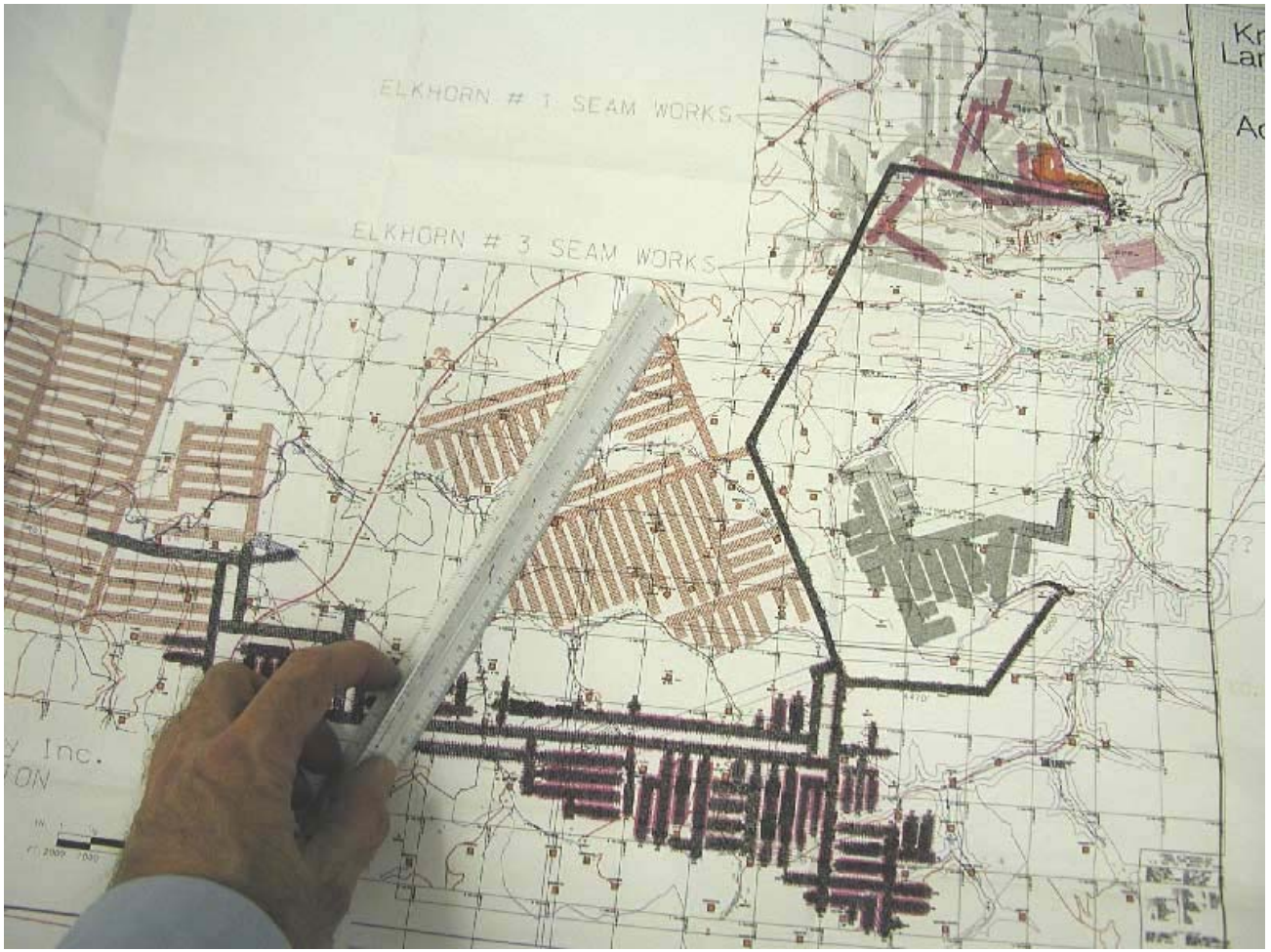
Kentucky's Mine Map Repository

Kentucky Office of Mine Safety & Licensing
John K. Hiett, P.G. , Manager ; UK CAER

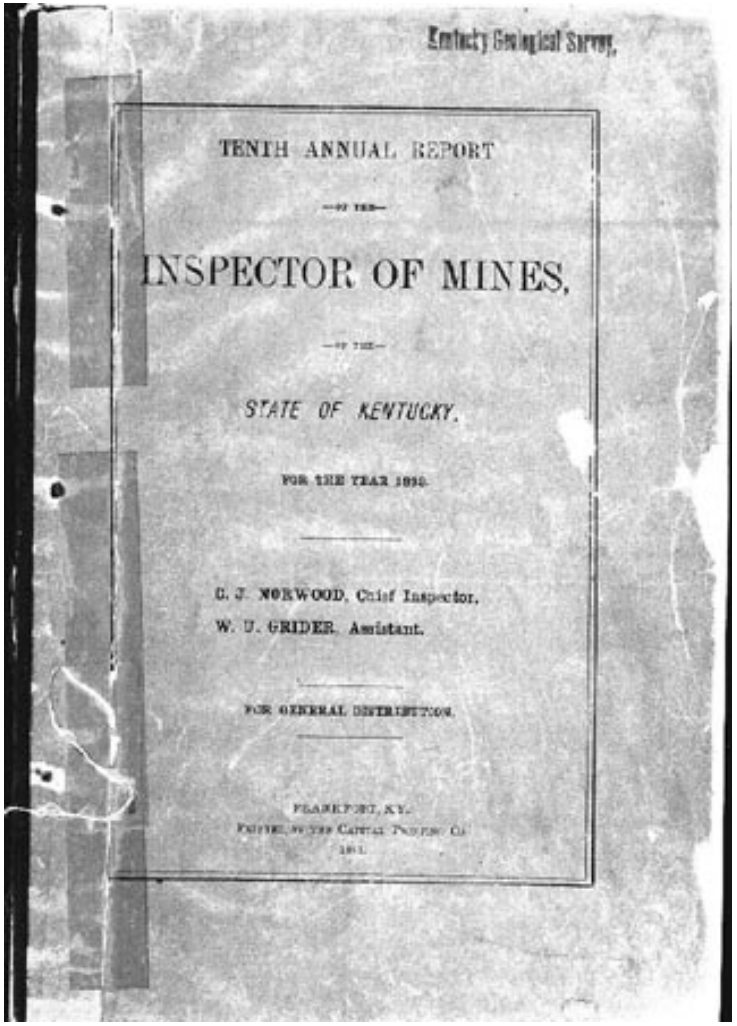
Coal Mine Map Acquisition, Storage and Archiving

