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MINERAL RESOURCE POTENTIAL AND GEOLOGY OF THE BLACK FORK MOUNTAIN ROADLESS AREA, POLK COUNTY, ARKANSAS, AND LE FLORE COUNTY, OKLAHOMA

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STUDIES RELATED TO WILDERNESS

Under the provisions of the Wilderness Act (Public Law 88-577, September 3, 1964) and related acts, the U.S. Geological Survey and the U.S. Bureau of Mines have been conducting mineral surveys of wilderness and primitive areas. Areas officially designated as "wilderness," "wild," or "canoe" when the act was passed were incorporated into the National Wilderness Preservation System, and some of them are presently being studied. The act provided that areas under consideration for wilderness designation should be studied for suitability for incorporation into the Wilderness System. The mineral surveys constitute one aspect of the suitability studies. The act directs that the results of such surveys are to be made available to the public and be submitted to the President and the Congress. This report discusses the results of a mineral survey of the Black Fork Mountain Roadless Area (08084), Ouachita National Forest, Polk County, Ark., and Le Flore County, Okla. The Black Fork Mountain Roadless Area was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

MINERAL RESOURCE POTENTIAL SUMMARY STATEMENT

The Black Fork Mountain Roadless Area has a high potential for resources of building stone, crushed rock, and clay for brick making from the Jackfork Sandstone and the Stanley Shale. Both formations crop out in the roadless area.

Although the potential for gas and oil cannot be determined at present, some investigators believe that conditions in the subsurface may be favorable for the presence of some gas and oil in the Black Fork Mountain region (C. G. Stone, Arkansas Geological Commission, oral commun., 1983). Deep exploratory drilling would be necessary to determine the gas and oil potential of the roadless area.

INTRODUCTION

The Black Fork Mountain Roadless Area (fig. 1) covers about 8,100 acres in the Ouachita National Forest in Polk County, Ark., and Le Flore County, Okla. The roadless area is about 45 mi south of Fort Smith and about 10 mi northwest of Mena, Ark.

Access to the southern part of the roadless area is via U.S. Highway 270. On the north, access is by U.S. Forest Service and privately owned roads. The Black Fork Mountain Roadless Area is densely timbered by shortleaf pine and hardwoods.

Elevation of the roadless area ranges from about 940 ft near the western boundary to 2,660 ft on the ridgetop near the eastern boundary. Black Fork Mountain is an east-west trending ridge along the north flank of Eagle Gap syncline. On the south, the Honess fault bounds the roadless area, and, on the north, it is bounded by the Briery fault (Seely, 1963). Nearly all the roadless area is under lease for gas and oil.

GEOLOGY

Stratigraphy

The Mississippian Stanley Shale is made up of olive-gray sandstone and shale (fig. 2) and is about 1,400 ft thick (Seely, 1963). Overlying the Stanley is the Pennsylvanian Jackfork Sandstone. It consists of gray shale interbedded with sandstone layers, some of which are carbonaceous (fig. 2). Thickness of the Jackfork is about 5,600 ft (Seely, 1963). The youngest indurated formation in the Black Fork Mountain Roadless Area is the Pennsylvanian Atoka Formation, which overlies the Jackfork Sandstone. It is made up of light-gray, laminated to thick-bedded sandstone interbedded with gray shale and is about 6,000 ft thick (fig. 2).

Structure

The major structure in the roadless area is the Eagle Gap syncline; the north flank of the syncline makes up Black Fork Mountain. The Honess fault, which is parallel to Big Creek on the south, cuts the Jackfork Sandstone and the Stanley Shale. Stratigraphic displacement on the fault may range from 5,000 ft to 7,000 ft. Movement on this fault was principally dip slip, but probably included a strike-slip component (Seely, 1963).

Along the north side of the roadless area, the Briery fault parallels Briery Creek for a short distance. Along this fault the Atoka Formation is in fault contact with the Stanley Shale. According to Seely (1963), displacement on the Briery fault could be as much as 25,000 ft. In most places the Honess and Briery faults are covered by alluvium and colluvium.

