

Mining and Mine Mapping in Kansas

James R. McCauley and Janice H. Sorensen Kansas has a 150 year history of underground mining for 5 different commodities: coal, lead and zinc, salt, gypsum and limestone. The earliest period of intense underground mining was in southeastern Kansas in what would become the Tri-State lead and zinc mining district which extends into southwestern Missouri and northeastern Oklahoma. A short distance to the north and a few years later in time, underground mining of coal began in the coal fields of southeastern Kansas. In later years, underground mining of salt, gypsum, and limestone followed.

Lead and Zinc Lead and zinc mining is restricted to the extreme southeast corner of Kansas. Underground mining of lead and zinc began in the 1870's and continued until 1970 when the last mine shut down. The ores were taken from Mississippian-age limestones in mines that reached depths of 480 feet. A 1983 study funded by the U. S. Bureau of Mines mapped the extent of underground lead and zinc mining in Kansas from existing maps and inventoried mine-related hazards such as open and collapsed shafts and mine cave-ins, which were numerous throughout the mined areas. A total of 589 hazardous open shafts were found, of which 541 were collapsed. In addition, 307 surface collapses were mapped. Similar concurrent studies were conducted in the adjoining states of Missouri and Oklahoma. The total mined area in Kansas is 2220 acres. In subsequent years, much reclamation and remediation has occurred in parts of the Tri-State district, but mine collapse continues to be a hazard. Contaminated water that has flooded these mines is an environmental threat to surface and groundwater supplies

Coal Eastern Kansas is located in the Western Interior Coal Basin and contains numerous coals of Pennsylvanian Age. Shallow underground mining of coal began as early as 1850 in the area near Fort Leavenworth, in northeastern Kansas. In 1874, underground mining of coal began in the more productive coal fields of southeastern Kansas. The original mines were shallow and near the outcrops of the coal beds. With time, mining followed the coal down dip to deeper levels of up to 150 feet. Underground mining of coal continued until 1960. A total of 52,500 acres overlie abandoned coal mines. Collapsing coal mines continue to be a geologic hazard, especially in the area of shallow mining, which includes part of Pittsburg, Kansas, the largest city in the region (population 19,243). Another smaller area of underground mining occurs in Osage County in east-central Kansas. Deep coal mines of 700 feet and 1000 feet once operated in the Leavenworth and Atchison areas, respectively. In addition, small, abandoned lignite mines occur in north central Kansas in the Dakota Formation of Cretaceous age. These mines are generally shallow with horizontal surface openings and are in undeveloped areas and are not considered a major geologic hazard.

Salt

Salt mining began in central Kansas in the city of Hutchinson in 1888, in what would become known as the Hutchinson Salt member of the Permian-age Wellington Formation. Salt mining is of two types, solution mining and conventional underground, room-and-pillar mining. The first mine in Hutchinson was a solution mine. In 1891 conventional mines opened in Lyons and Kanopolis in central Kansas and Kingman in south-central Kansas. Over the years, additional mines of both types operated in this same area of central and south-central Kansas and many have since been abandoned. Today, 5 solution mines and three conventional mines extract salt from beneath Kansas. Mine depths range from 650 to 1,100 feet. Solution mines have collapsed in Hutchinson on mine owned property. A salt mine near Kanopolis was the site of a shaft collapse in 1972. A mine collapse in 2000 on the edge of Kanopolis occurred beneath a waste pile at a brick plant. The compressed air in the mine caused an ensuing "eruption" of broken brick into the air causing extensive property damage but miraculously, no serious injuries.

Gypsum

Gypsum mining in Kansas began in the 1880's near Medicine Lodge in south-central Kansas. The gypsum bed mined is the Medicine Lodge Member of the Blaine Formation and occurs in Permian-age red beds. Mining later moved northwest of Medicine Lodge to an area near the small town of Sun City where it continues today. Gypsum is mined at this site by both open pit and underground methods. The underground mines are generally shallow, less than 150 feet and underlie undeveloped land. Gypsum mining began at a later date in northeast Kansas, north of the town of Blue Rapids. The gypsum mined is in the Easley Creek Shale, also Permian in age but older than the gypsum mined at Sun City. This mine is generally less than 200 feet deep and also underlies an **undeveloped area**.

Limestone Mines

Outside of one small abandoned limestone mine in Mississippian-age rocks of extreme southeastern Kansas, limestone mining is restricted to Pennsylvanian-age limestones in the northeastern part of the state. The Kansas City metropolitan area is home to a number of limestone mines in two separate geologic units, the Argentine Member of the Wyandotte Limestone and the older Bethany Falls Member of the Swope Limestone. A number of limestone mines have been converted to usable underground space with multiple uses, including cold and cool storage, manufacturing, warehousing, offices, document and record storage, and even a college library. Kansas City leads the nation in the amount of usable underground space, totaling several square miles. These **mines are** located on both sides of the Missouri-Kansas state line. All these mines are accessible from the surface by roads or ramps and even railroads in some instances. Depths are generally less than 200 feet. In Kansas, some abandoned mines have collapsed causing property damage, especially

in Kansas City, Kansas. Additional limestone mines are found in Leavenworth and the Atchison area north of Kansas City in younger Pennsylvanian limestones. These mines are also generally less than 200 feet deep at the most and some have collapsed in and close to the two cities.

There is no central collection of mine maps for older abandoned coal mines. Maps of lead and zinc mines and other records are in a collection in the library of Missouri Southern State University in Joplin, Missouri, however this is not a complete collection of mine maps. Maps of other small abandoned mines may not exist.

The State Geologist of Kansas, mandated by state statute (K.S.A. 49-201), holds the responsibility for collecting and archiving maps of active underground mines in the State of Kansas. This responsibility was transferred to the State Geologist in July 2000 from the Secretary of Human Resources. All maps collected prior to 2000 were transferred to the KGS. These include active and inactive mines. The older maps date from the late 1960's. There are 150 to 175 maps for limestone, gypsum, or salt mines in the state. The maps are in paper format with the exception of 2 that are on mylar. The maps vary in size. The smallest maps are approximately 11" x 17". Larger oversized sheets measure approximately 36" x 46". None of the maps have been digitized.

Nine companies currently operate limestone, gypsum or salt underground mines in Kansas. Mine owners are notified each year that a current map is to be on file at the Kansas Geological Survey by July 10. When maps are received they are dated, inventoried, and filed under company name and housed in the KGS library and archives unit. Maps are available at the KGS for prompt and easy access. If needed, paper copies can be reproduced.