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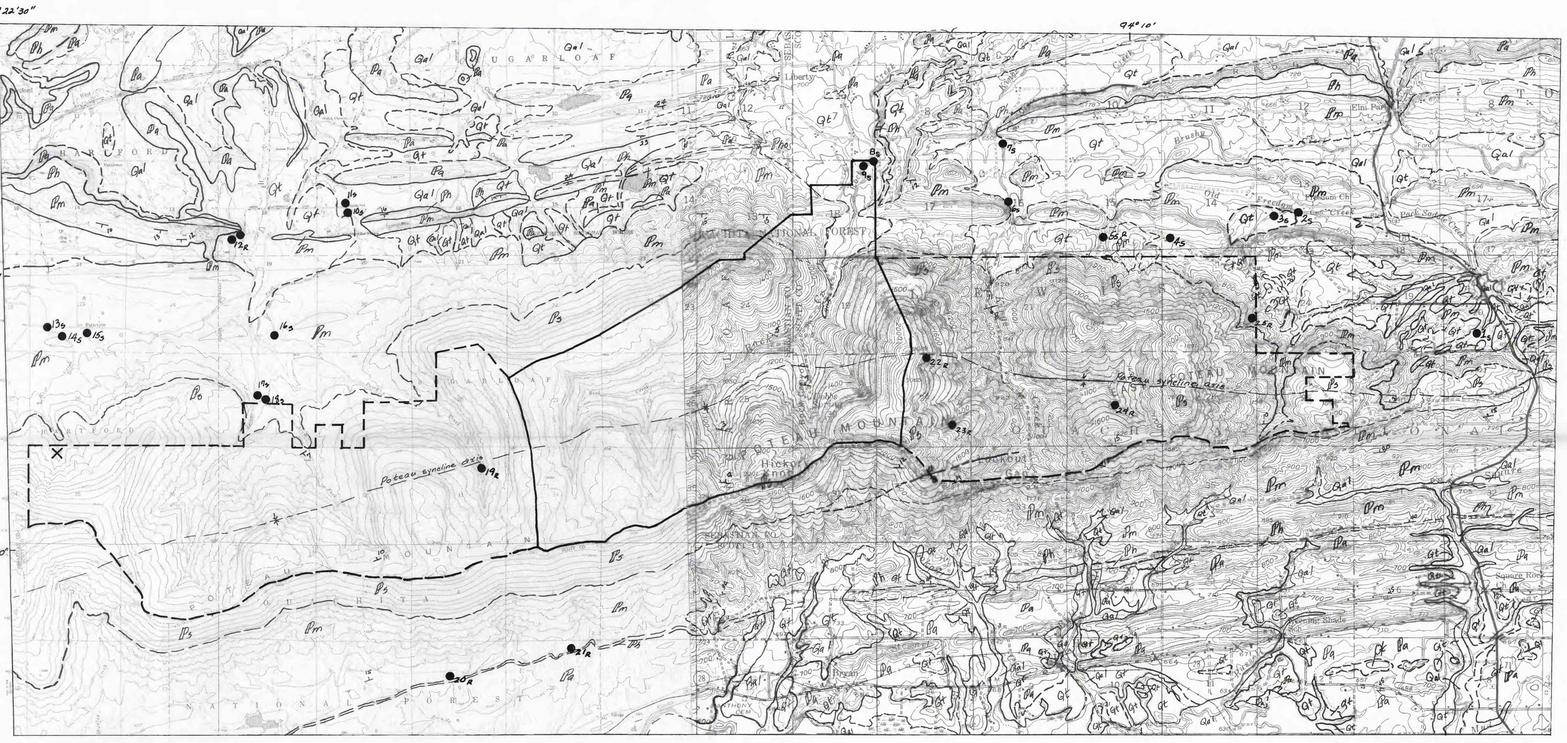
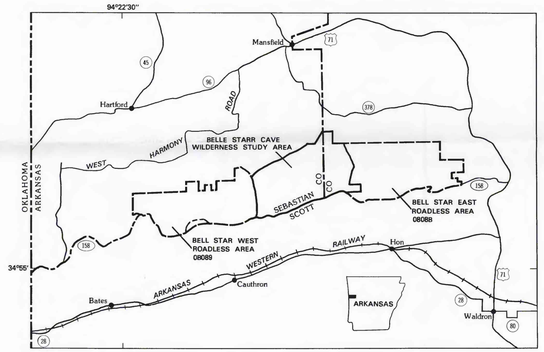
PAMPHLET ACCOMPANIES MAP





MINERAL RESOURCE POTENTIAL AND GEOLOGIC MAP OF THE BELL STAR EAST AND WEST ROADLESS AREAS, SEBASTIAN AND SCOTT COUNTIES, ARKANSAS

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EXPLANATION

EXPLANATION OF RESOURCE POTENTIAL

- APPROXIMATE BOUNDARY, ROADLESS AREA
- APPROXIMATE BOUNDARY, WILDERNESS STUDY AREA
- 20R SAMPLE LOCALITY AND NUMBER--S, stream sediment; R, rock
- COAL MINE OR PROSPECT

