

ATTACHMENT 7

MINE SUBSIDENCE & MINE SUBSIDENCE INSURANCE



Mine Subsidence and Mine Subsidence Insurance

Matt Cavanaugh - Mineral Resources Program Specialist

Drew Frost – Mineral Resources Program Specialist

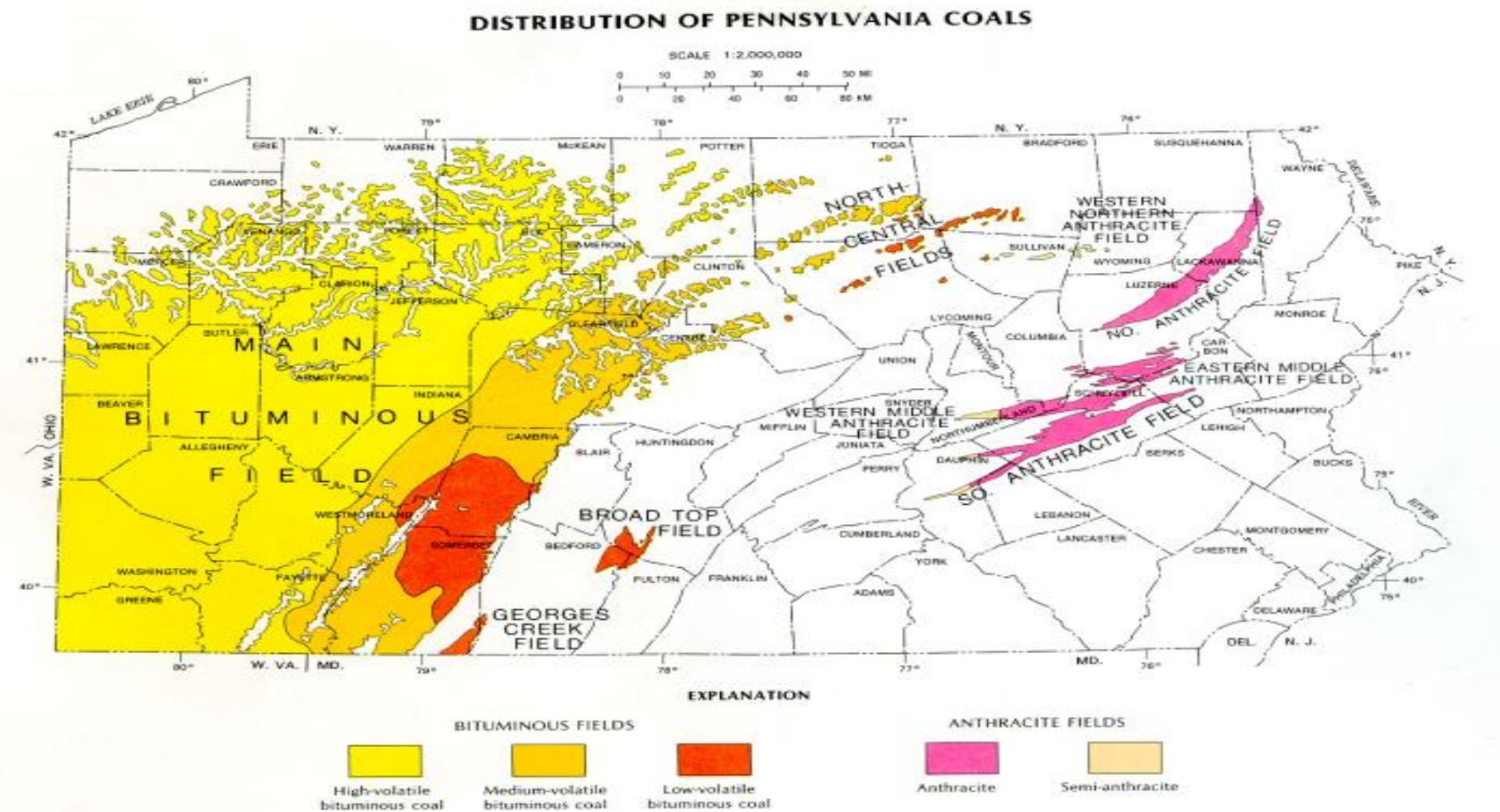
MSI Board Meeting

January 10, 2019

Tom Wolf, Governor

Patrick McDonnell, Secretary

➤ Coal Fields in PA

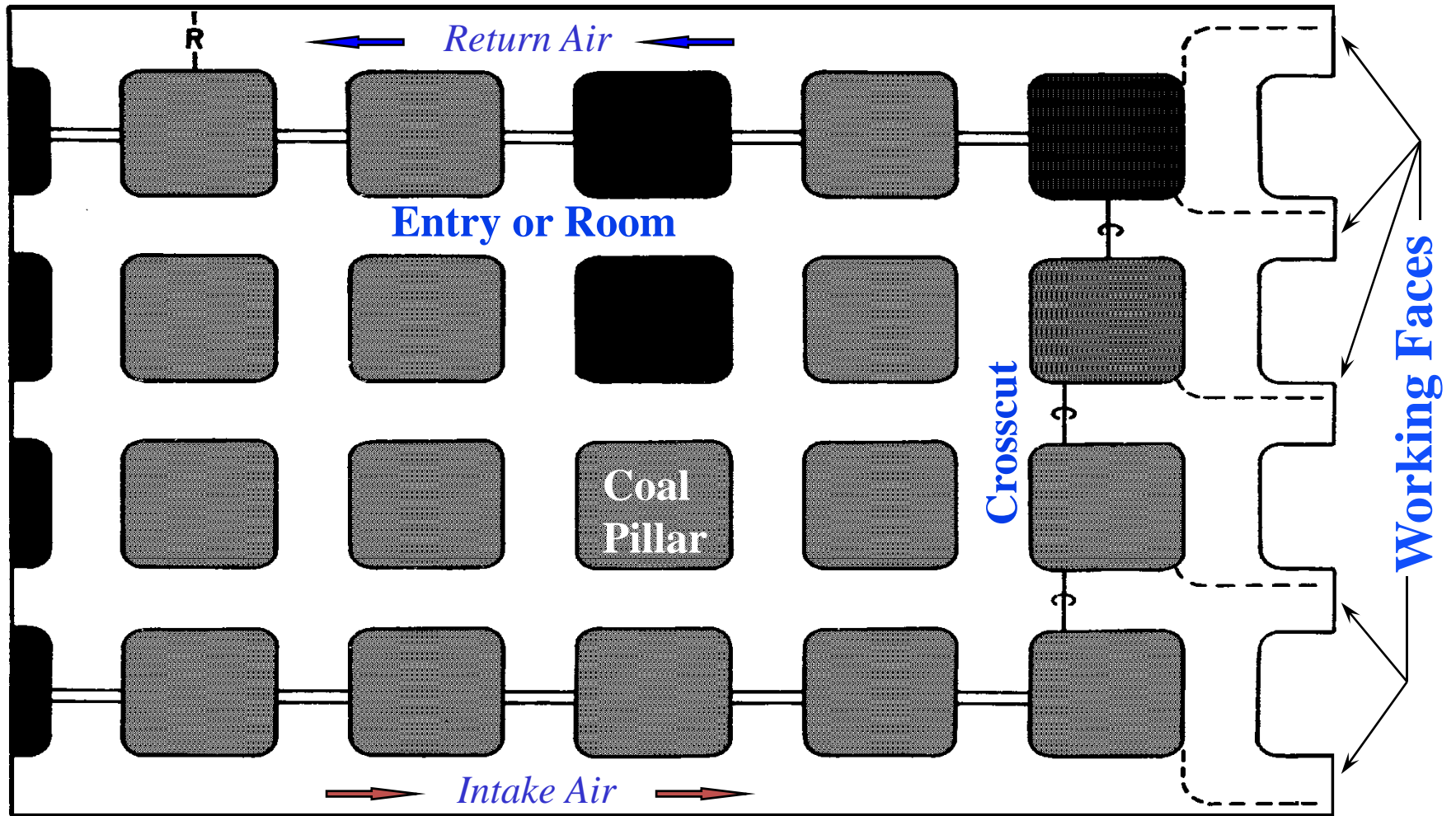


Copyright 1992 by Commonwealth of Pennsylvania

➤ Coal in Pennsylvania

- Types of Mining
 - Room and Pillar Mining
 - Partial extraction
 - “Rooms” = Mined Out Areas
 - “Pillars” = Solid Coal for Support
 - Longwall Mining
 - Large Panels of Coal Mined
 - 100% Extraction within panel
 - Immediate subsidence at surface

