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# Mine Map Archiving in Utah

# IMCC/MSHA Benchmarking Workshop

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# Objectives

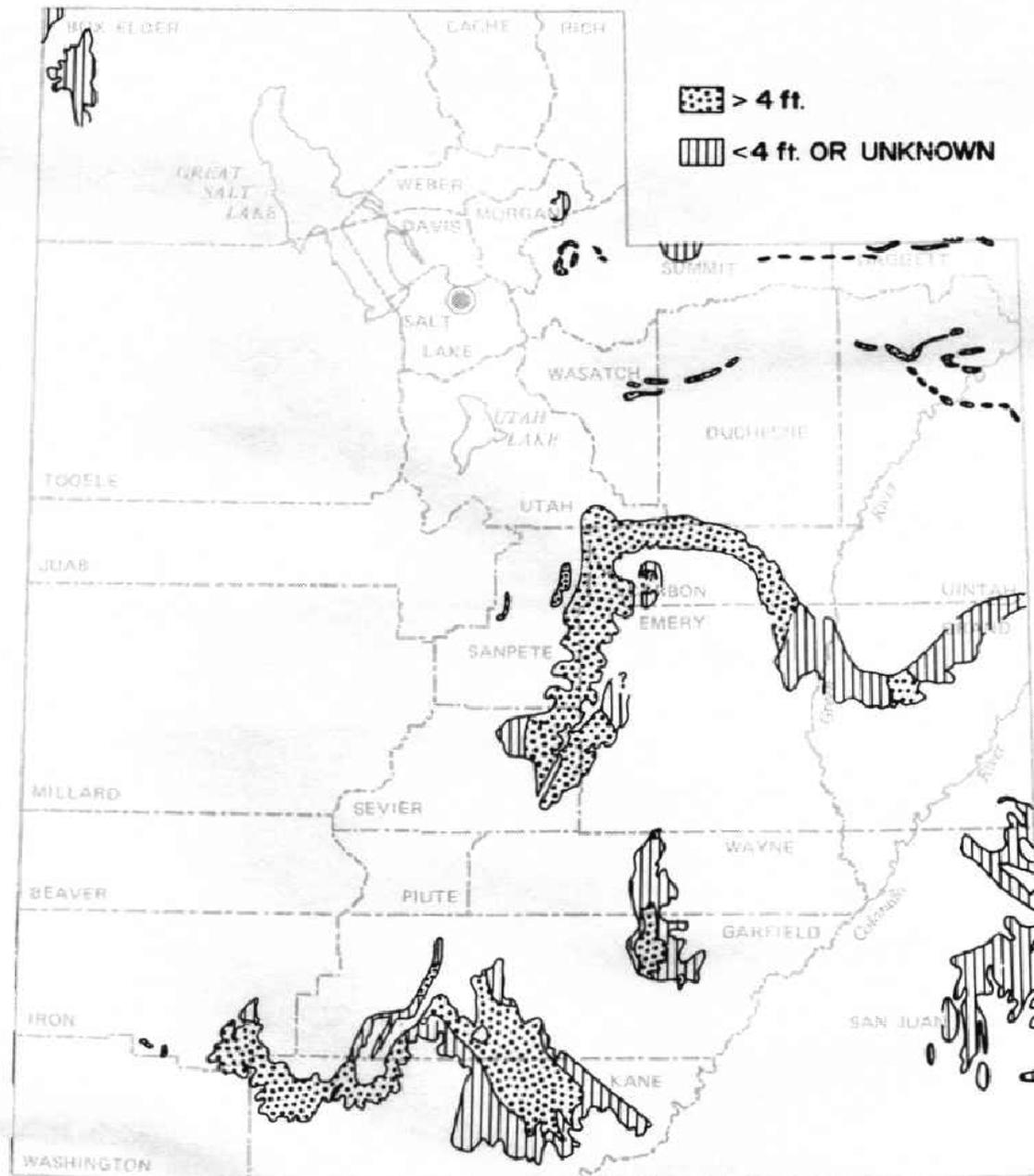
- Understand the history of mine mapping in Utah- accuracy and limitations
- Importance of mine maps
- Gathering, sharing and storing information