EXPLANATION FOR GEOLOGIC BASE

(Note: The following correlation and description are for the geologic base map shown in gray)

CORRELATION OF MAP UNITS

Qal			QUATERNARY
Qt			
UNCONFORMITY			
Pa	Des Moinesian	Middle Pennsylvanian	PENNSYLVANIAN
Pm			
Ph			
Pa	Atokan		

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (QUATERNARY)--Unconsolidated clay, sand, and gravel. Deposits on flood plains along streams and on fans on river terraces

Qt TERRACE DEPOSITS (QUATERNARY)--Partly consolidated clay, silt, sand, and gravel on terraces along streams or perched on slopes

Pa SAVANNA FORMATION (PENNSYLVANIAN)--Interbedded shale, siltstone, and sandstone. A few discontinuous beds of carbonaceous shale and coal. Shale, 80 percent of formation light olive gray to olive or dark gray, fissile to thin bedded, medium grained; fine-grained sandstone layers through remainder. Thickness about 1,580 ft

Pm MCALESTER FORMATION (MIDDLE PENNSYLVANIAN)--Interbedded shale, siltstone, and sandstone. Shale, about 80 percent of formation, dark gray, olive gray or black, weathers to light gray, yellowish or grayish brown. Fossil plant fragments in some layers. Lower Hartshorne coal bed in lowest part of McAlester. Thickness 2,620–2,750 ft

Ph HARTSHORNE SANDSTONE (MIDDLE PENNSYLVANIAN)--Interbedded shale, siltstone, and sandstone. Shale forms 70 percent of Hartshorne. Lenticular units of siltstone and sandstone as much as 15 ft thick; shale mostly silty, in units as thick as 60 ft, weathers yellowish brown; contains a few layers of carbonaceous shale. Thickness about 270 ft

Pa ATOKA FORMATION (MIDDLE PENNSYLVANIAN)--Interbedded shale, siltstone, and sandstone. Shale forms 90 percent of formation, fissile, olive gray, grayish black. Most sandstone units fine grained, olive gray or yellowish brown. Thickness about 18,000 ft

——— CONTACT--Dashed where approximately located

U/D FAULT--U, upthrown; D, downthrown

STRIKE AND DIP OF BEDS

INTRODUCTION

Bell Star East and West Roadless Areas cover about 11,460 acres in the Ouachita National Forest in Sebastian and Scott Counties, west-central Arkansas. About 98 percent of the surface rights are owned by the federal government; the remainder is privately owned. Most mineral rights, except for oil and gas leases, are held by the federal government; mineral rights on 129 acres are privately owned. About 70 percent of the roadless areas is leased for oil and gas.

Altitude ranges from 740 ft at the northern boundary of Bell Star East to 2,570 ft on the western boundary of Bell Star West. The roadless areas are made up of a relatively flat hilltop and steep rock-covered hillsides.

Access to the southern part of the roadless areas is by U.S. Forest Service Road 158; access to the northern part of the area is by dirt and primitive roads, several of which are private roads cutting across privately owned land. The areas are moderately timbered. West, James Fork, Alum Fork, Posey, Rock, Kings, Old Freedom, and Clear Creeks drain the roadless areas.

The mineral resource potential map covers Belle Starr Cave Wilderness Study Area and Bell Star East and West Roadless Areas. Sample localities shown on the map include the Belle Starr Cave Wilderness Study Area and the roadless areas.

GEOLOGY

The Pennsylvanian Atoka Formation is the oldest formation exposed in the region; it is as much as 19,000 ft thick (Reinemund and Danilchik, 1957). Rocks mapped by Reinemund and Danilchik as Hartshorne Sandstone rest conformably on the Atoka formation. In this region the sandstone is about 270 ft thick. The McAlester Formation of Pennsylvanian age, the oldest formation that crops out in the roadless and wilderness areas, overlies the Hartshorne Sandstone. The lowest bed of the McAlester is the Lower Hartshorne coal bed. The Lower Hartshorne coal bed is not exposed in the roadless or wilderness areas, but it probably extends under all these areas. This coal bed has been mined north and south of the roadless areas. The upper part of the McAlester Formation is exposed on upper Pack Saddle Creek in the eastern part of Bell Star East Roadless Area. Most of the rocks exposed in the roadless areas belong to the Pennsylvanian Savanna Formation (Reinemund and Danilchik, 1957).

Alluvial and colluvial deposits in the Bell Star Roadless Areas include Pleistocene terrace deposits, Holocene talus and landslide deposits, and Holocene clay, silt, sand, and gravel on the flood plains and valley floors (Reinemund and Danilchik, 1957; Haley and others, 1980).

Bell Star East and West Roadless Areas and Belle Starr Cave Wilderness Study Area are located on the east-west-trending asymmetrical Poteau syncline. Dips are steeper on the south limb. Within the roadless areas dips average about 20°. One fault parallel to the trend of the syncline has been mapped across secs. 31, 32 and 33, T. 4 N., R. 30 W., near the southern boundary of Bell Star East Roadless Area. Anticlines bound the study areas on the north and south.

