KANSAS GEOLOGICAL SURVEY
OPEN-FILE REPORT 44-1

DEVELOPMENT OF KANSAS MINERAL RESOURCES, 1944

By

John C. Frye

Disclaimer

The Kansas Geological Survey does not guarantee this document to be free from errors or inaccuracies and disclaims any responsibility or liability for interpretations based on data used in the production of this document or decisions based thereon. This report is intended to make results of research available at the earliest possible date, but is not intended to constitute final or formal publications.

Kansas Geological Survey
1930 Constant Avenue
University of Kansas
Lawrence, KS 66047-3726

Dean's Conference
April 11, 1944

Please make a copy for Dean Lawson first thing from morning

KGS OF 44-1

DEVELOPMENT OF KANSAS MINERAL RESOURCES

I have been asked to discuss the probable future development of Kansas mineral resources, but before I attempt to summarize the pertinent data I want to point out that for many years Kansas mineral production has been of significant importance and that during the last decade this state has ranked among the top ten states of the nation in dollar value of mineral output. We have outproduced our neighbor states to the west, north, and east, and a large variety of mineral resources, some of which are still virtually untouched, are widely distributed throughout the state. It must be remembered, however, that any appraisal of probable post-war developments of the mineral industries in this or any state is subject to the uncertainties of the economic conditions that will prevail in the nation and throughout the world. Facts known about the diversity, kind, and reserves of Kansas underground resources seem to point toward a prosperous future for the mineral industries in Kansas.

Water.—Underground water, even though it does not appear in the statistical summaries, is probably the most vital mineral resource of Kansas. Water pumped from wells is used daily by a large percentage of Kansans, for domestic purposes by both rural and city residents and for industrial and agricultural purposes. Many industries are becoming more reliant upon well-water supplies, and irrigation by well water is continuing to expand in southwestern Kansas even during the war period. The utilization of well water in some areas allows industry to be more independent of the variabilities of stream flow; the expanding utilization of well water for irrigation purposes is gradually changing agricultural practices of certain areas in southwestern Kansas. Underground-water reserves are large, but they are not inexhaustible as some people apparently believe. Detailed studies of the quantity and quality of underground water available in various parts of the state are being made by the State and Federal Geological

420
200
80,000
3
240,000 sq mi

.00057
5280) 3.000000
2 6400
36000
31680

.057%

3) 5.280 = .0176 = .43

.00057
80000.
45.60000 cu. miles

.00057
80,000.
45.60000

42 cubic miles = 1 1/2 / 4 [illegible]

Surveys working in cooperation with the State Board of Agriculture and the State Board of Health. Certain industrial and irrigation areas in the state have already passed the point of maximum safe development, whereas many other areas are capable of supplying much larger quantities of water than are now being pumped.

Mineral fuels.--The mineral fuels -- oil, gas, and coal -- represent the largest cash products from below the soil of Kansas. In 1943, we reached an all-time high in the production of petroleum when more than 105,000,000 barrels were brought to the surface. This production placed Kansas as number five among the oil-producing states of the nation. It is interesting to note that according to the 1943 production figures published in the Oil and Gas Journal only two countries other than the United States, the U. S. S. R. and Venezuela, produced more oil during the year than did the State of Kansas. In spite of the many pessimistic comments that have been made in the press in recent months concerning the dwindling reserves of crude oil in the United States, it is certain that Kansas will continue to produce significant quantities of oil for many years. Oil, unlike other mineral resources such as coal and limestone, cannot be counted as a reserve until it is brought into production. It is quite probable that significant new pools will be discovered in parts of the state now inadequately tested, particularly the Dodge City basin and the Jewelsburg basin. It is certain, however, that new pools will be increasingly difficult to find, and this means that more intensive geologic studies must be made to locate new oil. The Survey's contribution to this work consists of Regional studies of subsurface stratigraphy and the maintenance of well-log and well-cuttings libraries. ~~are the Geological Survey's contribution to this work.~~

Another important aspect of the future oil production of the state is the probable fate of the old and abandoned fields, particularly in eastern Kansas. As it becomes more difficult to discover new reserves of flush oil, it is

reasonable to expect an increase in price, and as this happens secondary recovery operations of various types will probably become more widespread. This will allow us to count as reserves some oil that in the past has not been considered commercially recoverable.

The Hugoton gas field, one of the world's greatest reserves of easily obtainable cheap fuel, lies under the High Plains of southwestern Kansas and our neighbor states to the south. In addition to the Hugoton area, Kansas possesses many other important gas fields. The maximum annual production was attained in 1943, when 122 billion cubic feet of natural gas were produced in the state. Our reserves, particularly in the Hugoton area, are very large and we are not yet producing at our maximum capacity. Our reserves of good quality natural gas usable both as a fuel and as a raw material represent one of our most valuable assets and one that could be used as a basis for great industrial expansion.