2005



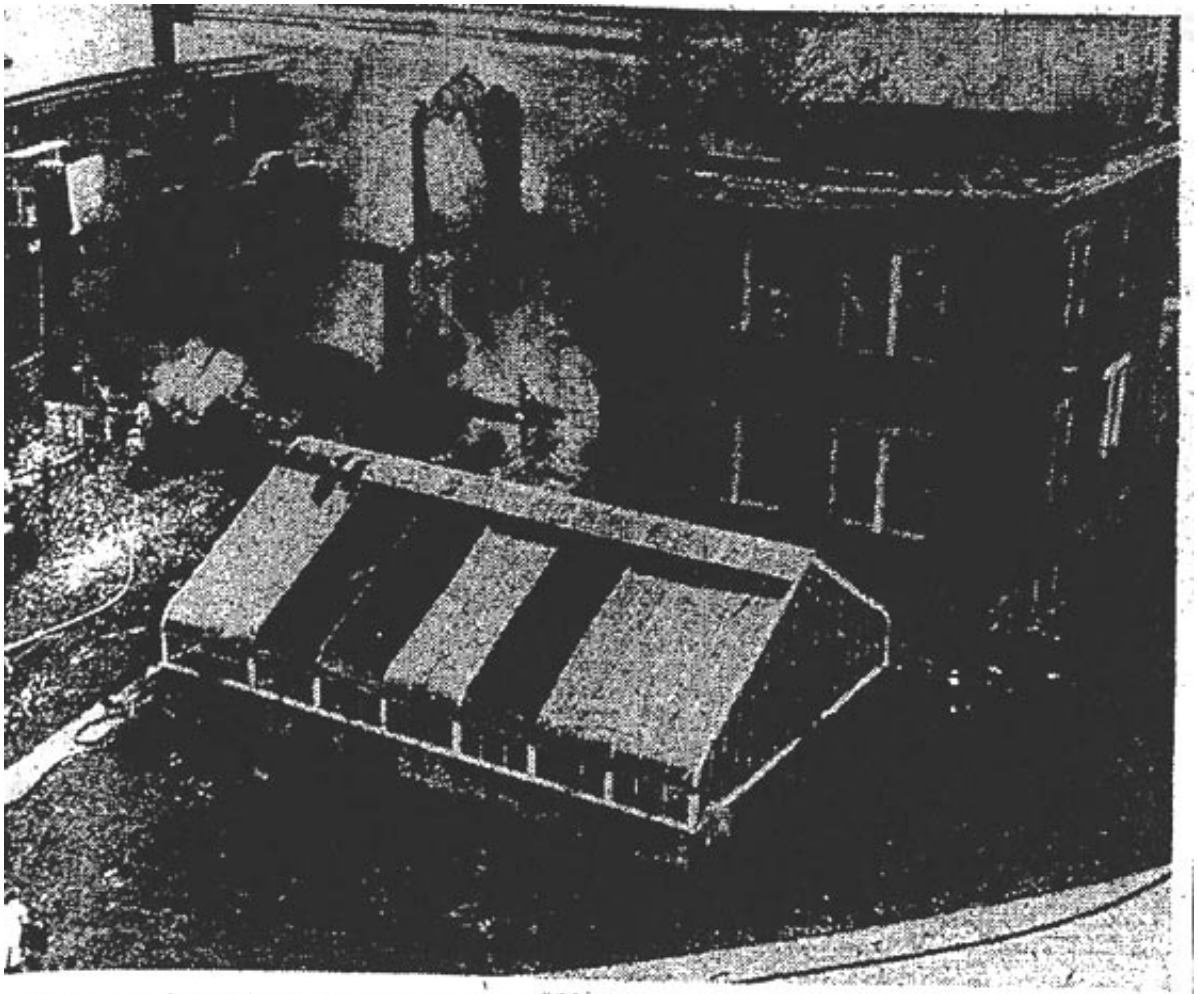
Mine License Maps

The Kentucky Department of Mines & Minerals (KDMM) (now OMSL) has received coal mine license maps since it began in 1884.



In Kentucky each calendar year a coal mine is licensed / relicensed and a mine plan (map) is submitted. Final maps are submitted when a company closes a mine. Other incoming maps include 6 month Oil & Gas well (proximity) maps, ventilation changes, underlays and overlays.

Fire destroys KDMM in 1948.



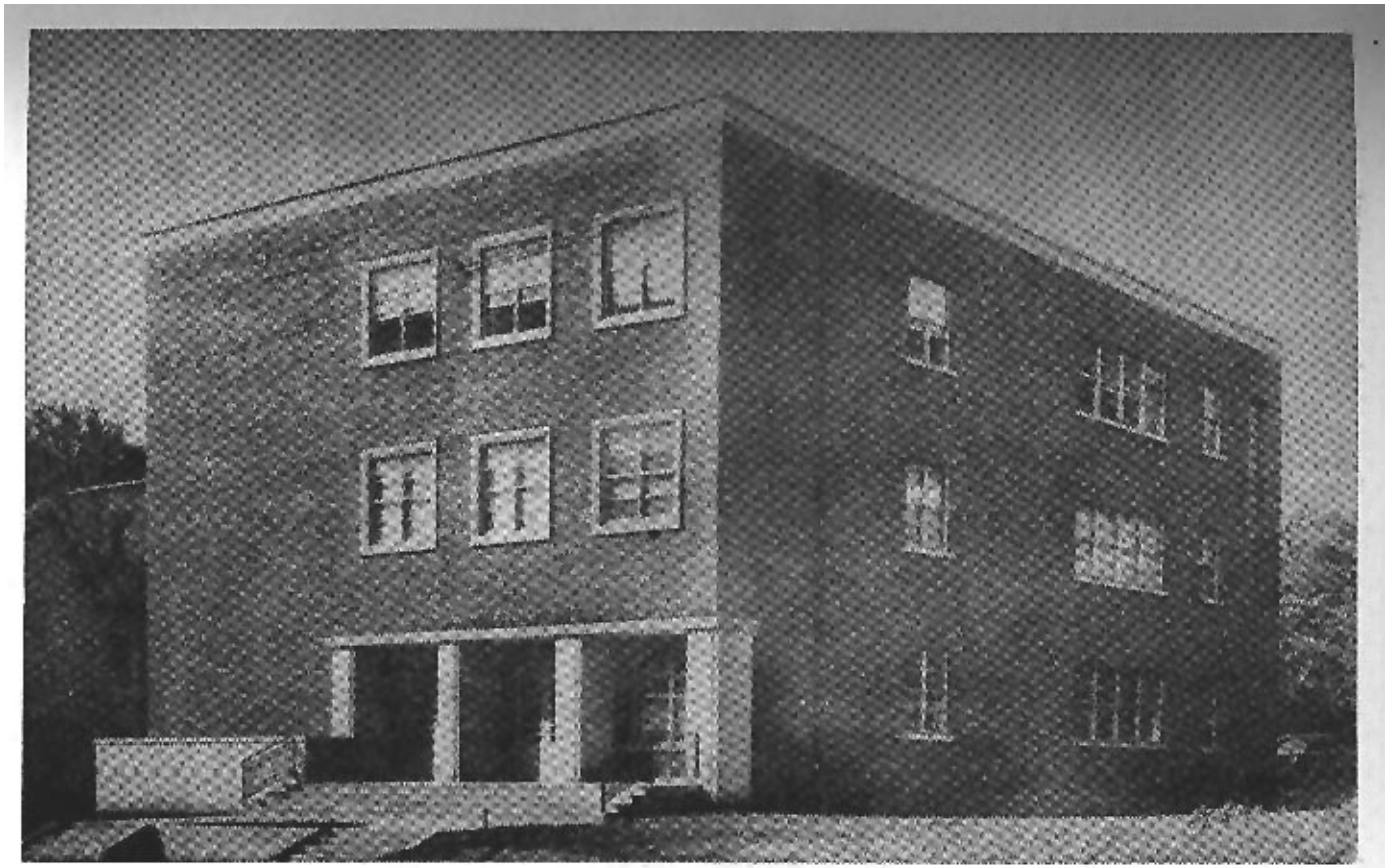
FIRE DESTROYS UNIVERSITY BUILDING—An early-morning fire yesterday destroyed Norwood Hall, University of Kentucky building housing the Botany Department, the State Department of Mines and Minerals and the Kentucky Geological Survey. Loss was officially estimated at $200,000. Many valuable materials, records and equipment in the building were lost and are considered irreplaceable by UK officials. Cause of the fire was not known.