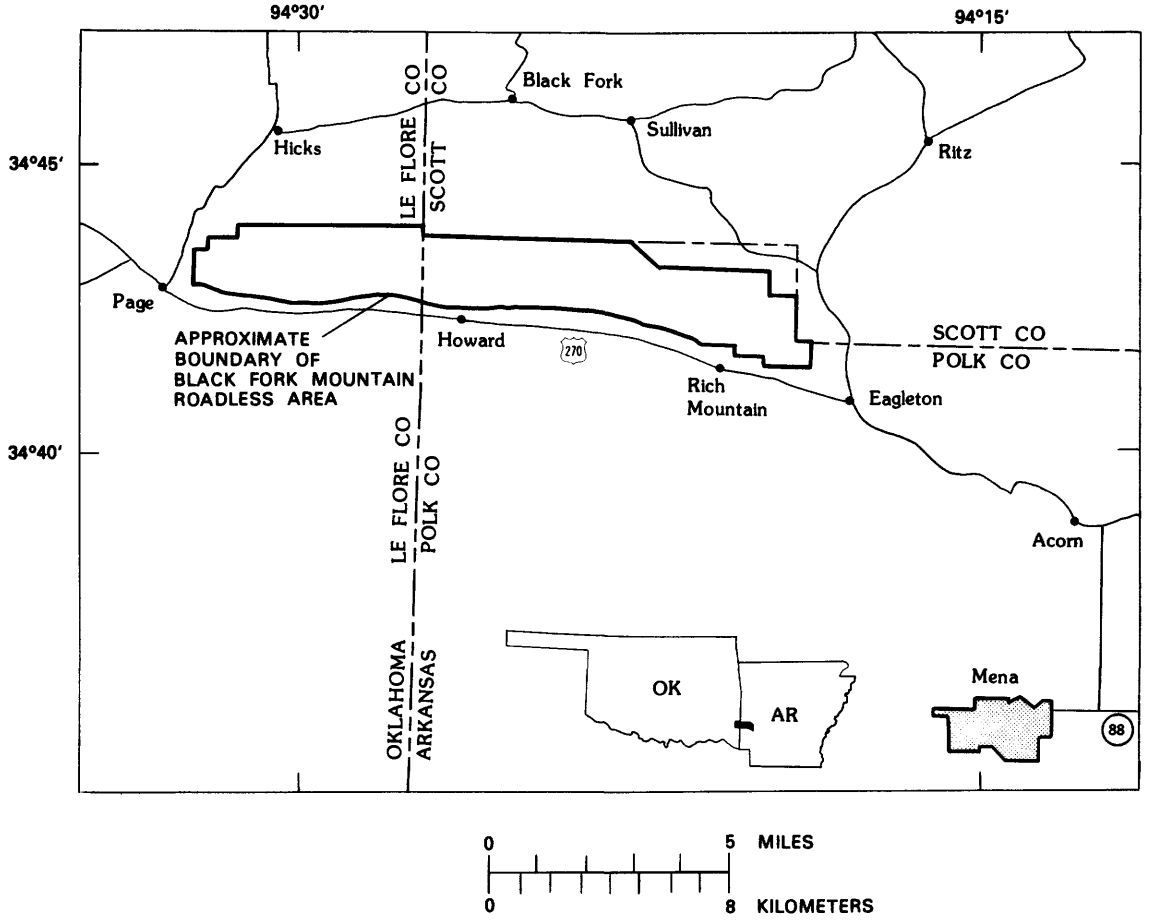

Figure 1.--Index map showing location of the Black Fork Mountain Roadless Area (08084), Polk County, Ark., and Le Flore County, Okla.

