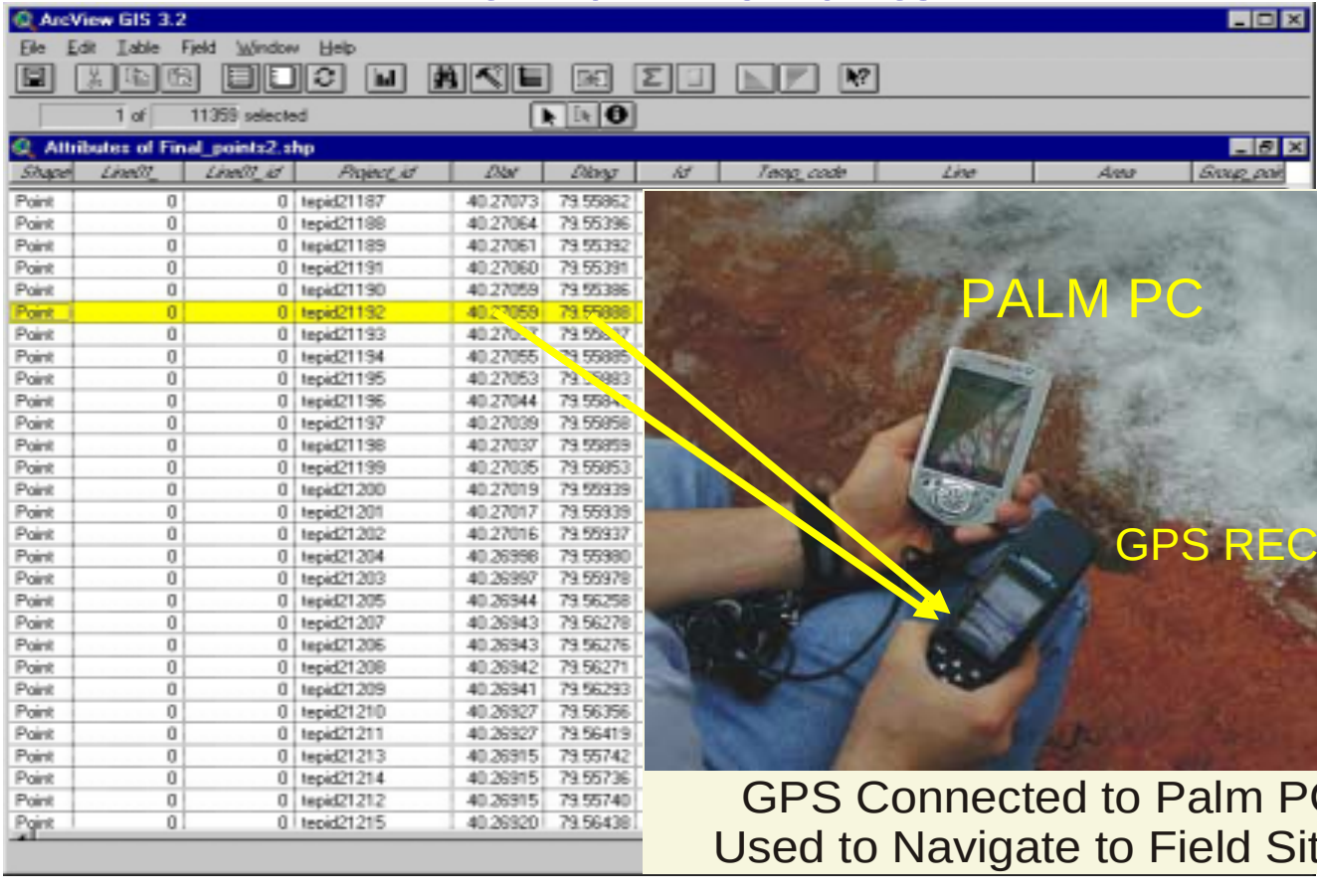
Brinkerton Mine Site Discharges



Kettle Creek Project



Sewickley Creek Watershed GIS Database of Thermal Anomalies



GPS Connected to Palm PC
Used to Navigate to Field Sites

Mine Discharge Kettle Creek Watershed

Site Number 205

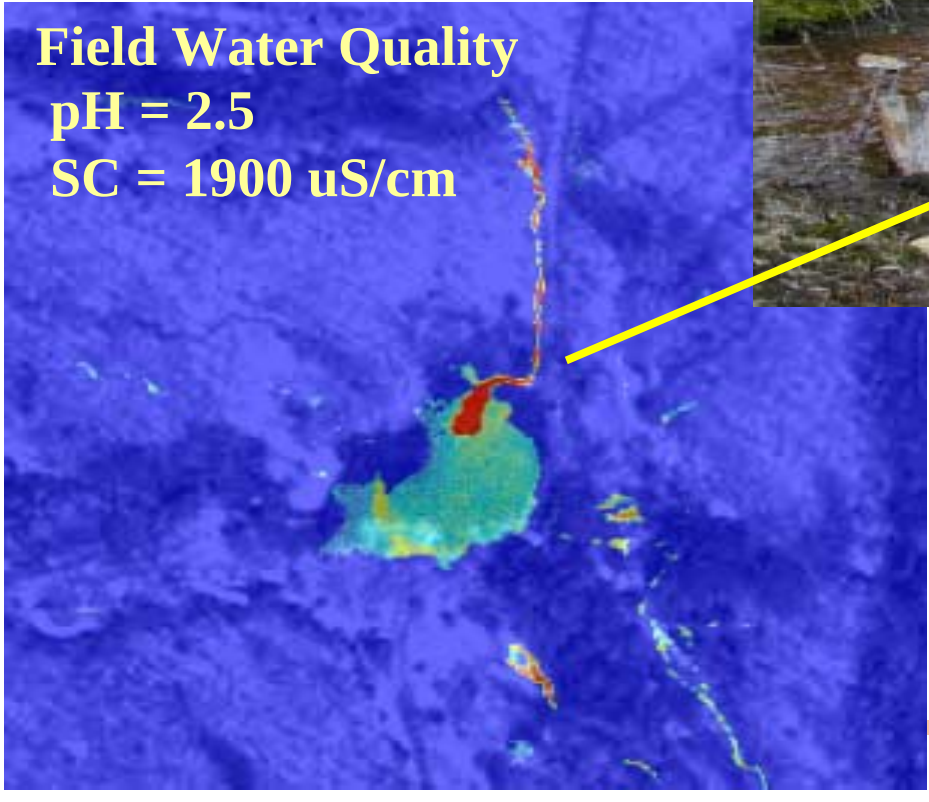