30,000 coal mine maps destroyed!

Sisk said the mines department lost its reports including safety records, inspection reports and recommendations and some 30,000 maps, many of them of abandoned mines which could not be replaced. He emphasized the value of the maps

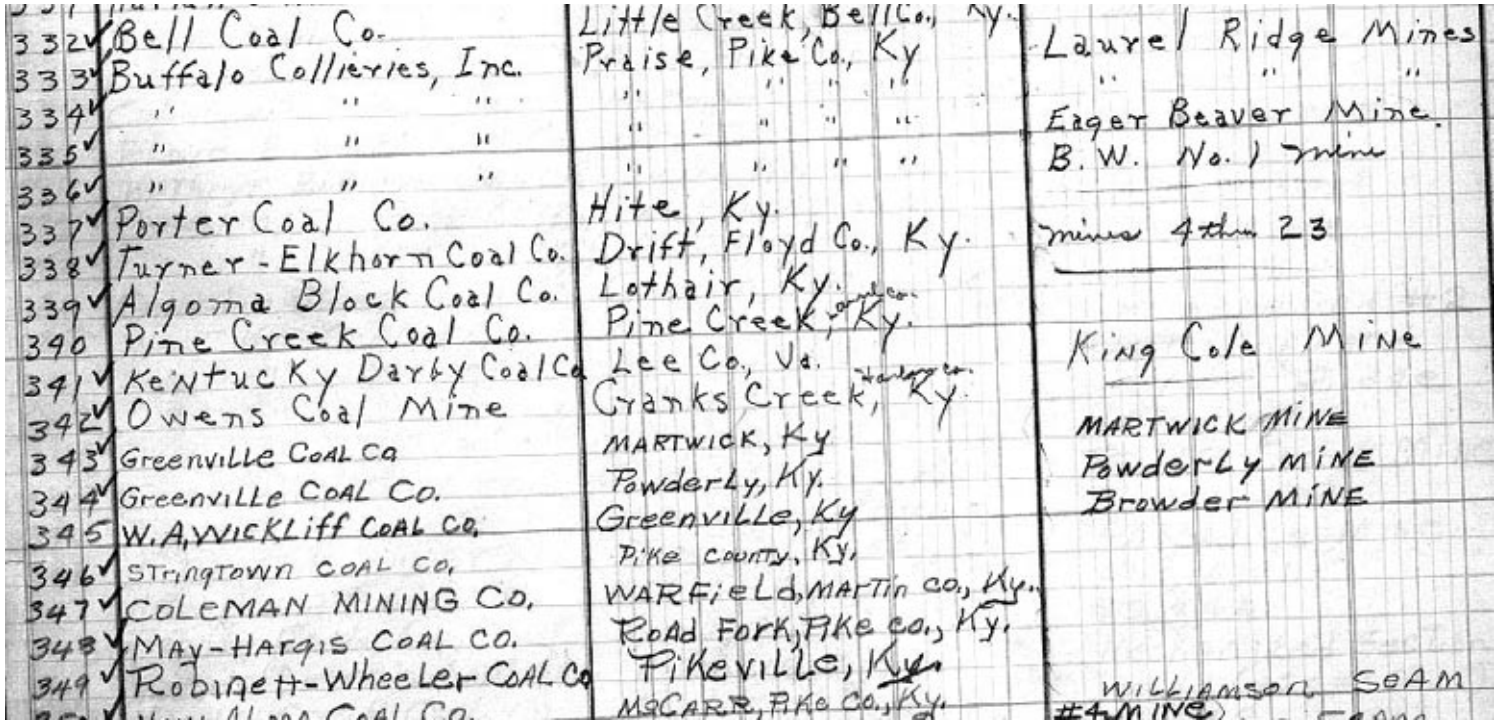
(See Column 5, Back Page, This Section)

Hundreds of “final” maps were recovered from outside sources and operations resumed. By 1951 KDMM was in a new building receiving License Maps.



The New Home of the Department of Mines and Minerals
Located at 120 Graham Avenue on the University Campus, Lexington, Kentucky

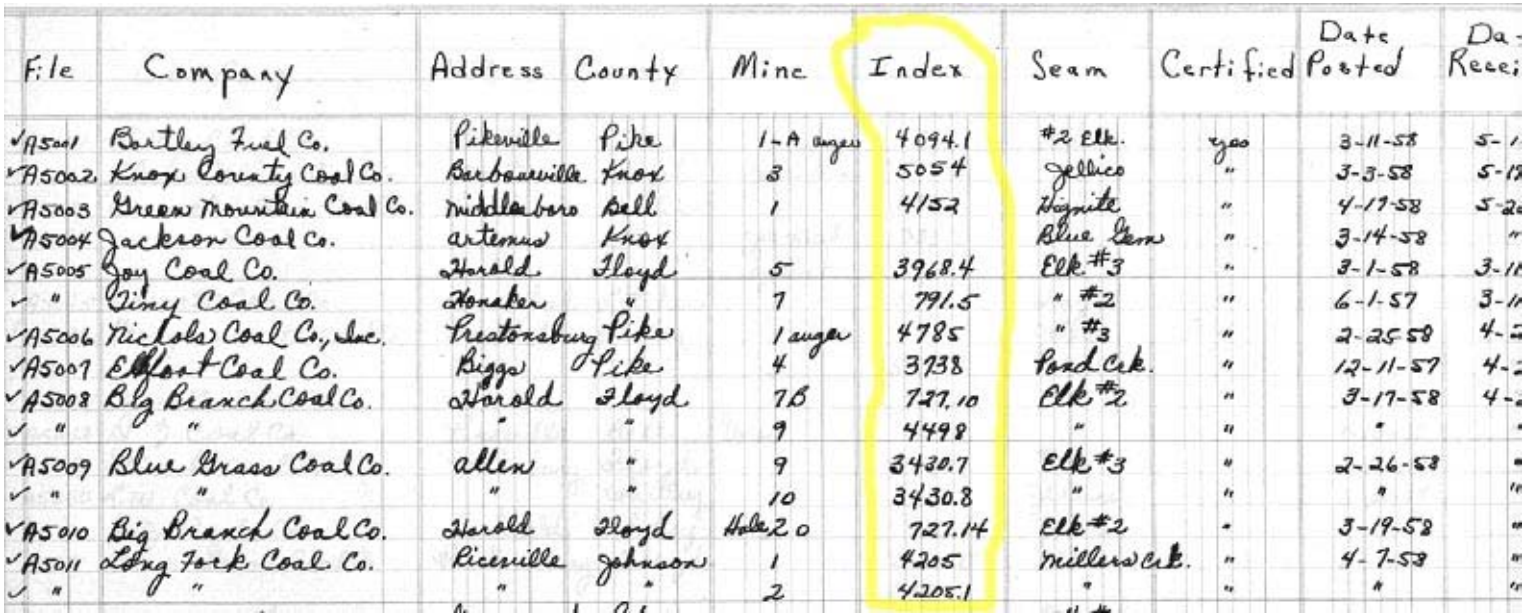
For approximately twenty years the maps were stored in clasp folders and the indexing went through four file numbering systems.