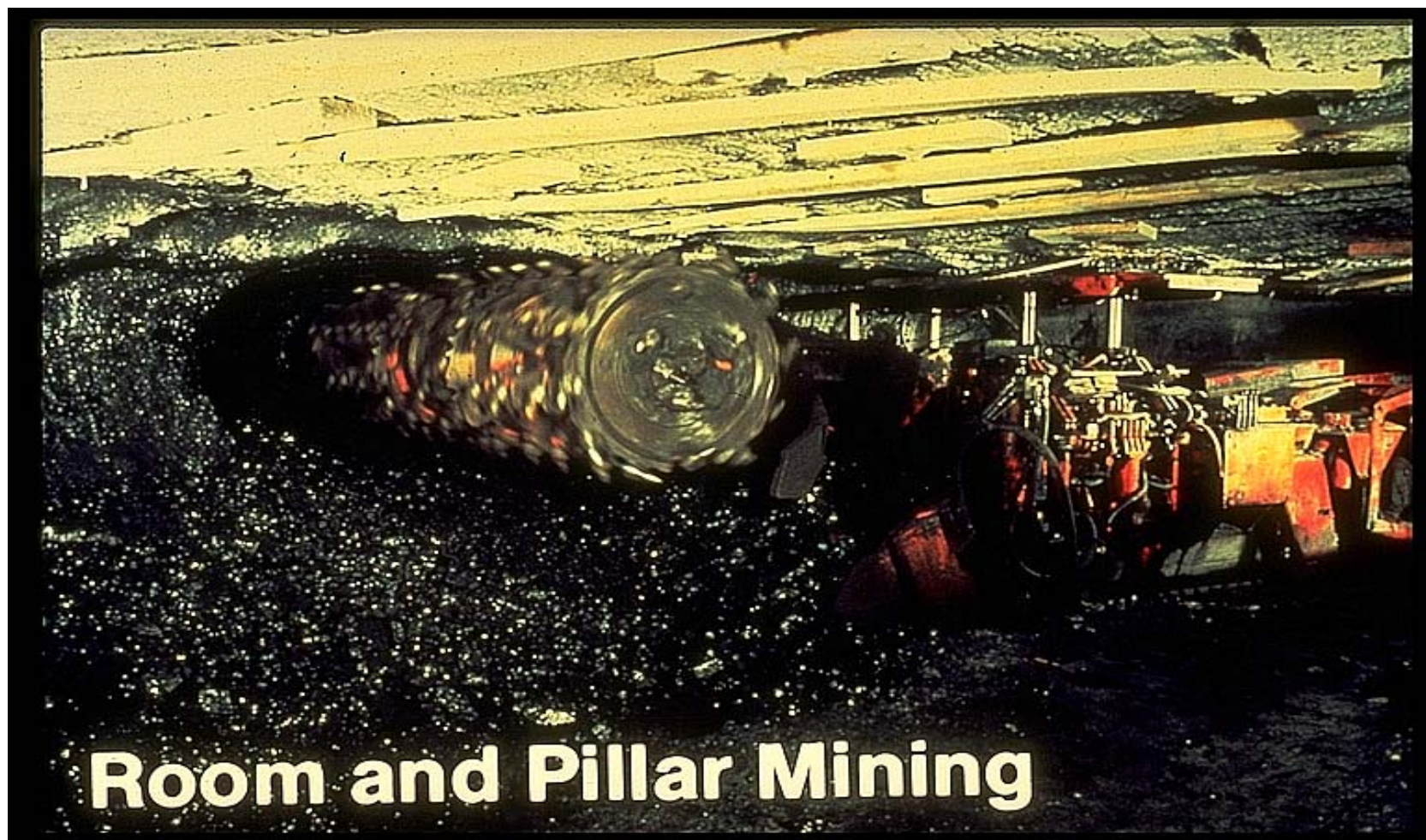
TYPICAL ROOM AND PILLAR SECTION



LEGEND

---	Line Curtain		Permanent Stopping	⌘	Regulator
-	Temporary Stopping	⌘	Check Curtain	X	Overcast

