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# *Helium in southern Black Mesa Basin*

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*This is one of many related papers that were included in the 1958 NMGS Fall Field Conference Guidebook.*

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The Black Mesa basin has many possibilities for commercial oil and gas production. More detailed surface and subsurface studies are expected to outline local areas that will prove commercially productive.

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Data were freely used from the references cited; however, inasmuch as the writers exercised their own judgment and interpretation in controversial cases, they accept full responsibility for the final form of the material.

## REFERENCES

Allen, John Eliot and Balk, Robert (1954), Mineral Resources of Fort Defiance and Tohatchi Quadrangles, Arizona and New Mexico. New Mex. Inst. of Mining and Tech. Bull. 36.

Baker, A. A., Dane, C. H., and Reeside, J. B. Jr., 1947, Revised correlation of Jurassic formations of parts of Utah, Arizona, New Mexico, and Colorado: Am. Assoc. Petroleum Geol. Bull. v. 31, No. 9, pp. 1664-68.

Bradish, B. B., 1952, Geology of the Monument upwarp: Geol. Symposium of the Four Corners Region, pp. 47-59.

Brown, Silas C., 1956, Petroleum and natural gas potentialities of the Navajo-Hopi Reservation — Arizona and Utah: Univ. of Arizona Press, Mineral Resources v. 1, pp. 64-72.

Cooper, Jack C., 1955, Cambrian, Devonian and Mississippian rocks of the Four Corners area: Four Corners Geol. Soc. Guidebook, pp. 59-65.

Gregory, H. E., 1917, Geology of the Navajo Country: U. S. Geological Survey Prof. Paper 93.

....., 1950, Geology and geography of the Zion Park region, Utah and Arizona: U. S. Geol. Survey Prof. Paper 220.

Halpenny, L. C., 1951, Preliminary report on the ground water resources of the Navajo-Hopi Indian Reservations, Arizona, New Mexico and Utah: New Mex. Geol. Soc. Guidebook, pp. 147-154.

Harrell, Marshall A., and Eckel, Edwin B., 1939, Ground water resources of the Holbrook region, Arizona: U. S. Geol. Survey Water Supply Paper 836-B.

Harshbarger, J. W., Repenning, C. A., and Jackson, R. L., 1951, Jurassic stratigraphy of the Navajo Country: New Mex. Geol. Soc. Guidebook, pp. 95-98.

....., and Repenning, C. A., 1954, Water resources of the Chuska Mountain area, Navajo Indian Reservation, Arizona and New Mexico: U. S. Geol. Survey Circular 308.

Kelley, Vincent C., 1955, Regional tectonics of the Colorado Plateau and relationship of the origin and distribution of uranium. Univ. of New Mexico Pub. in Geol. No. 5.

McKee, E. D., 1951, Sedimentary Basins of Arizona and Adjoining Areas. Geol. Soc. America Bull. v. 62, pp. 481-506.

Repenning, Charles A. and Page, Harry G., 1956, Late Cretaceous stratigraphy of Black Mesa, Navajo and Hopi Indian Reservation, Arizona: Am. Assoc. Petroleum Geol. Bull. v. 40, No. 2, pp. 255-294.

Smith, Clay T., 1951, Problems of Jurassic stratigraphy of the Colorado Plateau and adjoining regions: New Mex. Geol. Soc. Guidebook, pp. 99-102.

Stokes, W. L., 1951, Carnotite deposits in the Carrizo Mountains area, Navajo Indian Reservation, Apache County, Arizona and San Juan County, New Mexico: U. S. Geol. Survey Circular 111.

Stoyanow, Alexander, 1942, Paleozoic paleogeography of Arizona: Geol. Soc. America Bull. v. 53, pp. 1255-82.

....., 1936, Correlation of Arizona Paleozoic formations: Geol. Soc. American Bull. v. 47, pp. 459-540.

Turnbow, Dix R., 1952, Permian and Pennsylvanian rocks of the Four Corners area: Four Corners Geol. Soc. Guidebook, pp. 66-69.

Wright, H. E. Jr., 1954, Problems of Tohatchi formation, Chuska Mountains, Arizona-New Mexico: Am. Assoc. Petroleum Geol. v. 38, No. 8, pp. 1827-1934.

# HELIUM IN SOUTHERN BLACK MESA BASIN

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Helium, the wonder gas with a rapidly growing list of industrial uses, is known to occur in this region. The first recorded report of helium-bearing gas was from the Great Basins Oil Company's Taylor-Fuller No. 1 well, a non-productive oil test drilled a few miles south of Holbrook in 1927. The amount of helium is reported by Anderson and Hinson (1951) to be only a little more than one per cent with an open-flow potential of 100 MCFPD. In 1950 the Macie No. 1 test was drilled to the southwest of Navajo by the Kipling Petroleum Company. This test encountered some helium-bearing noninflammable gas in the Chinle formation, and a relatively large flow in the uppermost part of the Coconino sandstone at a depth of 1032 feet (Heindl, 1952). Heindl also reports that the gas, principally nitrogen (89%), contained about 8% helium and about one per cent each of carbon dioxide and hydrocarbons. The eight per cent helium content ranks favorably with known occurrences of helium in the world. Natural gasses bearing about two per cent helium are processed in Kansas and Texas. The high nitrogen content is characteristic of relatively high helium-bearing natural gasses. This well is reported to havehad a 24,000 MCFPD potential four weeks after completion with a casing head pressure of 98 psi. It is said to have flowed unrestricted for an eight-month period.

The Macie Nos. 1 and 2 wells were acquired by Kerr-McGee Oil Industries who in the past several years have drilled five more wells in the same area. Detailed information regarding these later wells is not available although it is known that the Coconino sandstone was encountered from between 800 and 1100 feet. To date the refining and marketing of helium is completely controlled by the federal government. There are signs, however, that the U. S. Bureau of Mines, the agency within which this authority rests, may relinquish all or part of this operation to private industry. Facilities for the refining of helium are not available in this region, but presumably adequate reserves will eventually lead to the building of a helium plant. The Bureau of Mines officials foresee the need for at least a dozen new plants in the near future to handle the industrial demands for helium.

## REFERENCES

Anderson, C. C., and Hinson, H. H., 1951, Helium-bearing natural bases of the United States, analyses and analytical methods: U. S. Bur. Mines Bull. 846.

Heindl, L. A., 1952, Occurrence of helium in northeastern Arizona: Geol. Soc. America Bull., v. 63, no. 12, pt. 2, p. 1331 (Abstract).