In the 1950's the current State File Number system was created.

format = 99999.999A

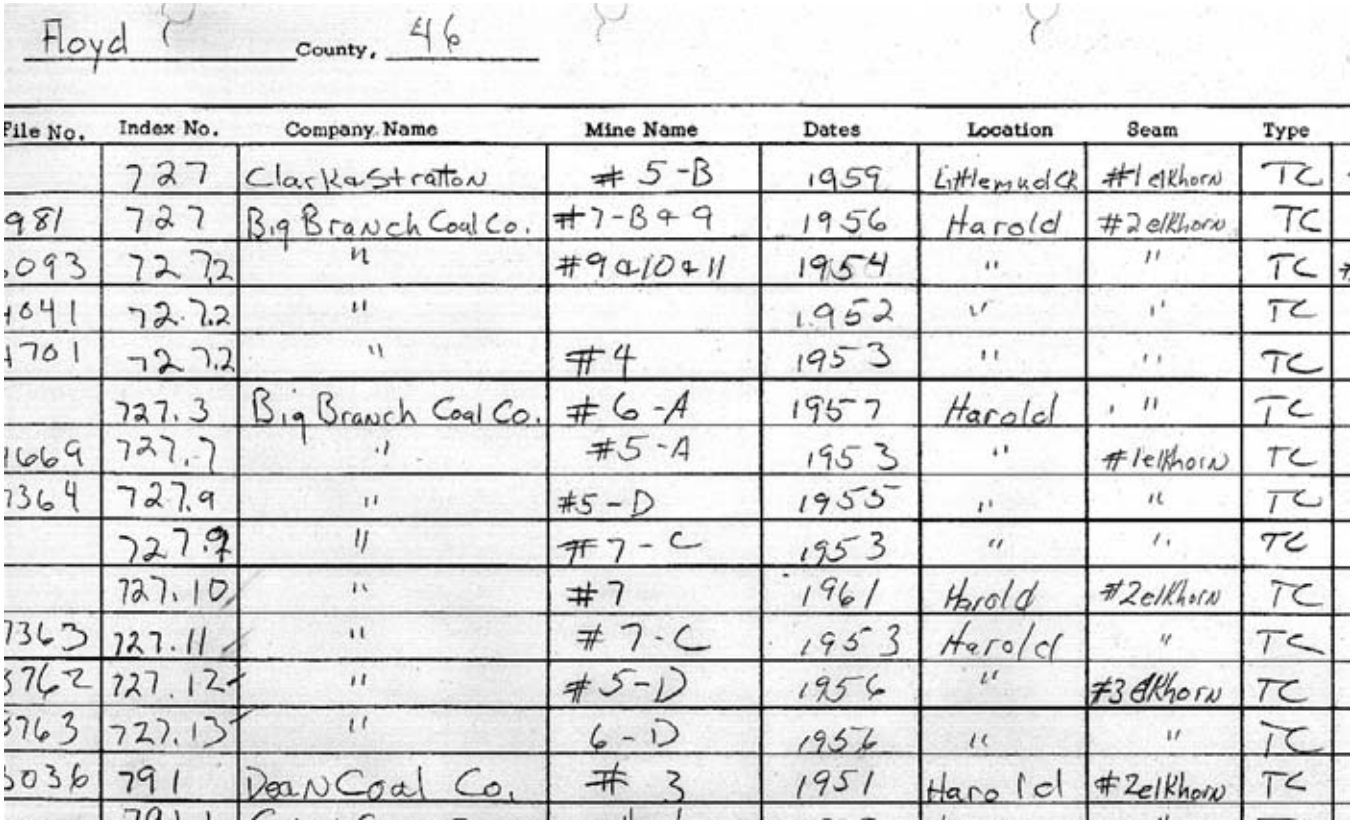
Each "mine" would retain it's number forever.



File	Company	Address	County	Mine	Index	Seam	Certified	Date Posted	Da- Rece:
✓A5001	Bartley Fuel Co.	Pikeville	Pike	1-A auger	4094.1	#2 Elk.	yes	3-11-58	5-1
✓A5002	Knox County Coal Co.	Barbourville	Knox	3	5054	gellico	"	3-3-58	5-13
✓A5003	Green Mountain Coal Co.	middlesboro	Bell	1	4152	Lignite	"	4-17-58	5-2
✓A5004	Jackson Coal Co.	artemus	Knox			Blue Gem	"	3-14-58	"
✓A5005	Joy Coal Co.	Harold	Floyd	5	3968.4	Elk #3	"	3-1-58	3-1
✓ "	Tiny Coal Co.	Honaker	"	7	791.5	" #2	"	6-1-57	3-1
✓A5006	Nichols Coal Co., Inc.	Treatonsburg	Pike	1 auger	4785	" #3	"	2-25-58	4-
✓A5007	Elkfort Coal Co.	Biggs	Pike	4	3738	Pond Crk.	"	12-11-57	4-
✓A5008	Big Branch Coal Co.	Harold	Floyd	7B	727.10	Elk #2	"	3-17-58	4-
✓ "	"	"	"	9	4498	"	"	"	"
✓A5009	Blue Grass Coal Co.	allen	"	9	3430.7	Elk #3	"	2-26-58	"
✓ "	"	"	"	10	3430.8	"	"	"	"
✓A5010	Big Branch Coal Co.	Harold	Floyd	Hole 20	727.14	Elk #2	"	3-19-58	"
✓A5011	Long Fork Coal Co.	Riceville	Johnson	1	4205	Millers Crk.	"	4-7-58	"
✓ "	"	"	"	2	4205.1	"	"	"	"

Mine maps were licensed and filed by these State File Numbers (aka Index Nos.)

In 1972 all of the files were reorganized and filed by State File Number. Each of the 100,000 maps were catalogued by hand, stamped and “re-enveloped”. This was the first comprehensive catalog by county and cross-index.