➤ Coal in Pennsylvania



➤ Room and Pillar Mining



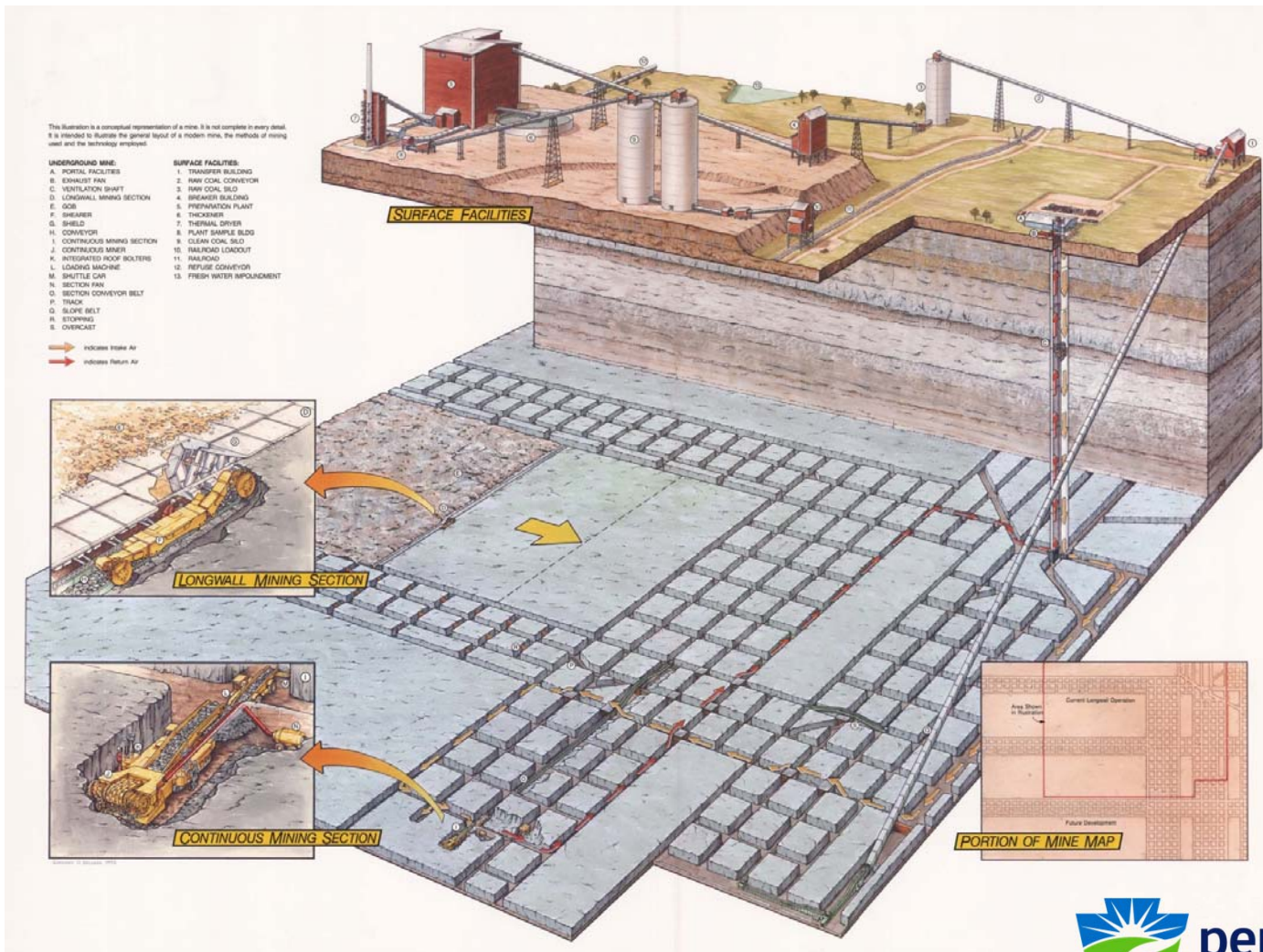
➤ Room and Pillar Mining



➤ Coal in Pennsylvania



Coal in Pennsylvania



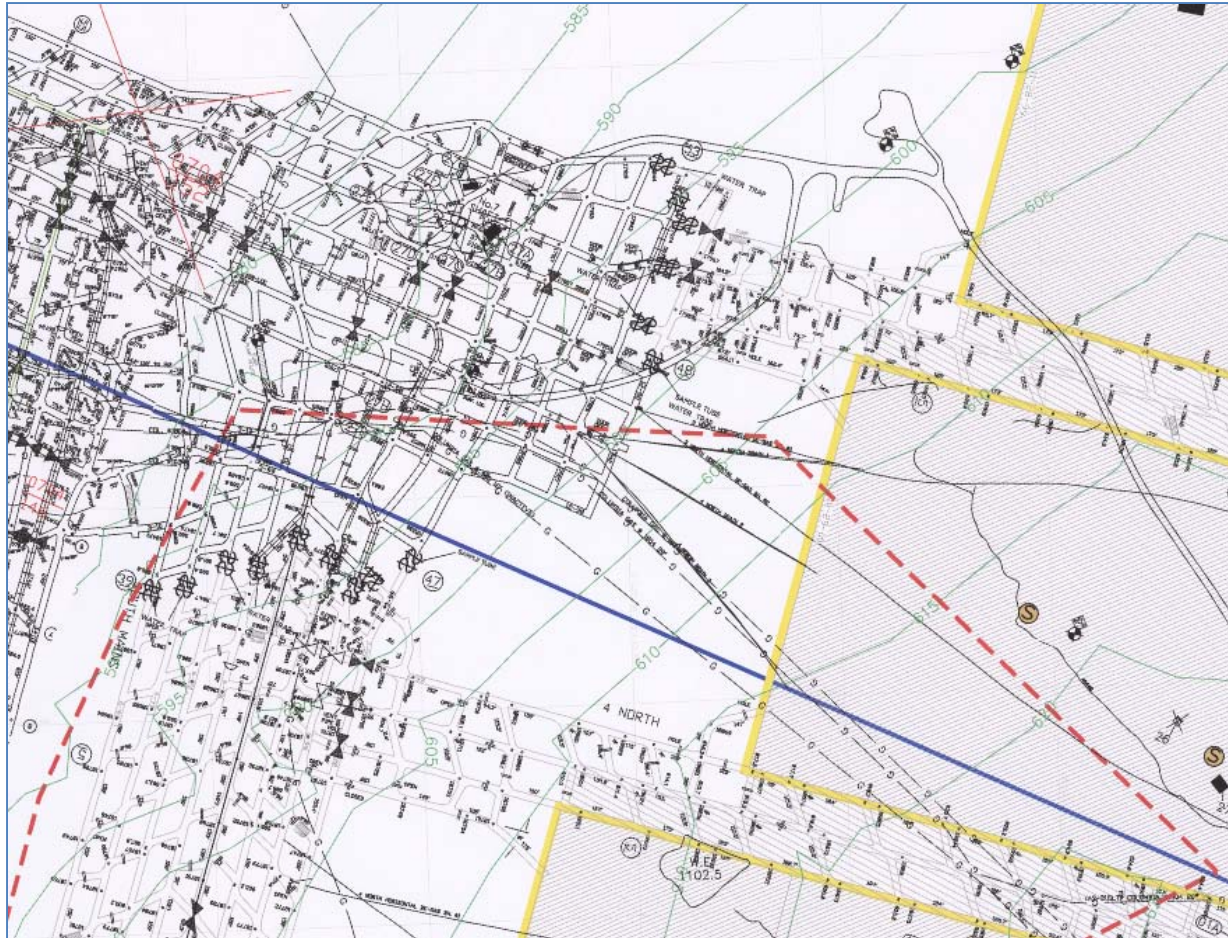
➤ Mine Maps in Pennsylvania

- Tracking of Underground Mine Workings
 - Earliest Mine Maps Date to Mid 1800's
 - Canvased-backed maps, main record
 - Linen tracing made off of those “hard-backs”
 - Later, blue-printing copying available
 - Storage conditions range poor to archival
 - Many damaged and lost over the decades
 - Scattered over various sources

➤ Mine Maps in Pennsylvania



➤ Mine Maps in Pennsylvania



➤ Mine Maps in Pennsylvania

- Sources and Repositories of Mine Maps:
 - DEP and DCNR Offices (7 offices)
 - National Mine Map Repository (OSM)
 - Educational Institutions
 - Mining Company Collections
 - Coal Heritage Museums
 - Historical Societies
 - County Courthouses (Recorder of Deeds Offices)
 - Private Collections

➤ Mine Maps in Pennsylvania

- Why are Mine Maps Important?
 - Mine Subsidence Insurance Program
 - Mine Safety
 - Mine Reclamation Projects
 - Oil and Gas Drilling
 - Infrastructure
 - Make Government More Efficient

➤ Mine Maps in Pennsylvania

- DEP Mine Map Plan
 - Locate sources of additional map repositories
 - Create digital archive of scanned map images
 - Create centralized inventory database
 - Georeference maps and vectorize features in GIS
 - Provide Public and Industry Access

➤ Mine Maps in Pennsylvania

- Know of ~110,000 hardcopy mine maps
 - ~105,000 scanned to DEP standards
 - ~35,000 georeferenced in GIS
 - Duplications in different offices, need to eliminate
- Intake from outside collections
 - New small, private collections found all the time
 - Advertise for map collections

➤ Public Access to Mine Maps

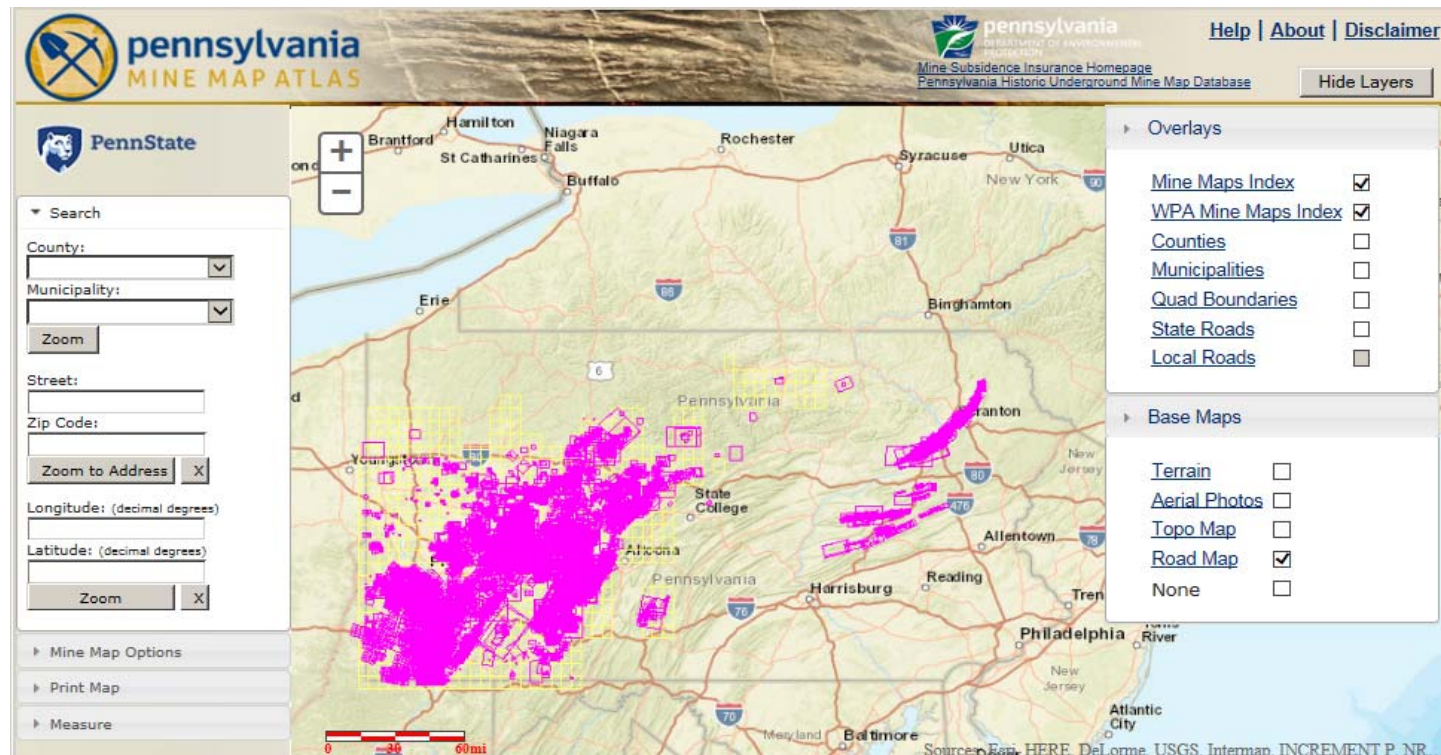
- Pennsylvania Spatial Data Access (PASDA)
- Pennsylvania Historic Underground Mine Map Inventory System (PHUMMIS)
- Coal Status Reports