Important supplementary products of natural gas are helium, natural gasoline, and carbon black. Helium is now being extracted from natural gas in the Otis and Cunningham pools and a plant not now in operation is located at Dexter. Natural gasoline is extracted at a number of points along the major pipe lines, and carbon black is being produced at two plants in Grant County.

Coal has been mined in Kansas for many years. Although our rank as a coal-mining state is well below our rank among the oil states, we have appreciable mining operations in several areas. The last year for which figures are available is 1942; in that year 4,209,000 tons of coal were mined. Although coal mining in Kansas has increased during the war period, the annual production is below the State's maximum output of more than 7½ million tons in 1918. Kansas coal reserves are adequate to maintain the present output for many years, but because our reserve of thick and easily mined coal is not as large

as that of several other states, a great increase of coal mining in Kansas is not likely. The minor coal beds of the state are now being inventoried in detail by the Survey and may be more generally used in the future.

Ceramic materials.--The production of ceramic raw materials may be the most rapidly expanding of the Kansas mineral industries during the post-war period. Clay of several grades has been located and tested by the Geological Survey, and large reserves are known to occur in the Dakota formation in Kansas. The quality of our clays will allow the development of light face brick, refractory, pottery, and artware industries. These large reserves of high-grade clay in the proximity of an abundant and cheap gas supply give Kansas an advantage in the manufacture of many ceramic wares. A process for the extraction of alumina from Kansas clay has been developed in the Survey laboratories, and although the probability ~~possibility~~ of such a development on a commercial basis is more remote it nevertheless should be considered as one of the possibilities in the future.

Structural tile and brick have been made for many years from Kansas shale and clay. The reserves of raw material for these products are enormous and although this production is now curtailed due to the war, it will undoubtedly return to its former level of production and show some expansion after the close of the war.

The manufacture of cement can properly be classed as a ceramic industry. Portland cement is made from limestone and shale and is produced at six plants in Kansas. We have large reserves of these raw materials and if markets exist the cement industry of the State will probably expand.

Metals.--Metal mining in Kansas is restricted to the southeastern corner of the state, that is the part of Kansas included in the district generally referred to as the Tri-State mining district. Zinc and lead are the two metals produced. The probable future of the Tri-State zinc and lead district is difficult to foresee, particularly since the mining of zinc, a critical metal, has

been greatly stimulated by the war effort. In some cases the grade of ore now being mined may be too lean to warrant operations on a peace-time basis. Exploration for new ore bodies is being carried on, and important new discoveries may change the future outlook for the area. An impartial view of zinc and lead mining in Kansas leads one to believe it possible that we may have to face some reduction in mining activities after the close of the war.

Miscellaneous mineral resources.--Kansas produces a wide variety of miscellaneous nonmetallic and nonfuel mineral products. Gypsum of good quality is being mined in Barber and Marshall counties and extensive minable reserves of gypsum occur in Dickinson County. Salt is produced from brine wells and is mined extensively in Ellsworth, Reno, and Rice counties. The reserves in Kansas of good quality salt suitable for table salt and for use in food processing and chemical industries are enormous, and our production will be governed by the available market. During the present century, Kansas has been the leading producer of volcanic ash, and although the minable deposits are widely scattered our reserves are relatively large. Ash is used as an abrasive, a ceramic glaze, in hydraulic cement, and as a filtering material. Several commercial pits are now being operated in Meade County and elsewhere in the western half of the state. The Kansas reserves of building and road materials are sufficient to supply any possible increase in production. Building stone and crushed rock have been quarried and prepared at many localities in eastern and north-central Kansas, and sand and gravel are produced on at least a small scale in nearly every county of the state. Asphalt rock has been mined and processed in east-central Kansas.

Several other mineral products worthy of mention are pyrite, recovered as a by-product of coal washing in Crawford County; rock wool, produced at three plants in southeastern Kansas, both from natural wool rock and from a blend of

rock materials; Carlile shale for use as drilling mud; and caliche for road topping.

Other mineral resources which have commercial possibilities but have not as yet been developed have been discovered or investigated by the Geological Survey. These include bentonite, chalk, diatomaceous marl, and magnesium brines. Bentonite is used as a drilling mud and as a filtering material. Preliminary tests of Kansas bentonite show only fair drilling mud characteristics, but have demonstrated its usefulness as a filtering material and as a bond in molding sand. The Kansas reserves of chalk in the Niobrara formation are enormous. Kansas chalk could be utilized in whiting, in the chemical industries, and as agricultural and feed lime. Diatomaceous marl, which may prove to be useful as a filler, abrasive, filtering material, and in certain kinds of cement, has been found to occur in Wallace County. A detailed study of the oil-field brines of Kansas has revealed that the water produced with the oil in several fields contains sufficient quantities of magnesium to make possible the commercial recovery of magnesium hydroxide.

Conclusion.---Kansas possesses a large and diversified reserve of mineral resources. In many cases these resources are only partly developed, and although the future may bring a reduced output of some items it will probably see a compensating expansion of other.

By John C. Frye,

April 11-1944.