Field Water Quality

pH = 2.3

SC = 2500 uS/cm

Mine Discharge Kettle Creek Watershed

Site Number 182



Water Treatment

WATER-POWERED TREATMENT

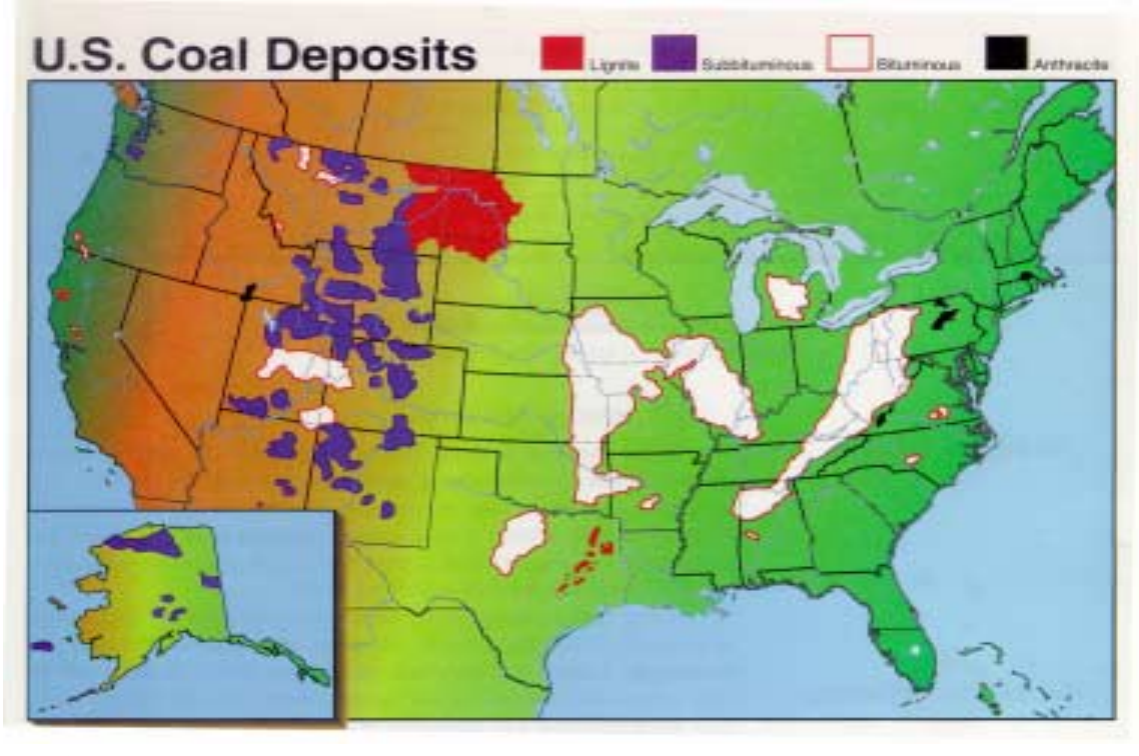
LIMESTONE DIVERSION WELLS

WATER-POWERED DEVICES

REDUCE COSTS

Coal Is Our Most Plentiful Domestic Energy Resource