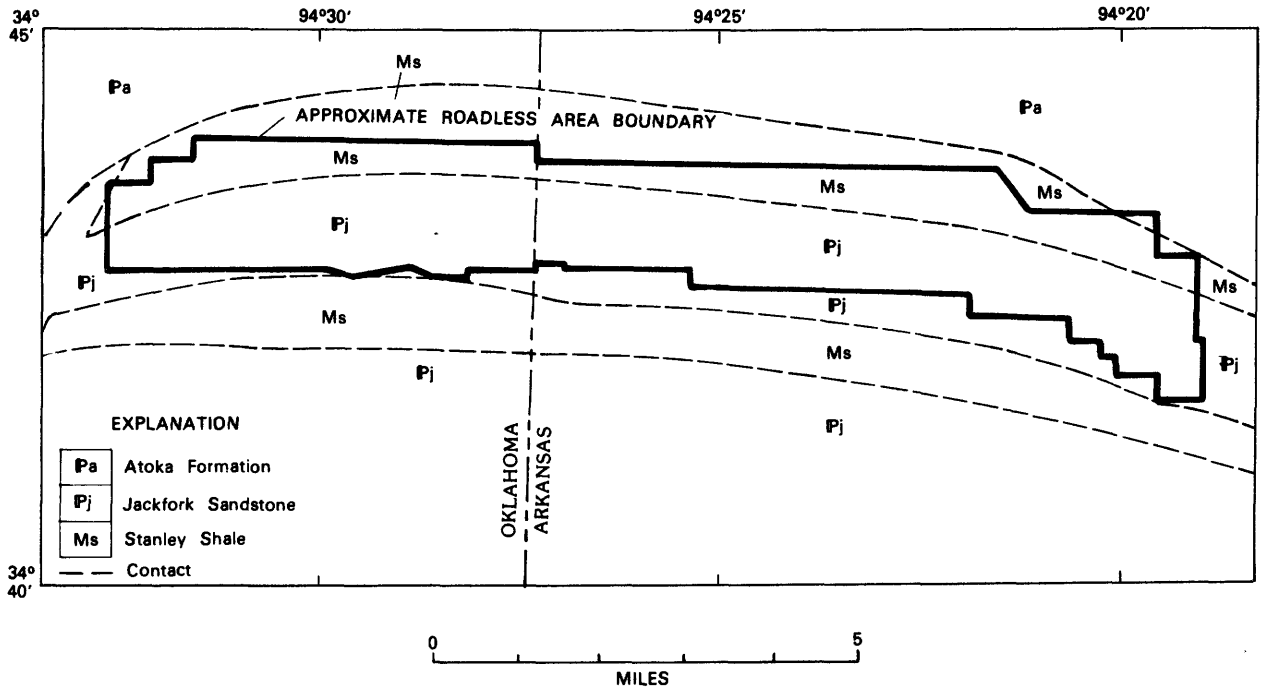

Figure 2.--Mineral resource potential and geologic map of the Black Fork Mountain Roadless Area, Polk County, Ark., and Le Flore County, Okla.

GEOCHEMISTRY

On the basis of spectrographic analyses of 29 stream-sediment samples and one rock sample from the Black Fork Mountain Roadless Area, there are no surface areas of highly anomalous metal content. Sample 1 showed a zinc content (1,000 ppm) higher than background values (200 ppm). Although no evidence of contamination was noted, this one higher value may be the result of contamination from a zinc-bearing manufactured product. Other samples showed no anomalous zinc content. The high zinc content of this one sample is not considered significant.

GEOPHYSICS

No detailed magnetic or gravimetric surveys have been made of the roadless area. A Bouguer gravity map of Arkansas (Hendricks and others, 1981) shows a gravity low on Rich Mountain, just south of the roadless area. This low probably is associated with the Ouachita Mountain negative gravity anomaly centered in northern Pushmataha County, Okla., which Lyons and others (1964) interpret as indicative of a great thickness of sediments. Magnetic and gravimetric maps of Oklahoma, compiled by Lyons and others (1964), show a magnetic and gravity high, the Heavener maximum, about 10 mi northwest of the roadless area. Lyons and others interpreted the Heavener maximum as strongly suggesting a batholith at great depth.