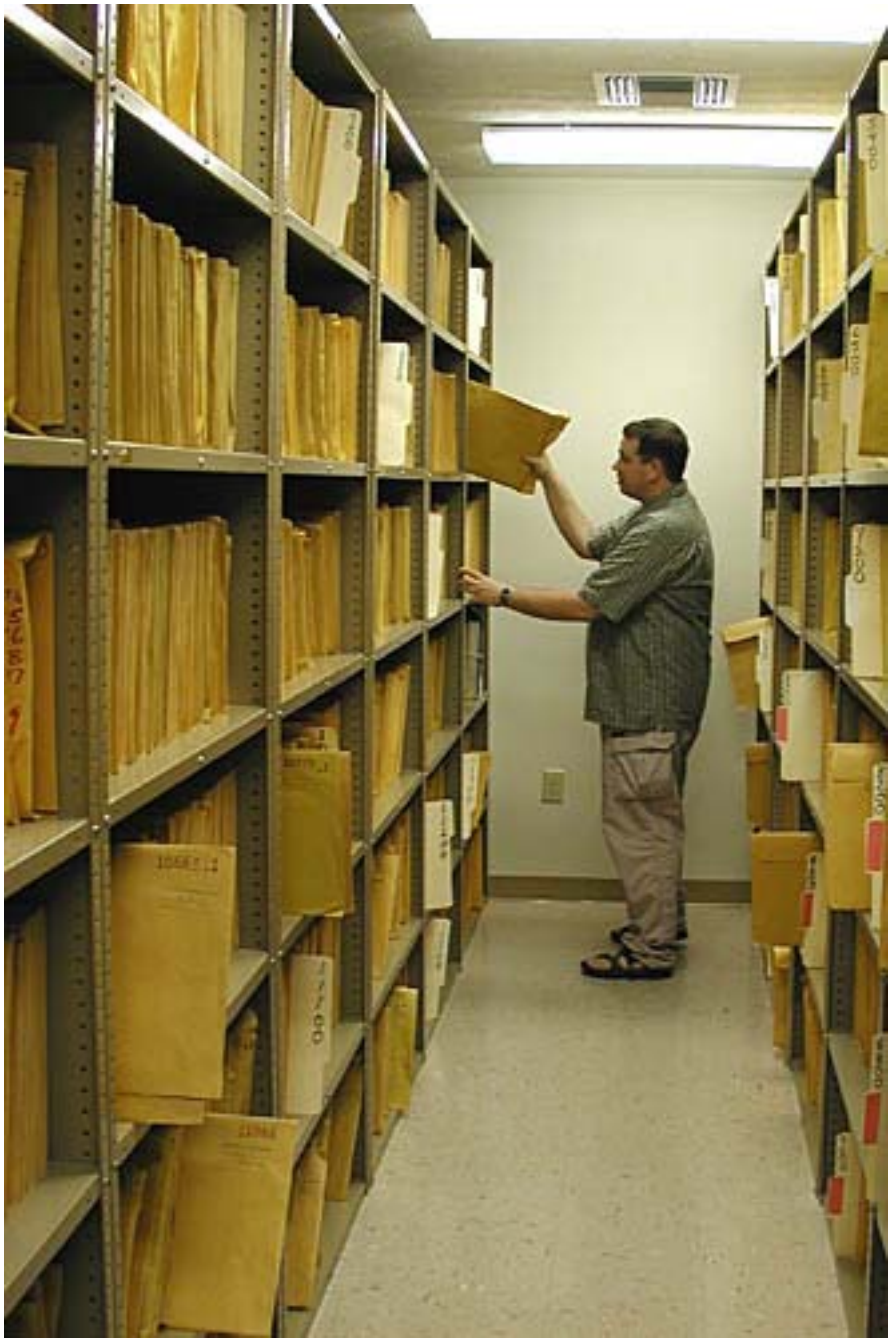
Floyd County, 46

File No.	Index No.	Company Name	Mine Name	Dates	Location	Seam	Type
	727	Clark & Stratton	# 5-B	1959	Little Mud Cr	#1 elkhorn	TC
981	727	Big Branch Coal Co.	#7-B & 9	1956	Harold	#2 elkhorn	TC
093	727.2	"	#9 & 10 & 11	1954	"	"	TC
1041	727.2	"		1952	"	"	TC
1701	727.2	"	#4	1953	"	"	TC
	727.3	Big Branch Coal Co.	# 6-A	1957	Harold	"	TC
1669	727.7	"	#5-A	1953	"	#1 elkhorn	TC
7364	727.9	"	#5-D	1955	"	"	TC
	727.9	"	#7-C	1953	"	"	TC
	727.10	"	#7	1961	Harold	#2 elkhorn	TC
7363	727.11	"	#7-C	1953	Harold	"	TC
3762	727.12	"	#5-D	1956	"	#3 elkhorn	TC
3763	727.13	"	6-D	1956	"	"	TC
5036	791	Dean Coal Co.	# 3	1951	Harold	#2 elkhorn	TC

165,000+
coal mine maps,
1948-2005
1 million sq. ft.

183,000+
Database
records from
1884-2005.

Paper maps (mostly bluelines) are stored in custom top-loading folders on metal shelves. Currently they are stored in a newly constructed fire resistant file room.



1975 Microfilming Project with USBM

- In 1975 KDMM began collaborating with USBM in an effort to microfilm the mine maps onto 35 mm film and record key data for the database. 8000+ documents were filmed over the span of the project.
- KDMM did all of the work in-house including processing and duplication.

Utilizing the Microfilm

- 35 mm microfilm blowback to hardcopy proved to be the weak link in this system over time.
- In the 1980’s early efforts in digitizing polygon outlines of the maps was undertaken in collaboration with the Kentucky Geologic Survey.

Creating the first Digital Mine Outlines

- This project with KGS in 1984 utilized positive 35 mm duplicates in glass slide mounts projected “flat field” onto a custom rear screen Calcomp digitizing board. A VAX 11/750 computer was used to process the vector data.
- The first digital “mined out area” maps for Kentucky were made in this manner.

Linking the database to the maps.

- In 1984 Vax Datatrieve software was used to index all of the mine map data. Data sheets had been prepared since 1976.
- These data were used to generate computerized mapping products and link to the microfilm and paper documents.

Microfilm Shows It’s Age

- By the late 1980’s microfilm was only used as a method to copy old maps that had to be returned to their owners. Microfilm was increasingly a one way process.
- The efforts of the mapping program concentrated on map location and data entry.

The push to locate all the mines.

- From 1988 to 1992 a project was undertaken along with the Kentucky Revenue Cabinet to locate all of the mines and manually plot them by seam at topo scale (1:24,000). This was to front-end their in-house Arc GIS project. This effort aided in refining the organization of the files and better link the maps to the Mine Map Information System (MMIS) database. The MMIS resided on the UK Center for Applied Energy Research VAX 11/780. CAER is a sponsor of the Mine Mapping Program since 1976.

Technology Catching Up

- By the mid-1990's the advent of more powerful computers and scanners allowed for pilot projects in mine map scanning. The weak link was the massive amount of storage needed, even for black/white scans.

Finally, convergence !