# To Understand Utah's Program - Must Understand Utah's:

- Coal fields
- Coal mining history
- Coal industry
- Regulatory program

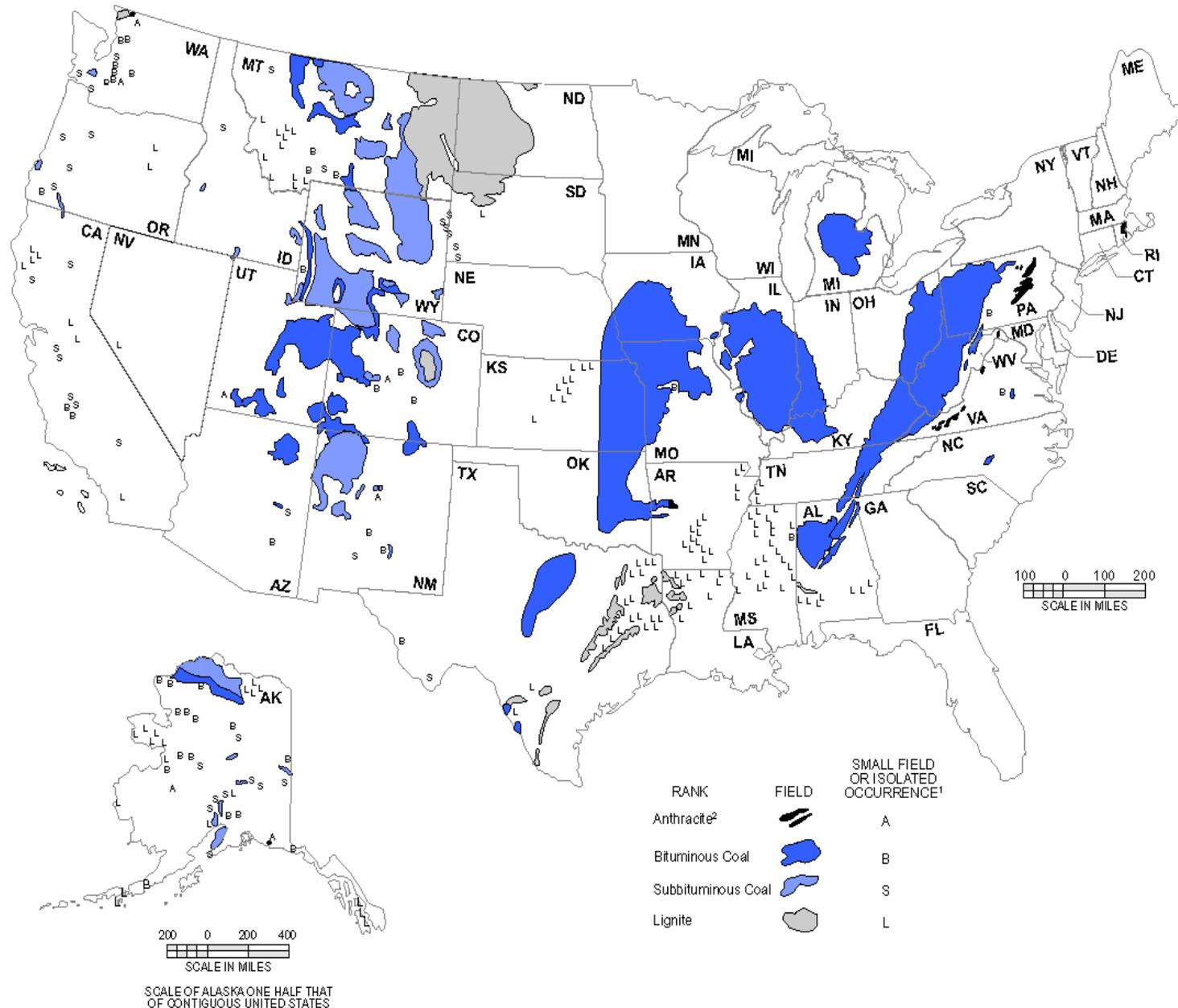
# Utah's Coal Reserves

- Economic cut off beds - greater than 4 feet in thickness/ under less than 3,000 feet of cover
- 4% of the State is underlain with coal reserves
- 80% of recoverable coal in three coalfields
- Wasatch and Book Cliffs fields developed
- Kaiparowits Plateau undeveloped - transportation problems and environmental concerns



Areas in Utah with coal less than 3,000 feet below the surface.

Figure 1. Coal-Bearing Areas of the United States



# Coalfields of West Compared to Utah

- 1/3 of nation's coal produced in Wyoming
- 2.4% of nation's coal produced in Utah
- Surface mines produce most western coal
- All active mines in Utah - underground
- 24% of the nation's coal reserves - Montana
- 1% of nation's coal reserves - Utah

# Western State's Coal Production 2001 in Million Tons

Rank	State	Production	% of U.S. Total
1	Wyoming	368.8	32.8%
6	Montana	39.1	3.5%
9	Colorado	33.3	3.0%
12	New Mexico	29.6	2.6%
13	Utah	27.0	2.4%
16	Arizona	13.4	1.2%

# Coal Production by Method

## Million Short Tons 2001

State	Surface	Underground	Total
Arizona	12.961	0	12.961
Colorado	9.431	22.958	32.389
Montana	32.298	0	32.298
New Mexico	17.409	1.200	18.609
Utah	0.019	25.490	26.148
Wyoming	350.780	1.024	351.805

