

**KANSAS GEOLOGICAL SURVEY
OPEN-FILE REPORT 2002-63**

THE MINERAL INDUSTRY OF KANSAS IN 2001

by

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The Mineral Industry of Kansas: 2001

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Labor Statistics

According to the Labor Market Information Services of the Kansas Department of Human Resources, an average of nearly 6,900 persons were employed in all aspects of mining during the twelve months. The majority were employed in the oil and gas extraction segment of mining with the remainder in coal and nonmetallic, nonfuel, mining operations. The nonfuel, industrial mineral operations averaged 1,300 persons with an average annual salary of \$39,740. These figures are derived from the NAICS or North American Industrial Classification System which Kansas intends to use in future years.

Mergers/Acquisitions

Mergers and acquisitions to create more efficient operations continued to occur. The quarries of long-time aggregate producer, Walker Stone Company, were acquired by Martin Marietta Corporation. Walker Stone had quarries in Geary, Dickinson, Butler, and Greenwood counties. Brick producer Cloud Ceramics (Cloud County) acquired the operations of Kansas Brick and Tile (Barton County).

Events

The most significant event during the year were the gas explosions that occurred at Hutchinson, Kansas (Barton County) on January 16-17. Two people were killed, and businesses were damaged or destroyed. A summary of the situation written by Lynn Watney is given in the last section of this report.

Industry Issues and Legislation

The aggregate industry successfully fought the intrusion of county/city government into the private sector. In the eastern part of the state, four counties have their own rock crushing facilities while in the western portion, city/county ownership of sand and gravel and asphalt facilities posed further threats. The situation could have expanded in Kansas (as well as other states) and have a profound effect on the state's aggregate industry. The actions were opposed by the Kansas Aggregate Producers Association-Kansas Ready Mix Concrete Association (KAPA-KRMCA). The group sponsored legislation that was passed by the legislature that bans the sale of paving materials by county operations to the public.

The issue of counties being able to impose severance taxes on mineral producers has apparently ended. House Bill 2584, passed in 1998, prohibits counties from imposing severance taxes on mineral extraction. However, Dickinson County had maintained early in the year 2000 that they would continue to pursue the severance tax on the grounds that the action by the legislature is *ex post facto*. However, threats of a lengthy court battle have probably settled the issue and no further action occurred during 2001.

In 1999, a ten-year Comprehensive Transportation Program (CTP) was approved for Kansas. By early 2000, it became apparent that state revenues were declining and program cuts were likely. Governor Graves recommended cuts to the CTP of \$27 million for FY 2000 and \$40 million for FY 2001. The total for the two years, \$67 million, was nearly as much as the \$72 million that was to be raised by the new fuel tax passed to raise revenue for the CTP. For FY 2002, state revenues continued to decline and the CTP took another cut of \$90 million. The Kansas Department of Transportation (KDOT) has said they believe the cuts will not have too great an impact on the program, although the programs plans may require an infusion of money in the form of another fuel tax increase.

Government Programs and Publications

The multiyear state-mapping program at the Survey continued. Geologic maps were issued for Comanche (M-94), Shawnee (M-95), and Anderson (M-100) counties. A geologic map (M-99) was also issued for the Tallgrass Prairie National Preserve. Map preparations and field mapping are ongoing for Kearney, Hamilton, Bourbon, Neosho, Cherokee, Ford, Republic, Douglas, Hodgeman, Gray, Barber, Crawford, Washington, Marshall, Osborne, Clark, and Sedgwick counties. Digital updates are underway for Wabaunsee, and Pottawatomie counties, and essentially complete for Chase, and Osage counties.

A total of more than 70 open file reports (OFR) were filed with the library of the Kansas Geological Survey. These reports cover a variety of project results, primarily by Survey staff. Many of the year's reports involve geologic maps. Included are OFR 2001-12 that contains field geology maps for additional portions of Crawford County, 2001-15 containing preliminary geology field maps for portions of Hodgeman County, 2001-24 through 2001-31 that are geologic maps of the Cottonwood Falls, Homestead, Matfield Green, Gladstone, Staffordville, Thrall NW, Hymer, and Elmdale quadrangles in Chase County, 2001-53 and 54 that are geologic maps of the Osage City and Osage City SE, respectively, in Osage County, and 2001-64, preliminary geologic maps of Pottawatomie County.