PASDA

- Pennsylvania Spatial Data Access (PASDA)
 - <http://www.pasda.psu.edu>
 - Files on FTP available:
 - Vector Data
 - Archive Mine Map TIFF Images
 - Un/Georeferenced Mine Map MrSID Images
 - Interactive Online Imagery Viewer:
 - PA Mine Map Atlas

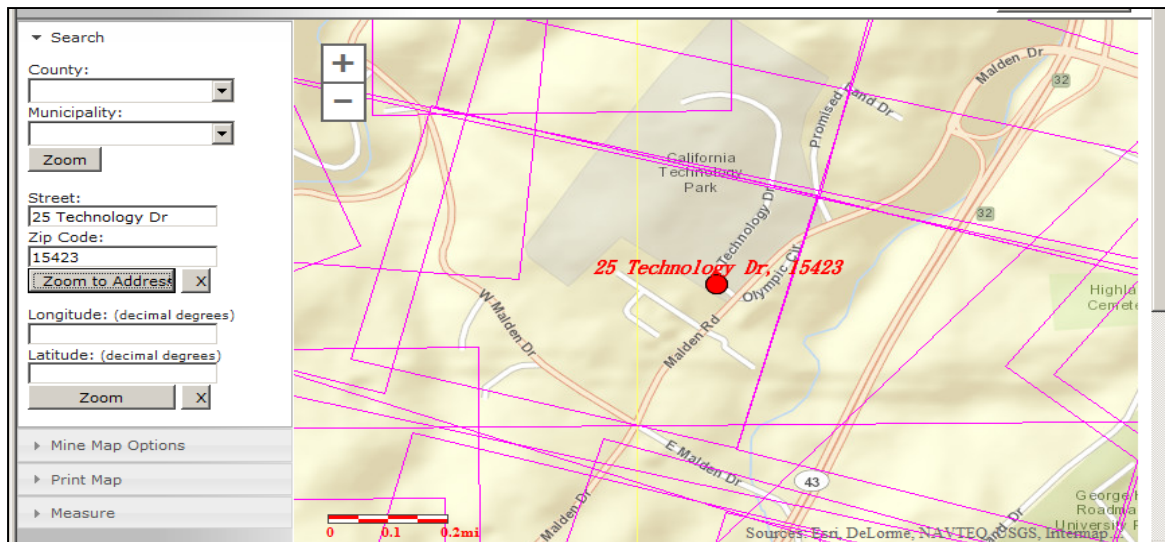
▶ Pennsylvania Mine Map Atlas

- <http://www.paminemaps.psu.edu/>



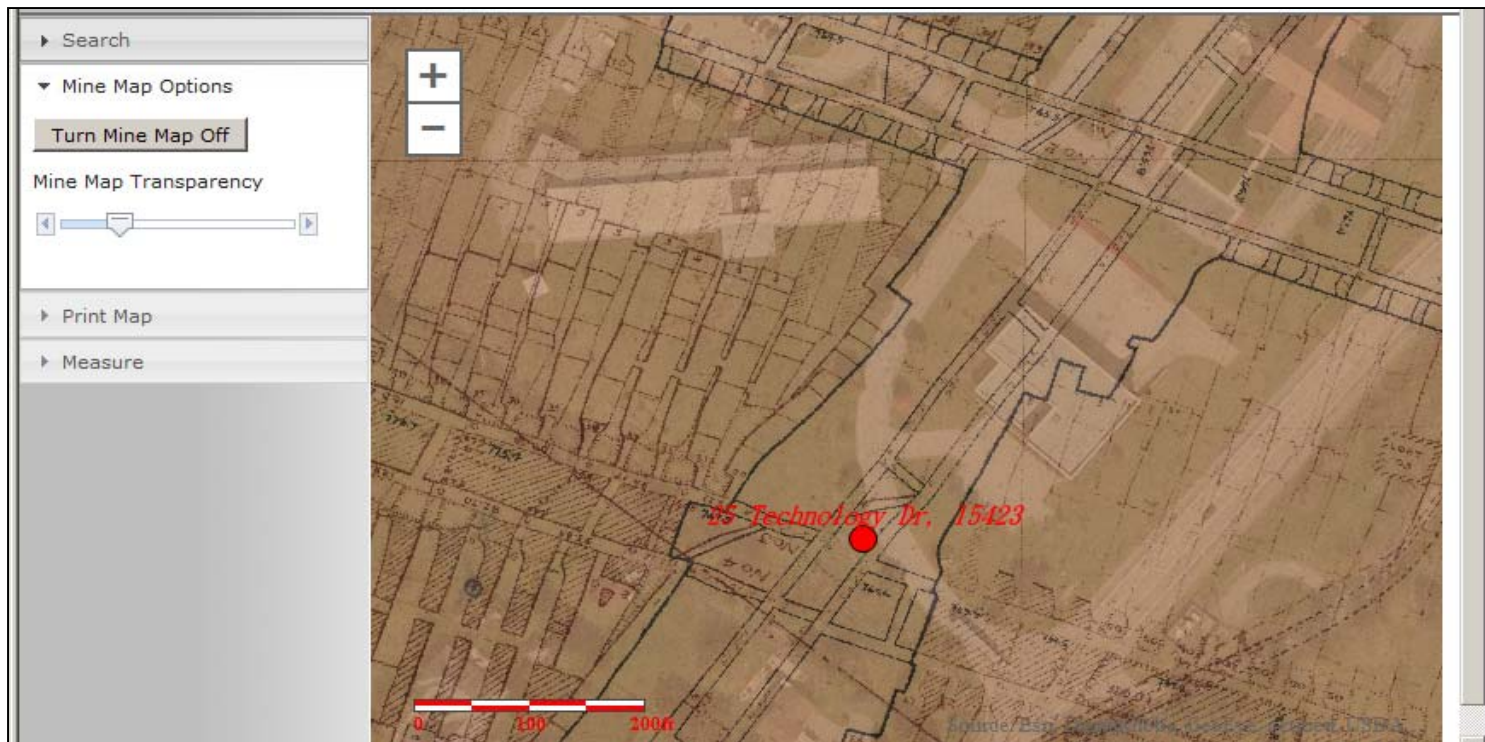
▶ Pennsylvania Mine Map Atlas

- Search by Address
 - See what is under your house
- Search by Latitude / Longitude
 - Oil & Gas Well location planning