Enough to Last at Least 275 Years, at Current Use Rate



Over 300 Billion Tons Recoverable Reserves

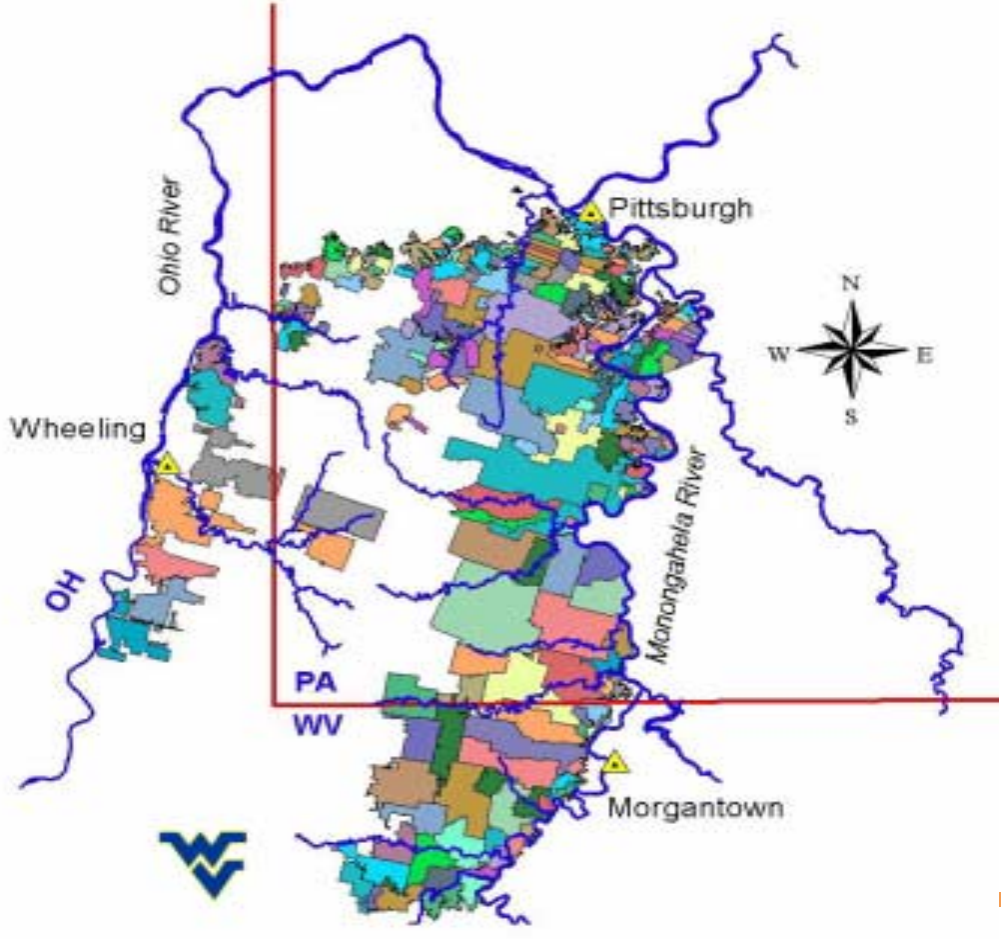
(Based on 60 % recovery rate and DOE/EIA reserve data)

(Map courtesy of Global Science, Fifth Edition, and Mineral Information Institute).