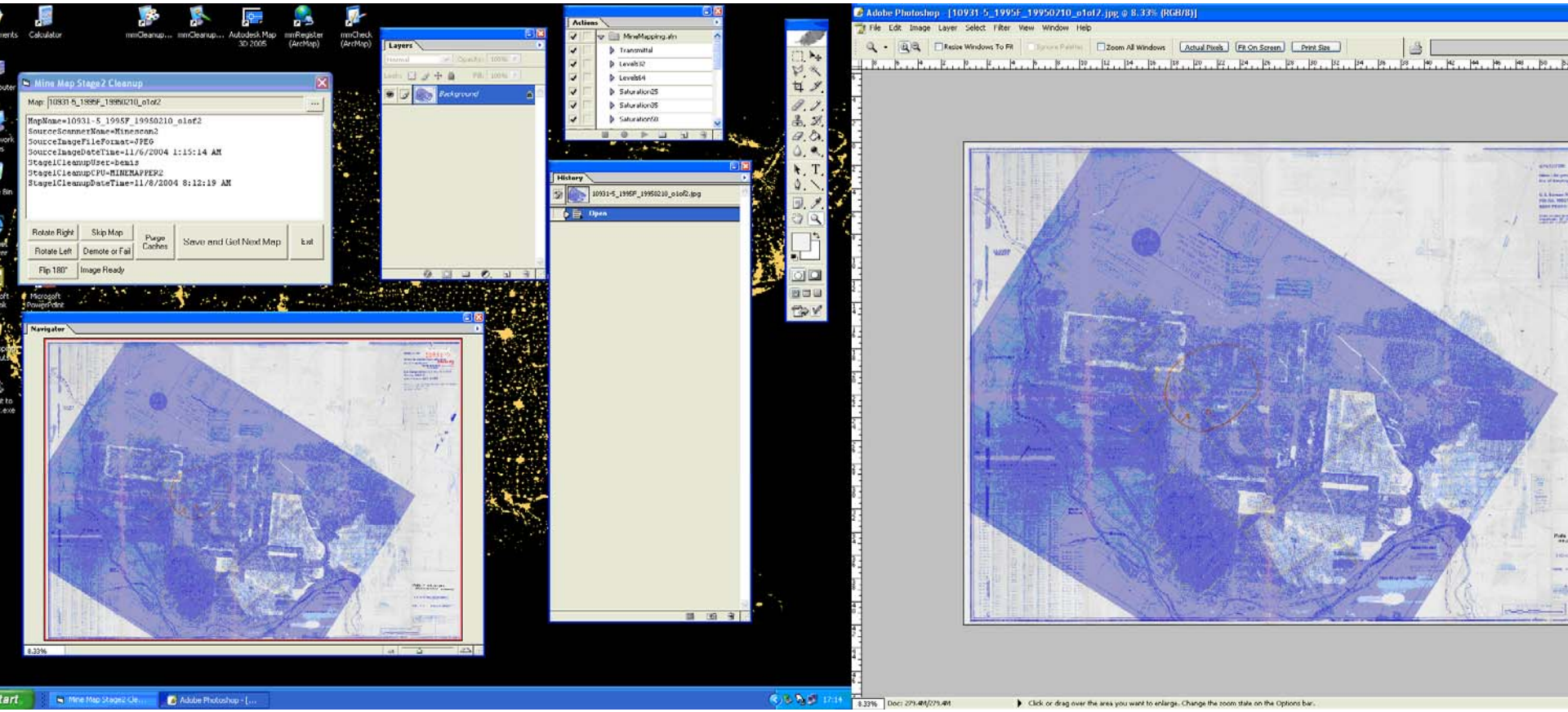
- Since 2001 the capacity of networks, storage arrays and workstations has increased enough to finally meet the archival needs of our map repository.
- Testing and process development proceeded.
- In 2004 the MSHA funded multi-agency scanning project was in full swing. The Kentucky Mine Mapping Initiative becomes a project.

Mine map preparation

Mine map error correction

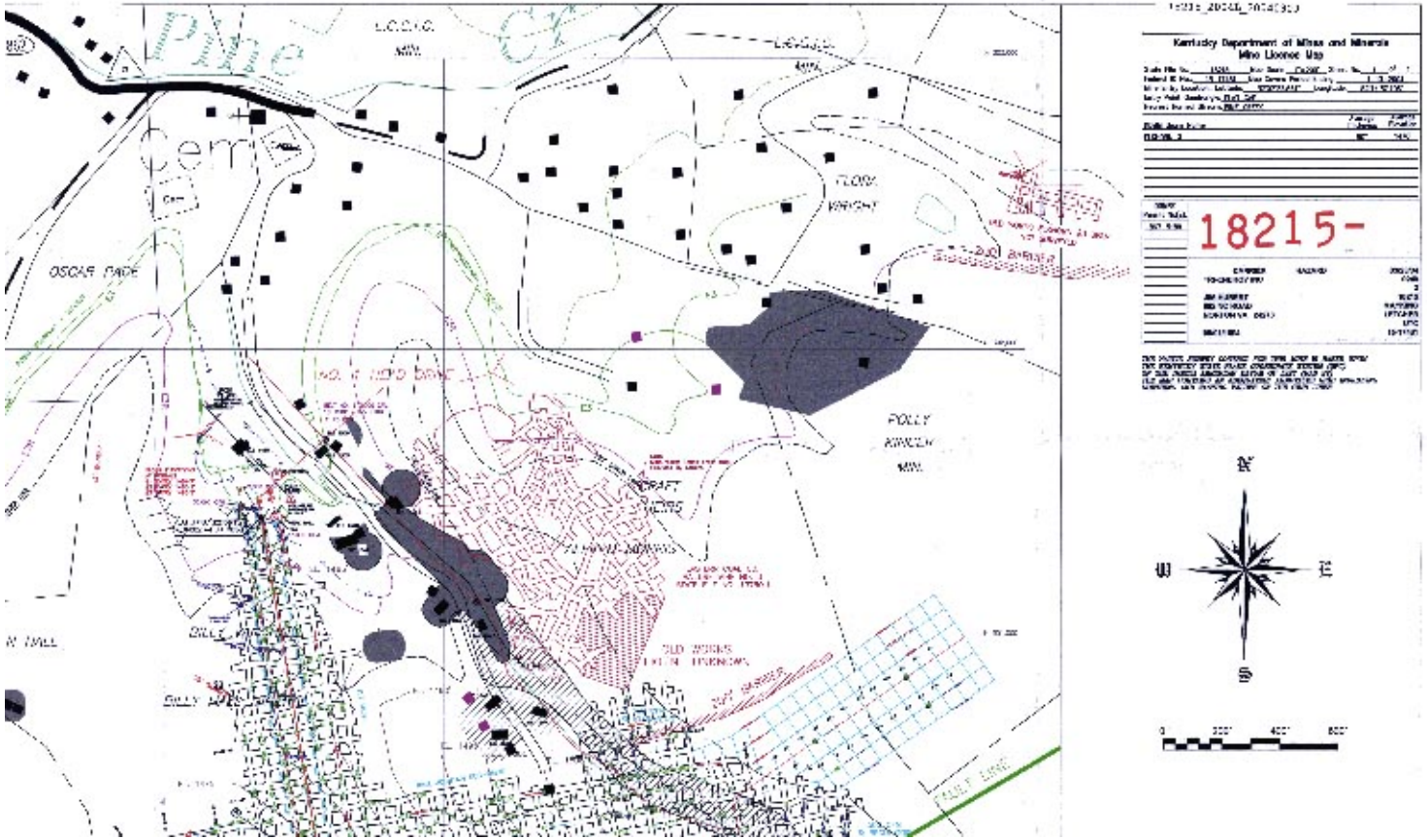
Mine map location

Clean up in Photoshop CS using automated tool set.