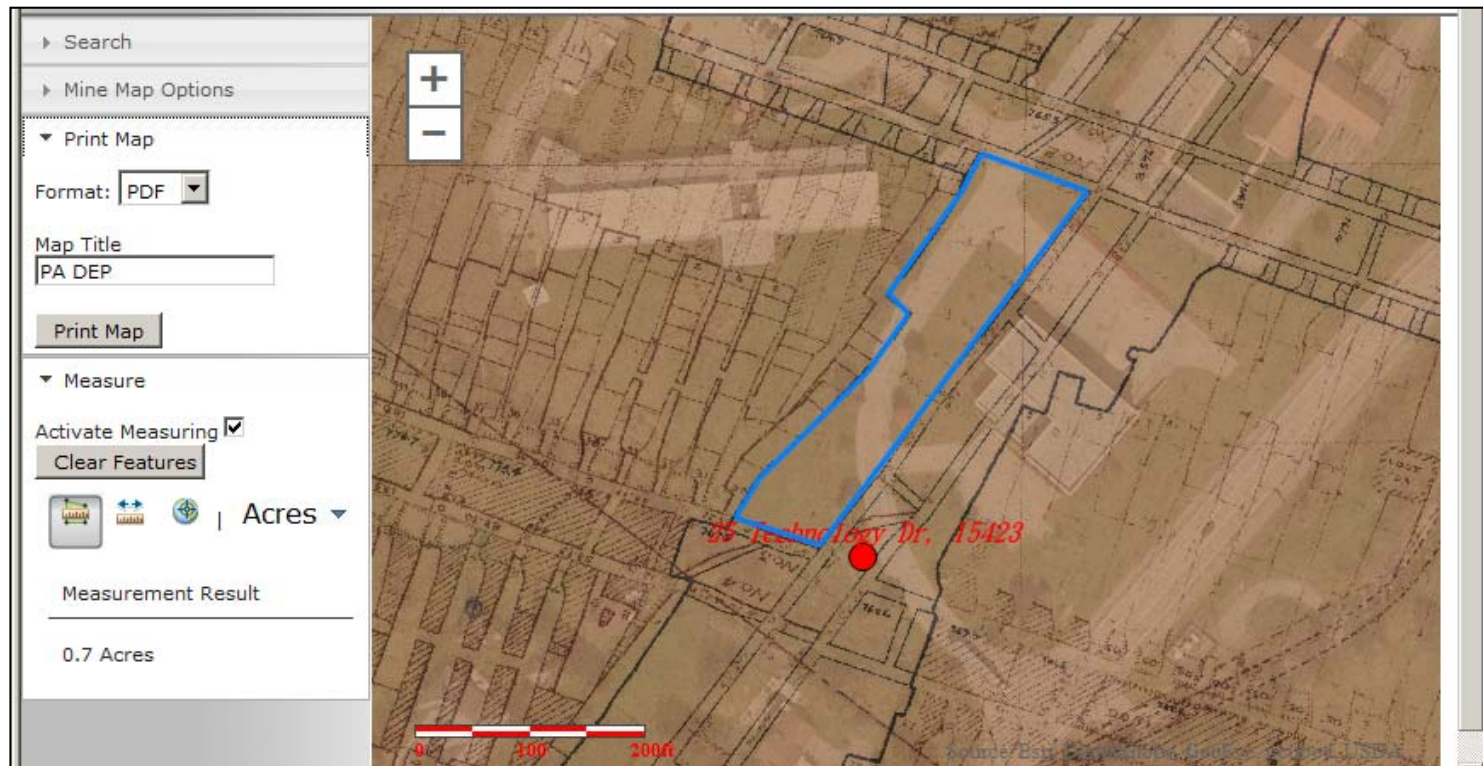
➤ Pennsylvania Mine Map Atlas

- View map and adjust transparency to see what is under your location.



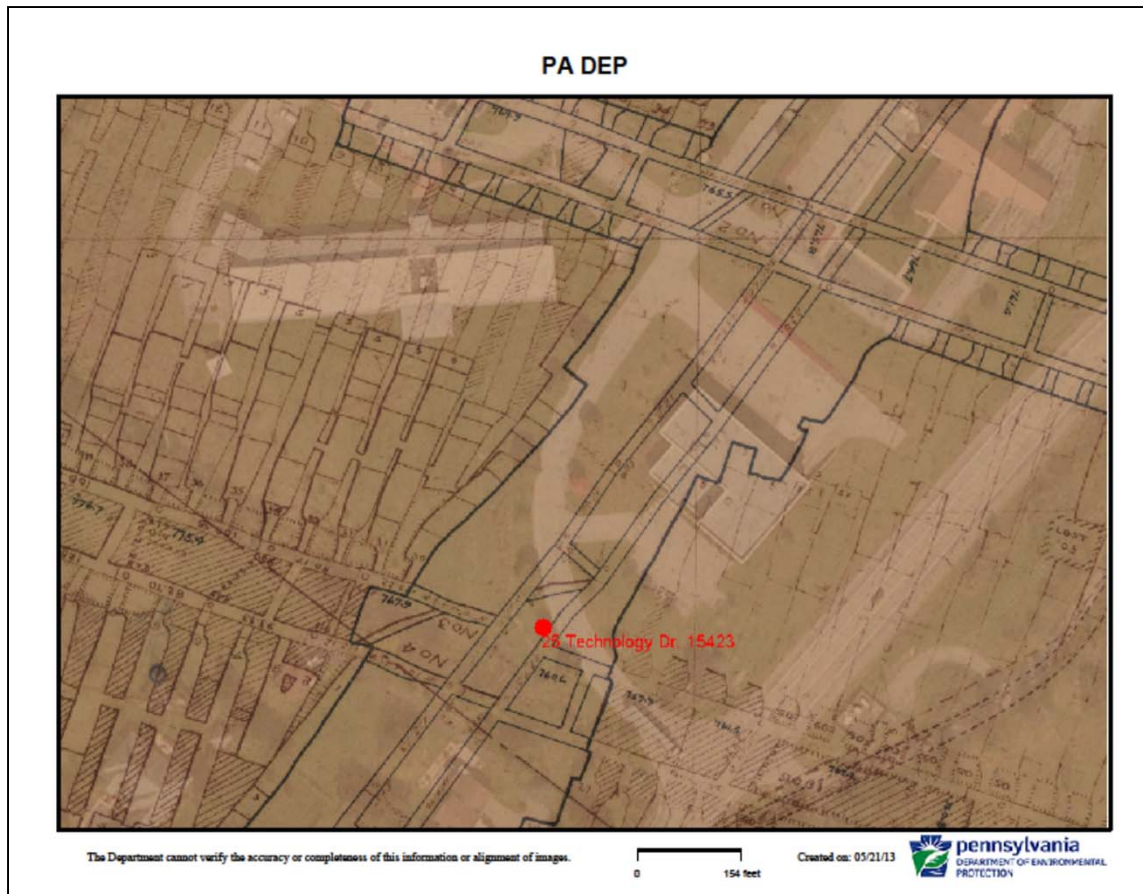
➤ Pennsylvania Mine Map Atlas

- Measure area, distance, or get Lat/Long



➤ Pennsylvania Mine Map Atlas


- Print PDF, PNG, or JPG to file




PHUMMIS

- Pennsylvania Historic Underground Mine Map Inventory System (**PHUMMIS**)
- www.phummis.pa.gov
- Metadata entered as map is scanned
 - Mine Name
 - Operator
 - Coal Seam
 - etc.
 - Scale
 - Location
 - Survey Dates

PHUMMIS

**pennsylvania**
DEPARTMENT OF ENVIRONMENTAL PROTECTION



pennsylvania PA

MORE AGENCIES
Tom Wolf, Governor

MORE SERVICES
Patrick McDonnell, Acting Secretary

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Sheet Search

Textbox searches can make use of % for wildcards.