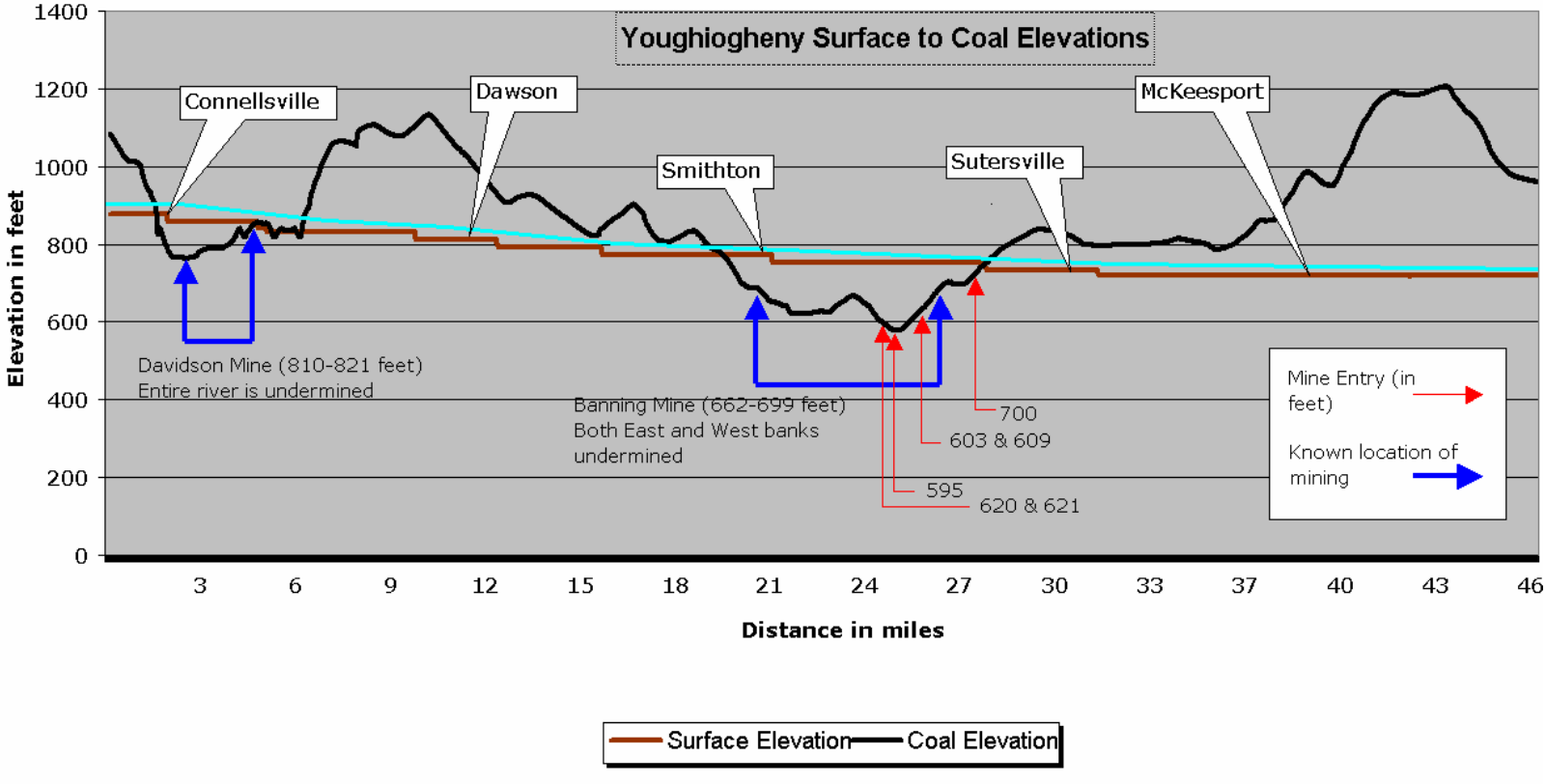
DEMONSTRATED U.S. COAL RESERVE BASE
(Billion short tons)

MINING METHOD AND AREA	ANTHRACITE	BITUMINOUS	SUBBITUMINOUS	LIGNITE	TOTAL
EAST OF THE MISSISSIPPI RIVER					
SURFACE	—	33	0	1	34
UNDERGROUND	7	162	0	0	169
WEST OF THE MISSISSIPPI RIVER					
SURFACE	0	8	68	27	103
UNDERGROUND	—	31	100	0	131
GRAND TOTAL	7	234	168	28	437

Coal Mines in the Pittsburgh Seam



Future Work


Youghiogheny Surface to Coal Elevations
Elevation in feet
1400
1200
1000
800
600
400
200
0
3
6
9
12
15
18
21
24
27
30
33
37
40
43
46
Distance in miles
Connellsville
Dawson
Smithton
Sutersville
McKeesport
Davidson Mine (810-821 feet)
Entire river is undermined
Banning Mine (662-699 feet)
Both East and West banks
undermined
700
603 & 609
595
620 & 621
Mine Entry (in feet)
Known location of mining
Surface Elevation
Coal Elevation

GENERAL COAL MINING PROBLEMS

QUESTIONS?