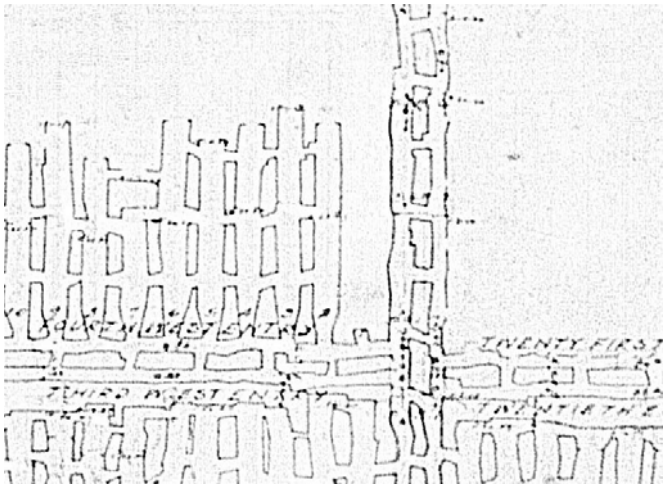
Color Archiving

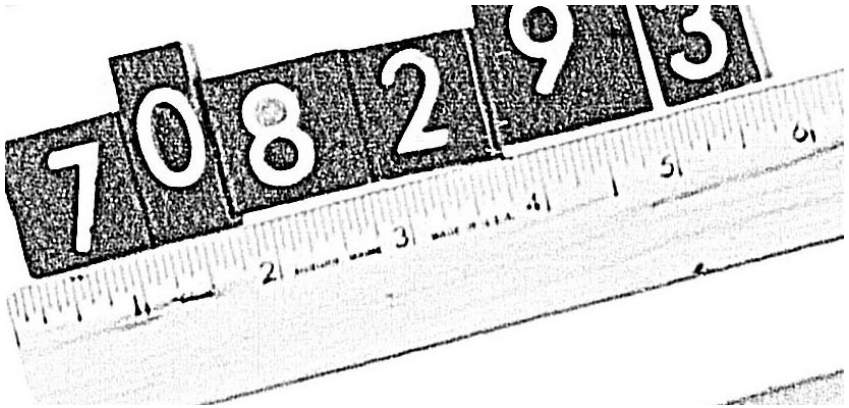
- High resolution (200/300 dpi or higher), high color (24 bit) scans are now made of mine maps on file for archiving and distribution.
- Other derivative products (color mapped indexed) are made for usage in the ARC GIS.



Salvaging the Microfilm

- Recent advances in microfilm scanners have made maps that only existed on film more accessible. Further efforts to increase the quality of these scans shall be pursued. The partial image below is 300 dpi grayscale from a Sunrise film scanner at Kentucky Department for Library and Archives.

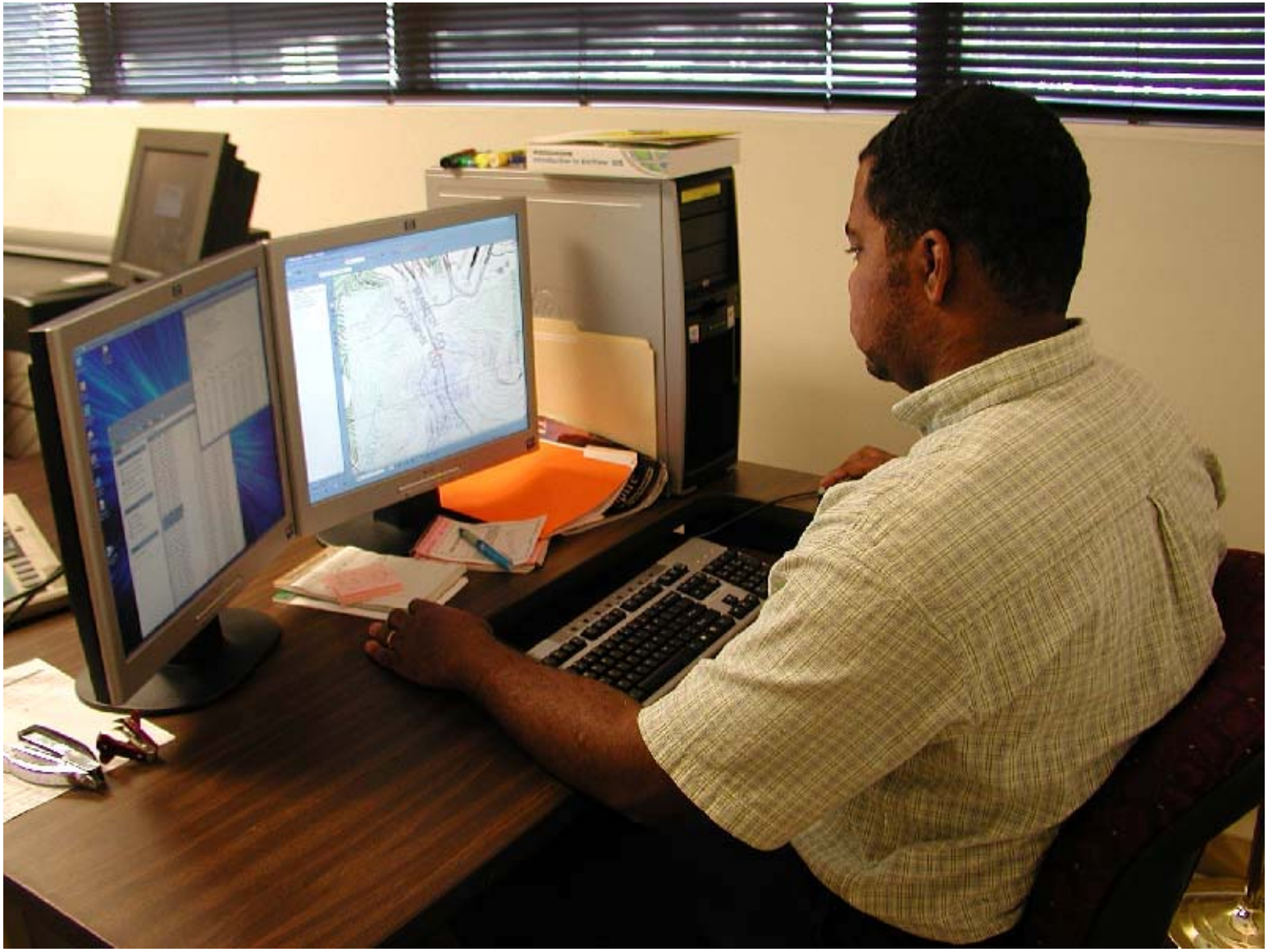




The Future

- In the near future OMSL will advance to electronic submittal of mine license maps.
- The existing hardcopy maps on file shall be retained in a stable environment after they are scanned. Maps are sometimes re-scanned when Quality Control dictates.

Final proofing for errors and quality control.