Mine Name: Folio/CDO/Collection ID: County:

Company Name: Local Sheet ID: Municipality:

Advanced Search

Scanning Information
Scan File Name:

Geology Information
Resource Mined:
Formal Coal Seam:
Local Coal Seam:
Coal Field:
Oil or Gas Features:

General Information
Permit #:
Longwall Method:
Projection Number:
Coordinate System:
Horizontal Datum:
Vertical Datum:
Mine Status:

Source Information
Dep Office:
Original Map Source:
Hard Copy Location:

Location Information
Quadrangle:

Map Information
Inventory Control ID:
OSM ID:
Map Type:
Scale:
Sheet Name:
Certified:
Final:

Public Access to Mine Maps

- Coal Status Report

REVISED 1/25/2012

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DISTRICT MINING OPERATIONS
25 Technology Drive
California Technology Park
Coal Center, PA 15423
(724) 769-1100

PAGE 1 OF 1

COAL STATUS REPORT

NAME: John Smith SITE ADDRESS / LOCATION: _____
ADDRESS: 123 Main Street Same
Happyville, PA 12345

PURPOSE OF REPORT:
☒ MSI ☐ O & G ☐ OTHER

MUNICIPALITY: California Borough
COUNTY: Washington
USGS QUADRANGLE: California

COAL SEAM RESEARCHED: Pittsburgh SURFACE ELEVATION: 1,010 FEET +/-
MINE NAME: Crescent Mine COAL SEAM ELEVATION: 760 FEET +/-
OPERATOR: Pittsburgh Coal Company COVER* (OVERBURDEN): 250 FEET +/-
LAST MINING DATE: 1954
MINING UNDER OR NEAR THIS SITE: ☒ Yes ☐ No ☐ Future Possibility ☐ Unknown ☐ Coal Seam Non-Existent

REMARKS:
The site is located over an abandoned mine on the Pittsburgh coal seam and mining is complete.

REFERENCE SOURCES CHECKED

☒ WPA MAPPING ☐ COUNTY MINE MAP
☒ CDO MINE MAP INDEX ☐ OSM MICROFILM
☒ DETAILED MINE MAP ☐ BITUMINOUS COAL FIELDS OF PA PART II (SISLER)
☒ COAL RESOURCES OF Washington County ☐ US GEOLOGICAL SURVEY FOLIOS
☐ OTHER _____

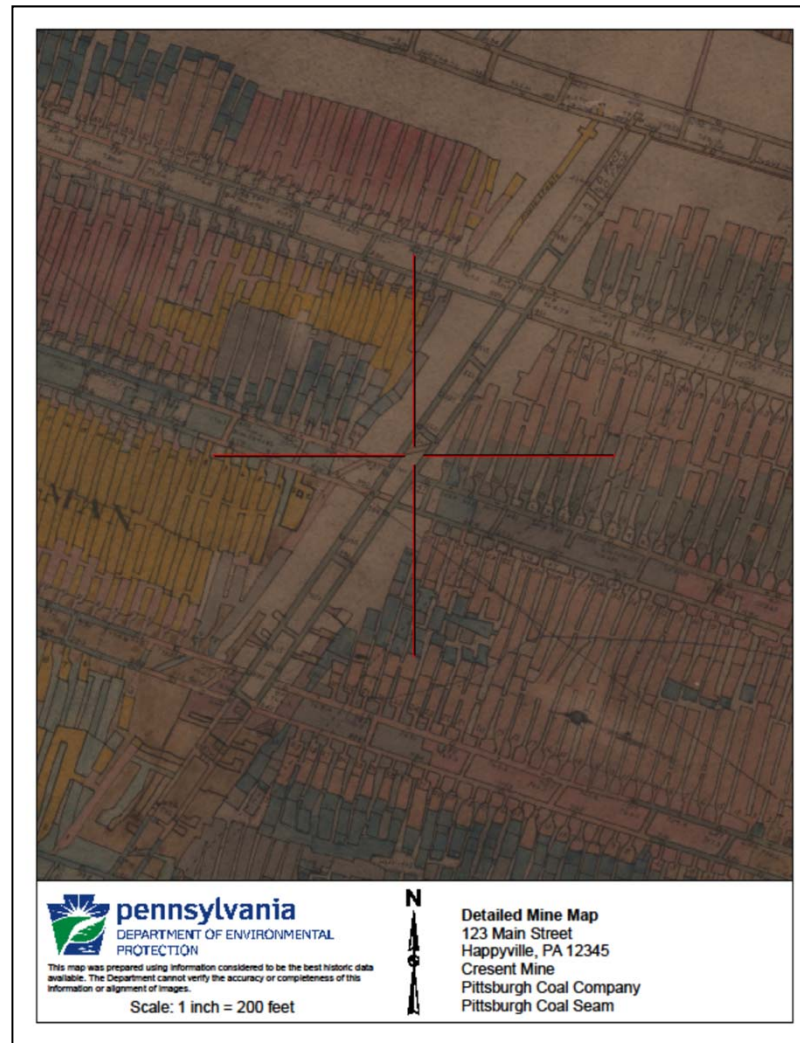
REPORT INFORMATION OBTAINED FROM: Consol Hardback xsl-628, K-Sheet K5723, WPA Brownsville 8

BY: Patrick Jaquay DATE: 5/21/2013

*COVER = Vertical distance between the ground surface and the coal seam.
The above information may be based on maps and plans obtained from various sources.
The Department assumes no responsibility for the accuracy or completeness of this information.