Among other open-file reports of interest are OFR 2001-21 that is a stratigraphic bibliography through the year 2000, arranged by geologic period, OFR 2001-37, a "Summary of STATEMAP geologic mapping program in the United States and the National Cooperative Geologic Mapping Program in 2001", and OFR 2001-74, "Case history of the collapse, eruption, and emergency backfilling and grouting of the abandoned Crystal Salt Mine shaft, Ellsworth County, Kansas". The latter refers to the January 2000 event mentioned in last year's chapter. All publications, maps and open file reports are available through the Sales and Publications office of the Kansas Geological Survey.

Summary of Production and Value by Commodity

Table 1, provided by the U.S. Geological Survey, lists the production and value for the three year (1999-2001) period in Kansas. It should be noted that the 2001 figures are

preliminary and subject to revision. In general, there has been a decline in construction related commodities reflecting the nature of the economy of Kansas. The decline in value was offset by the increased production and value for helium.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN KANSAS 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1999		2000		2001 p/		
	Quantity	Value	Quantity	Value	Quantity	Value	
Cement, portland	1,970	149,000 e/	1,980	155,000 e/	1,840 e/	144,000 e/	
Clays, common	592	2,770	594	3,970	594	3,970	
Gemstones	NA	21	NA	12	NA	3	
Helium:							
Crude	million cubic meters	W	W	W	W	45	48,700
Grade-A	do.	61	121,000	77	153,000	85	169,000
Salt		2,780	115,000	2,770	114,000	3,120	121,000
Sand and gravel, construction		10,800	31,300	10,000	28,200	10,200	29,100
Stone:							
Crushed		23,700	116,000	23,300	113,000	21,400	107,000
Dimension	metric tons	16,100	1,640	14,100	1,890	14,000	1,800
Combined values of cement (masonry), clays (fuller's earth), gypsum (crude), helium (crude), pumice and pumicite, sand and gravel (industrial)							
Total		XX	63,700	XX	59,800	XX	15,900
		XX	601,000	XX	629,000	XX	640,000

e/ Estimated. p/ Preliminary. NA Not available. XX Not applicable.

1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

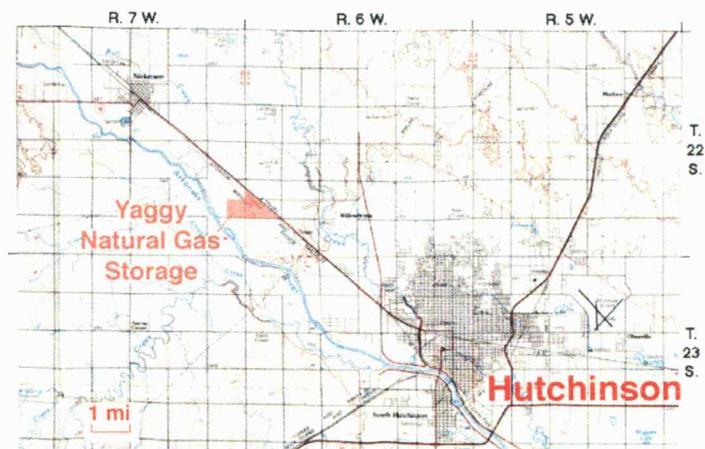
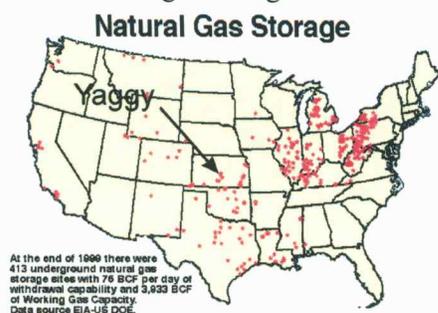
2/ Data are rounded to no more than three significant digits; may not add to totals shown.

[Unpublished U.S. Geological Survey (USGS) data, subject to change; official USGS preliminary 2001 data will be published in the USGS Mineral Industry Surveys, Kansas 2001 Annual Estimate.]