MINING DISTRICTS AND MINERALIZATION

No mining districts are in or adjacent to the Black Fork Mountain Roadless Area. During World War I, about 2,000 pounds of ash from impsonite, an asphaltic pyrobitumin, was shipped from a deposit 1 mi east of Page, Okla., in the roadless area. About 500 pounds of vanadium was recovered from the impsonite ash during that period (Ham, 1956). The ash contained 6.77-34.5 percent vanadium; Ham (1956) reported "0.76 [percent of sample] mineral ash containing 21.46 percent V_2O_5." The impsonite occurs in veins in fissures or along bedding planes in the Jackfork Sandstone. The Page deposit may still contain a small amount of impsonite. Solid bitumin is present near Eagle Gap, near the eastern boundary but outside the roadless area. Devolatilization of crude oil along fractures or faults probably produced the bitumin (Reinemund and Danilchik, 1957).

Sand and gravel and sandstone in the Black Fork Mountain Roadless Area are probably suitable for aggregate and ballast. Shale in the roadless area may be suitable for brick making. Sandstone and shale in the Jackfork Sandstone and Stanley Shale have a high potential for such uses.

Coal crops out at two places in and near the roadless area; however, the seams are thin (2-4 in.) and of small areal extent (Stroud and others, 1969). It appears unlikely that coal could be mined from either place.

Most land in the Black Fork Mountain Roadless Area is leased for gas and oil. Although potential for gas and oil cannot be determined at present, some investigators believe there is some probability for occurrence of gas and oil resources in this region in rocks of Arbuckle age (Cambrian and Ordovician) or younger (C. G. Stone, oral commun., 1983).

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

Although impsonite in the roadless area was mined for its vanadium content, there seems to be little or no likelihood of further production from the known deposit, which is very small.

Coal is present in the roadless area, but its extent is very small. There is no likelihood of coal production from this area.

The roadless area contains shale, sandstone, and clay that are suitable for construction material. The Jackfork Sandstone and the Stanley Shale contain rock that meets specifications for construction purposes. Thus, there is a high potential for resources of stone and crushed rock in the roadless area.

Some investigators believe that the Black Fork Mountain region has a moderate potential for the occurrence of gas and oil resources (C. G. Stone, oral commun., 1983); deep exploratory drilling is necessary to determine the gas and oil potential.

REFERENCES CITED

Ham, W. E., 1956, Asphaltite in the Ouachita Mountains: Oklahoma Geological Survey Mineral Report 30, 12 p.

Hendricks, J. D., Keller, G. R., and Hildenbrand, T. G., 1981, Bouguer gravity map of Arkansas: U.S. Geological Survey Geophysical Investigations Map GP-944, scale 1:500,000.

Lyons, P. L., Jones, V. L., and Jacobsen, Peter, Jr., 1964, Vertical-intensity magnetic map and Bouguer gravity-anomaly map of Oklahoma (Text to accompany Map GM-6 and Map GM-7): Oklahoma Geological Survey, 15 p. [in envelope with text are Map GM-6 by V. L. Jones and P. L. Lyons and Map GM-7 by P. L. Lyons].

Reinemund, J. A., and Danilchik, Walter, 1957, Preliminary geologic map of the Waldron quadrangle and adjacent areas, Scott County, Arkansas: U.S. Geological Survey Oil and Gas Investigations Map OM-192, scale 1:48,000.

Seely, D. R., 1963, Structure and stratigraphy of the Rich Mountain area, Oklahoma and Arkansas: Oklahoma Geological Survey Bulletin 101, 173 p.

Stroud, R. B., Arndt, R. H., Fulkerson, F. B., and Diamond, W. G., 1969, Mineral resources and industries of Arkansas: U.S. Bureau of Mines Bulletin 645, 418 p.