Public Access to Mine Maps

- Coal Status Report, Site Map





Mine Subsidence Insurance

Tom Wolf, Governor

Patrick McDonnell, Secretary

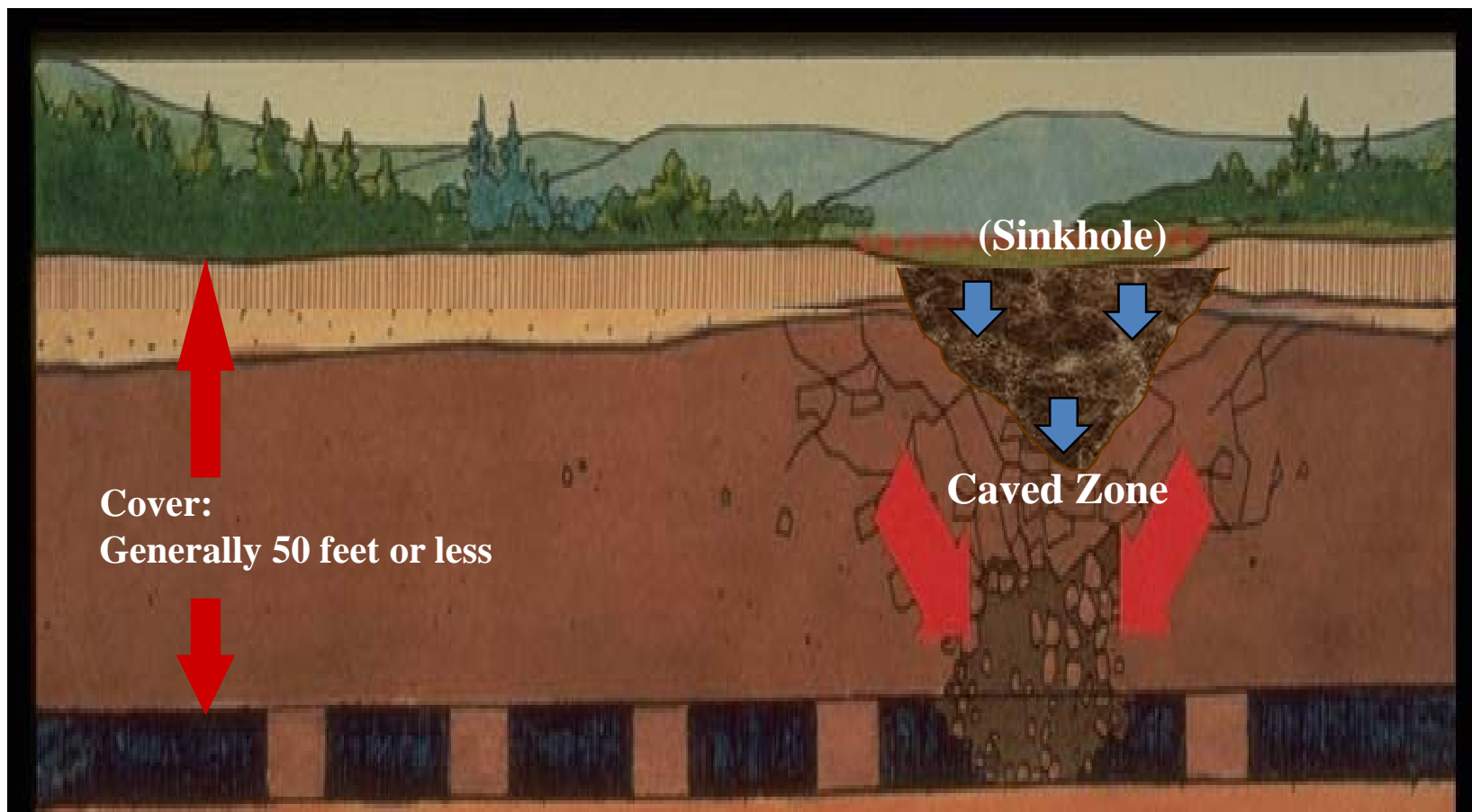
➤ Types of Subsidence

- Sinkhole Subsidence
- Trough Subsidence
- Mine Water Breakout

➤ Sinkhole Subsidence

- Occurs at shallow depths
- Caused by the collapse of a mine roof that reaches the surface
- Appears as a steep sided pit on the surface
- Usually 1 to 20 feet deep
- Usually 2 to 40 feet in diameter
- Can cause extensive and dramatic damage to structures and surface features

➤ Sinkhole Subsidence



➤ Sinkhole Subsidence



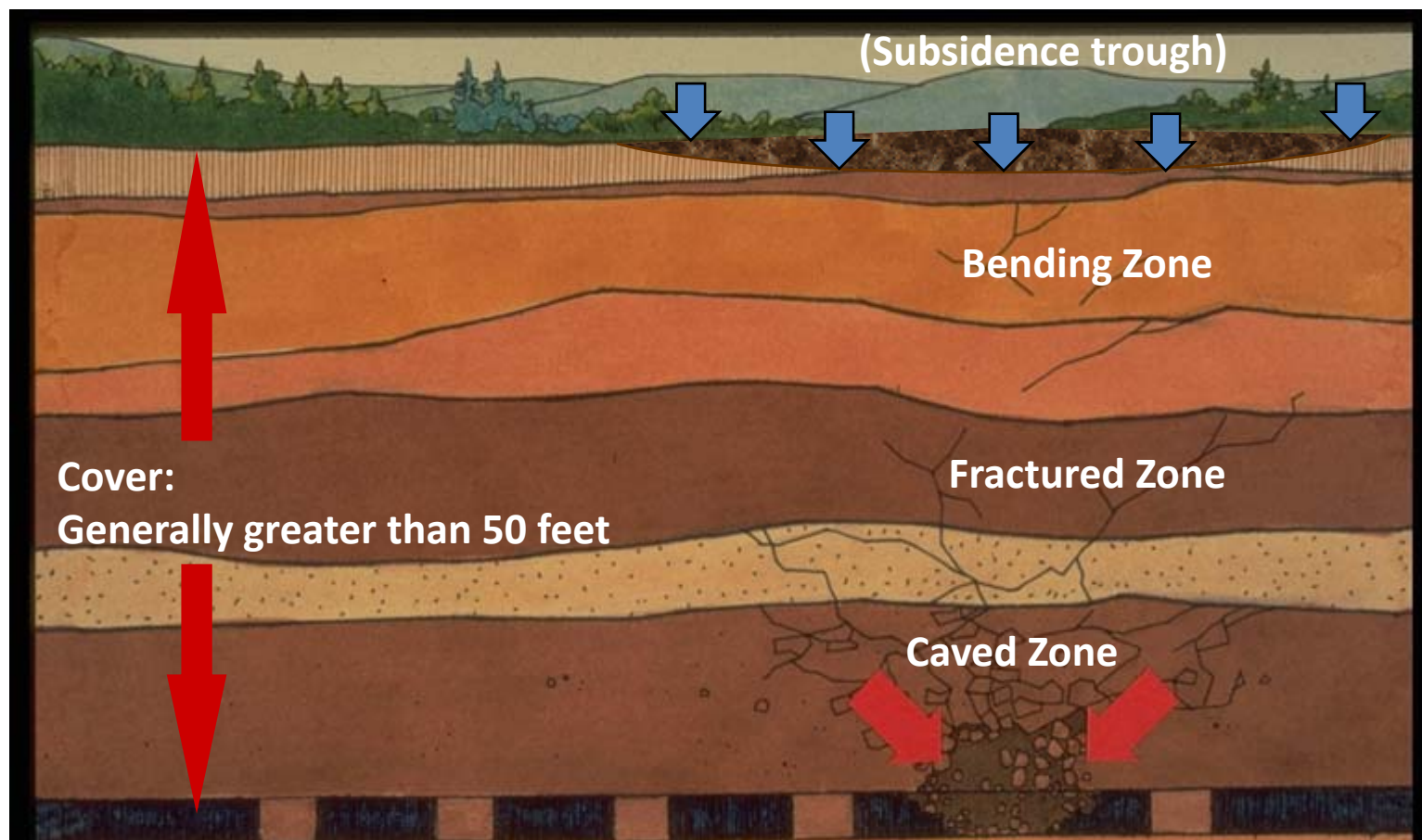
➤ Sinkhole Subsidence



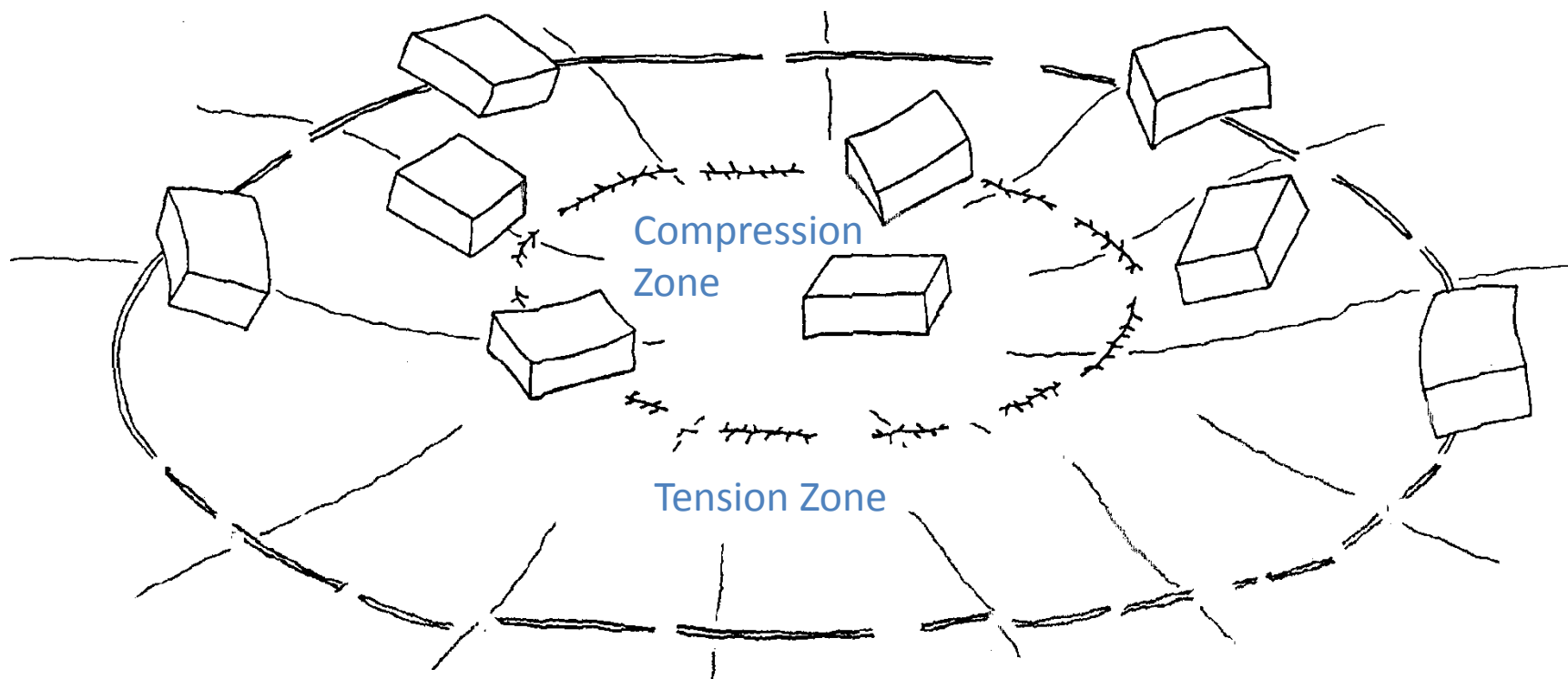
➤ Sinkhole Subsidence



➤ Trough Subsidence



▶ Trough Subsidence



Modified From Marino and Mahar, Subsidence Damaged Homes Over Room and Pillar Mines in Illinois, Civil Engineering Department, University of Illinois at Urbana-Champaign (May, 1985)