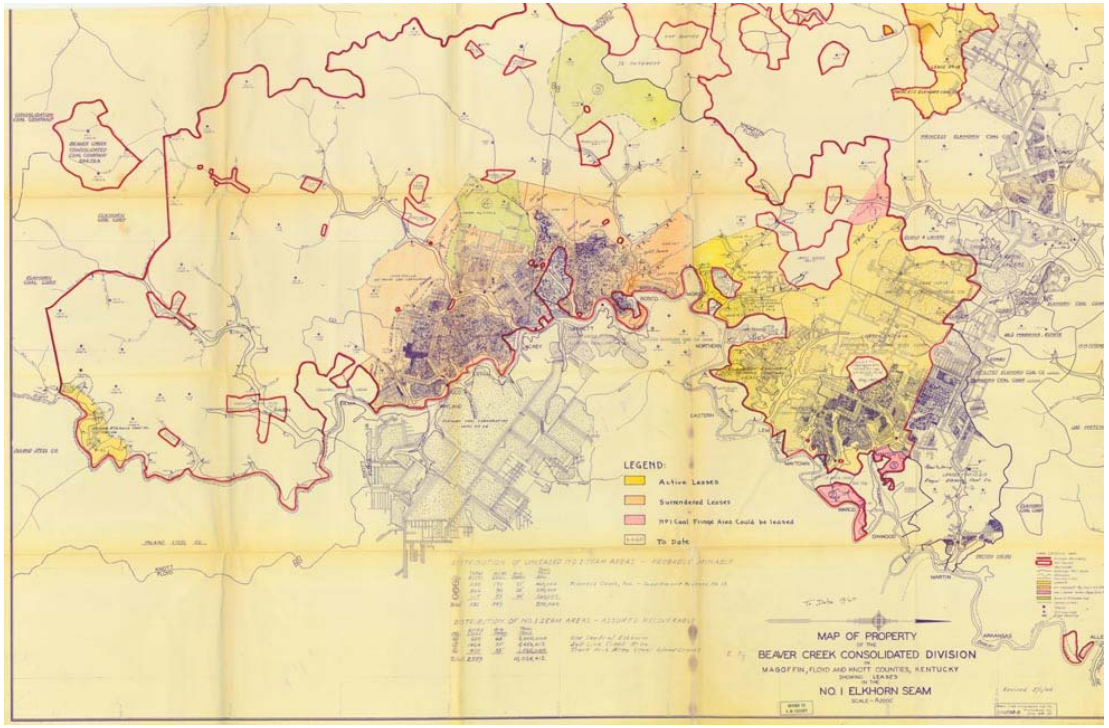


Technological Development

- The Mapping Program shall develop further techniques to digitally capture very old hardbacks, fragile maps and oversize maps using a flat field camera process. The existing Itek Planetary microfilm camera may be modified for his purpose.
- Similar work is being done by David Rumsey. See www.davidrumsey.com

Recovering the Maps lost by Fire

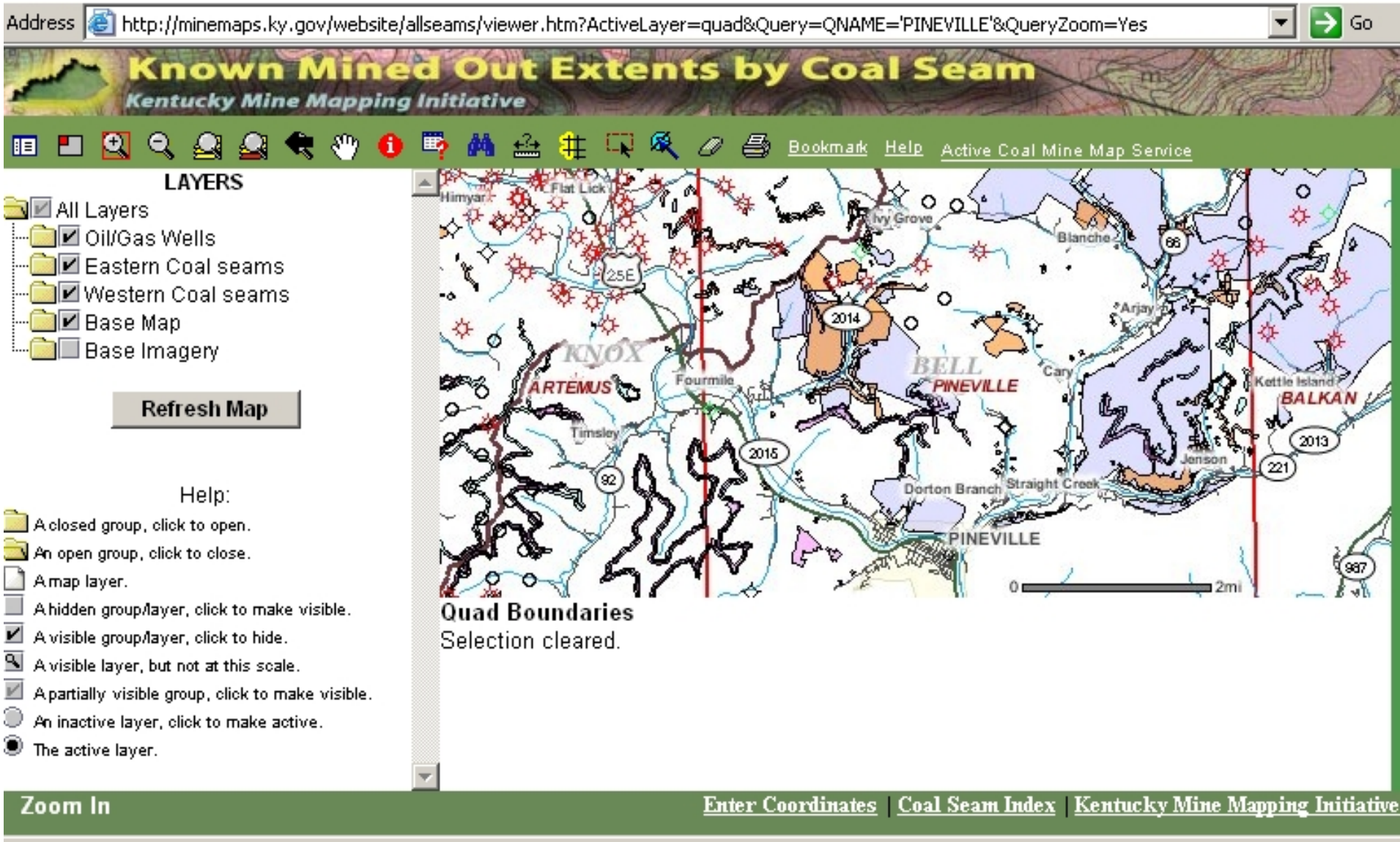
- Old mine maps in many forms are recovered from outside sources. Some are hardcopy, some originals and some are scans.



A Call for Old Maps

- When the hardware is ready any mine maps that remain missing from the collection may be copied, from outside sources, in this manner.

What is the status ?

- As of June, 2005 17,233 + “final” or “most comprehensive” maps are scanned.
- Approximately 5900 newer maps and 3186 older maps (total 9086) remain to be scanned in the coming months.
- Approximately 30,000 database records shall be created at some point to reflect all mine records since 1884.
- Incoming license maps are scanned as they arrive.

ARC IMS website of mined out areas. http://minemaps.ky.gov