Gas Leak at Hutchinson

On January 17 and 18, 2001 a series of natural gas explosions and geysers occurred at widely spaced locations within the City of Hutchinson. The outgassing in the city began three days after a major gas leak in a natural gas storage well, S-1, at the Yaggy Gas Storage Facility (Figure 1) located 7 miles northwest of Hutchinson. Two people were killed, several buildings destroyed, dozens of businesses and several hundred households were evacuated. A total of 54 vent and observation wells were drilled over several months subsequent to the gas leak and delineated linear and elongated gas accumulations, in part, corresponding closely with the crest of a small anticline.

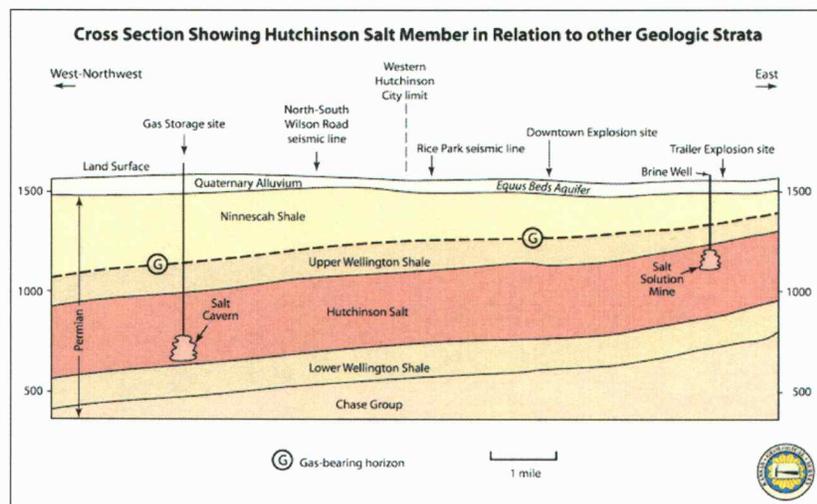
Figure 1. Location map of Yaggy Gas Storage facility and Hutchinson, Kansas and national gas storage fields



Gas has been stored in a shallow (600 ft deep), thin-bedded (350 ft.) salt (halite) unit called the Hutchinson Salt Member of the Lower Permian Wellington Formation (Watney et al., 1988). Wells in Yaggy were drilled to depths of about 900 feet, into the lower parts of the Hutchinson Salt Member. The wells were cased with steel pipe into the salt. The top of each jug starts about 200 feet below the top of the salt layer to ensure an adequate cap that will not fracture or leak. The Yaggy Gas Storage Facility is composed of 16 pods containing 98 storage caverns in the Hutchinson Salt Member. Caverns are formed by drilling into the salt, pumping down fresh water and dissolving out the caverns by removing brine.

The salt bed dips westward at 20 ft/mi through the storage facility from a subcrop of the salt located approximately 25 mi east of the storage facility. Overlying the salt caverns is “overburden” strata consisting of 450 ft of Permian gypsiferous shales and thin (cm) beds of gypsum, anhydrite, and dolomite. The Equus Beds freshwater aquifer overlies the Permian strata (Figure 2). The Permian section is divided into an interval consisting of primarily gray shale of the Upper Wellington Shale immediately overlying the salt succeeded by the reddish and more silty Ninescah Shale. A unit designated the three-finger dolomite is developed in the upper portion of the Upper Wellington Shale. Gas appears to have been transmitted laterally along this dolomite beyond the storage field.

Figure 2. Cross-section showing Hutchinson Salt Member in relation to other geologic strata with gas-bearing interval shown.



The storage facility during operation holds 3.5 billion cubic feet (Bcf) of gas at pressures of about 600 pounds per square inch (psi). The storage field is one of 30 “hubs” in the national gas distribution system (Figure 1) and is a rapid response supplier. It is a key element in the gas supply in central Kansas. Beyond the events at Hutchinson, this incident is relevant to siting and operating new shallow underground gas storage facilities

that will be inevitably be located near urban areas as domestic use of relatively clean gas increases.