# Western Coal Reserves in Million Short Tons

Rank	State	Underground	Surface	Total	% of U.S.
1	Montana	70,958	48,465	119,423	23.91%
3	Wyoming	42,501	23,257	65,758	13.17%
8	Colorado	11,721	4,771	16,493	3.30%
10	New Mexico	6,202	6,085	12,287	2.46%
15	Utah	5,317	268	5,585	1.12%
28	Arizona	102	0	102	.02%
31	Idaho	4	0	4	.00%

# Utah Coal Mining 1847-1905

- 1847 - Settlers arrive in Utah Territory
- 1852-1853 - Coal discovered near Cedar City used in iron industry
- 1854 - Reward for discovery of coal within 40 mile of Salt Lake City
- Early 1860's - Coalville field developed
- 1869 - Union Pacific monopolizes coal
- 1870's - Settlers develop coal for local markets
- 1881- D&RG enters Utah develops Wasatch and Book Cliff fields
- By 1900 total production was 1 million tons

# Utah Coal Mining 1906 -1941

- Trust busting between 1906 and 1912 -coal companies independent of railroads
- Midsize independent coal mines
- WWI spurs coal development
- Production plateaus in 1920's
- Depression cause fall in production/gradual recovery

# Utah Coal Mining 1942-1969

- WWII spurs increase in production
- Coal market stable during 1950's
- Production falls in 1957 due to competition from natural gas and diesel
- Projected reserves - 200 years

# Utah Coal Mining 1970's

- Environmental regulations and groups stop mining in the Kaiparowits Plateau
- SMCRA
- Small mining operations cease
- Coal production increases

# History of Coal Mining

## 1980-Present

- 1980 first unsuitable lands for mining
- Coal production increase in 1980's then hits a plateau in the 1990's,
- Wasatch and Book Cliff fields mature
- Grand Staircase-Escalante
- Mines become interdependent
- Dugout Canyon incident

# Dugout Canyon Mine

## – Mid 1950's- 1998

- Knight-Ideal Mine operated mid 1950's to late 1960's
- 1995 Canyon Fuel begins exploration program
- Acquired mine map dated November 25, 1965 supposedly showed all workings
- Searched state and federal records no new maps
- Contacted previous employees of Knight-Ideal
- Permit granted 1998

# Dugout Canyon Mine Incident

## July 29, 2002

- December 2001 rock slope from Rock Canyon to Gilson Seam began
- April 2002 mining begins in Gilson Seam
- No mining within 200 feet of abandoned works
- Water seeped from coal as mining progressed westward at first no concern
- Somerset, Pennsylvania

# Dugout Canyon Mine Incident - July 30, 2002

- Mine Mgr. contacts surveyor of Knight-Ideal mine - thought map was accurate
- Mine Mgr. visits BLM to recheck maps
- BLM staff finds another map tube
- Active workings within 20 feet of flooded mine works!!!!
- 3:45 pm mine evacuation begins

# Dugout Mine Incident – August 2002

- Emergency drilling program to drain old works
- Workers saved
- \$3,000,000 in equipment saved
- \$700,000 in development saved

# Future of Mining in Utah

- New mines begin where old mines ended
- Need for mine maps increases
- Mine disaster could have major impacts on Utah economy



# Operator - Mine Maps

- Before 1869 coal mines were small, no maps
- Between 1870-1906 large railroad controlled mines that were mapped or small mines with no maps.
- 1906-mid 1970's Large company and independents mines have maps
- Late 1970's-Present all mines required to submit mine maps annually to DOGM

# History of Regulations

## 1891-1975

- 1891- Congress passes mine safety for territories (Utah included)
- 1910 - Bureau of Mine (BOM) Established
- 1941-BOM begins inspections
- 1973 - MESA
- 1975 Utah Abandoned mines program

# History of Regulations

## 1976-Present

- 1970's – 2000 Utah Industrial Commission
- 1977 SMCRA and MSHA
- 1979 Utah Coal Mining and Reclamation
- 1981 Utah Primacy
- 1980's AML begins inventorying state for coal mines

# Regulatory Agencies – Mine Maps

- Before 1941 no maps
- 1941-1970's Bureau of Mines – OSM
- 1970's – Present State and Federal Agencies will have mine maps

# Other Sources of Mine Maps

- Museums and historical groups collect maps
- BLM collects maps
- Utah Geologic Survey collect maps 1970's-1980's
- Companies, Employees, Consultants

# Map Archive Status

- No agency has responsibility to archive mine
- No agency has authority to get maps
- UGS has maps indexed by township, range and section
- DOGM is starting informal program to collect maps.

# Future of Archiving

- Scan maps from all agencies
- Develop long term storage and retrieval system
- Have miners review maps

# Limitation

- Final mine map?
- Map accuracy
- Covering up mistakes
- Robbing Coal

# Conclusions

- Accurate maps from closed mines have prevented mine disasters in Utah.
- Need for old mine maps will increase.
- Limited resources, lack of any agency having direct responsibility or authority to get old maps requires government agencies and industry to find and preserve old maps.