➤ Trough Subsidence



▶ Trough Subsidence



➤ Subsidence Damages



➤ Subsidence Damages



➤ Subsidence Damages



➤ Subsidence Damages



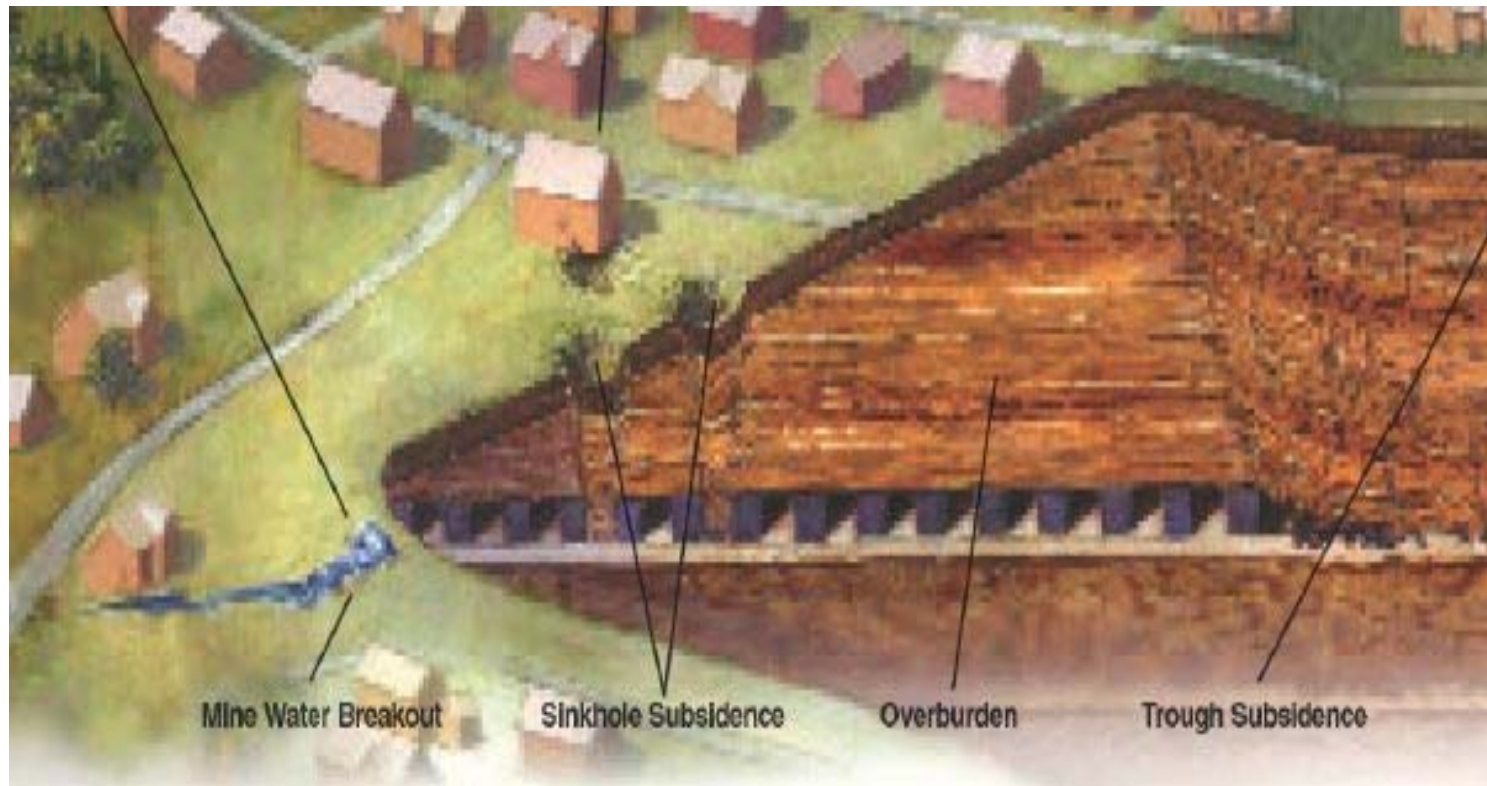
➤ Subsidence Damages



➤ Mine Water Breakout



➤ Mine Water Breakout



➤ Mine Water Breakout



➤ Mine Water Breakout



➤ Mine Water Breakout



➤ Mine Water Breakout



➤ Mine Subsidence Insurance



➤ MSI Notification Project

- Close to 1 million structures in PA sit atop abandoned mine workings
- Notification Project to notify those who don't have MSI
 - Started in February 2015
 - 1500 mailings every 2 weeks
 - To date: 29 municipalities notified with 100,000+ sent and 4,000+ returned

MSI Notification Project

As of November 1, 2018

<u>Municipality</u>	<u>Mailing year</u>	<u>Mailing dates</u>	<u>Total Mailing</u>	<u>Total Returns</u>	<u>Percent Return</u>
Pleasant Hills	2015	2/13, 3/6	1917	264	13.77%
Jefferson Hills	2015	3/20, 4/3	2021	230	11.38%
West Mifflin	2015	4/17, 4/24, 5/7, 5/15	5707	131	2.30%
South Park	2015	6/12,	3064	139	4.54%
Upper St. Clair	2015	7/24, 7/31	6933	297	4.28%
South Fayette	2015	7/23, 8/7	4683	157	3.35%
Bridgeville	2015	8/17,	2003	44	2.20%
Bethel Park	2015	9/21, 10/6	10586	184	1.74%
Mt. Lebo	2015	5/10-17, 6/6-13-30, 7/11-22	10462	266	2.54%
Rostraver	2016	8/23, 9/1-12	3588	136	3.79%
North Belle Vernon	2016	9/12,	498	24	4.82%
Washington Twp	2016	10/17,	1103	40	3.63%
Belle Vernon Boro	2016	10/17,	166	2	1.20%
South Union	2016	10/17-27, 11/10	3255	81	2.49%
North Union	2016	11/14, 12/12	3313	112	3.38%
Schuylkill County	2016	12/12-21,	2873	31	1.08%
Latrobe Boro	2017	2/22, 3/10, 3/20	4236	335	7.91%
Derry Twp	2017	4/24, 5/8	1950	264	13.54%
Unity Twp	2017	5/22, 6/5, 6/16	3346	235	7.02%
California Boro	2017	9/5,	986	38	3.85%
Centerville Boro	2017	9/18,	1445	25	1.73%
Cecil Twp	2017	10/16, 10/27, 11/13	4131	150	3.63%
Chartiers Twp	2018	1/16, 1/24	1877	52	2.77%
Monroeville	2018	2/5, 2/16	2867	289	10.08%
Peters Township	2018	2/26, 3/15, 3/26, 4/9	5316	240	4.51%
Stanton Heights	2018	4/23,	508	41	8.07%
North Braddock	2018	6/27,	678	19	2.80%
		7/19, 7/27, 8/10, 8/20, 9/4,			
North Huntingdon	2018	9/28, 10/15, 10/23	11611	364	3.13%
		TOTALS	101123	4190	4.14%



Thank You!

www.dep.pa.gov

www.pamsi.org

724-769-1100

*Please contact us if you know the location of any mine map collection.