GEOCHEMISTRY

Sixteen stream-sediment and eight rock samples were collected from Bell Star East and West Roadless Areas. Eight coal samples were collected from nearby mines and prospects. Sixteen stream-sediment and 14 rock samples were collected by Haley and others (1980) from Belle Starr Cave Wilderness Study Area. All samples were analyzed for 30-40 elements by semiquantitative spectrographic methods. Analytical data show that no samples from either the roadless areas or the wilderness study area contain significant amounts of metallic elements. Eight of the stream-sediment samples from the roadless areas and one coal sample were analyzed by atomic-absorption methods for zinc, cadmium, bismuth, antimony, and arsenic. These samples contained no anomalous concentrations of metals. Analytical data (Harris, 1981) of coals sampled indicate the coal is medium-volatile bituminous.

GEOPHYSICS

No detailed magnetic or gravimetric surveys have been made of Bell Star East and West Roadless Areas or Belle Starr Cave Wilderness Study Area. A Bouguer gravity map of Arkansas (Hendricks and others, 1981) shows no anomalous areas within the roadless or wilderness study areas.

MINING DISTRICTS AND MINERALIZED AREAS

There are no mines nor gas or oil wells within the roadless areas; there is possibly one coal prospect on West Creek in Bell Star West Roadless Area (Winslow, 1888; Harris, 1981).

The roadless areas are in the western region of the Interior coal province. Commercially important beds of the region occur in the Savanna and McAlester Formations. Thin coals also occur in the Hartshorne Sandstone and Atoka Formations. Coal mining in the region began in the mid 19th century. Most of the larger mines have not produced since the early or middle 1960's.

Two Savanna Formation coal beds have been mined 20 mi north of the roadless areas: the Charleston, ranging in thickness from 9 to 30 in., and the Paris, ranging in thickness from 6 to 32 in. Inside the roadless areas, a 4-inch exposure of a slightly weathered Savanna Formation coal bed was found in West Creek. Winslow (1888) reported that an opening had been made in a coal and shale sequence containing 18 in. of coal. The coal was probably used locally for blacksmithing. Coal beds in the Savanna Formation are thin and discontinuous in the roadless areas.

Coal has been mined from the Lower Hartshorne coal bed in the McAlester Formation along its outcrop about 2 1/4 mi north and about 1 mi south of the roadless areas. This low- to medium-volatile bituminous coal has a sulfur content ranging from 0.6 to 3.34 percent; ash content ranges from 4.4 to 14.1 percent; and the heating value averages about 13,530 BTU/lb (Haley and others, 1980; Harris, 1981).

North of the study area, the coal occurs in one to five beds, with the lower bed being most continuous (Haley, 1966). Net coal thickness ranges from 14 in. in the east to 50 in. in the west. Clay and shale partings in the vicinity of the roadless areas appear to thicken and become more numerous toward the east. South of the study area coal exposures exhibit similar east to west variations in thickness and partings.

The synclinal structure of the roadless areas does not preclude natural gas accumulations. The stratigraphic variations that played a major role in gas accumulation in nearby fields probably are also present in Atoka sandstones under the study area. Small quantities of natural gas are produced from the Mansfield field, about 3 mi north of the roadless areas (Haley and others, 1980), and minor amounts of gas were produced for local use from the Waldron syncline, about 4 1/2 mi south of Bell Star East Roadless Area (Reinemund and Danilchik, 1957). In the Mansfield area, gas is produced from the Atoka Formation at depths of as much as 6,000 ft (Haley and others, 1980), although many of the producing wells are less than 3,000 ft deep (W. M. Caplan, Arkansas Geological Commission, oral commun., 1982).

Clay, shale, and sandstone within the roadless areas are similar to those regionally abundant. There are no known occurrences of metallic minerals in or near the roadless areas.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The Lower Hartshorne coal bed of the Pennsylvanian McAlester Formation underlies the roadless areas, and thus, the areas have high potential for coal. Within the roadless areas, the Lower Hartshorne coal bed is 2,000 ft or more below the surface.

Inferred resources of coal projected in the subsurface of Bell Star East are about 12.5 million short tons, and in Bell Star West are estimated to be about 35 million short tons (Haley and others, 1980). An average of 1,800 short tons per acre-foot of coal was used in the calculations.

Although all producing gas wells in the Mansfield field are north of the roadless areas, the roadless areas have a low to moderate potential for minor amounts of gas from the Pennsylvanian Atoka Formation. There is also a low potential for accumulation of gas in the Lower Hartshorne coal bed.

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geologic and mineral survey of the Bell Star East (08088) and Bell Star West (08089) Roadless Areas in the Ouachita National Forest, Sebastian and Scott Counties, Arkansas. Bell Star East and West Roadless Areas were classified as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

MINERAL RESOURCE POTENTIAL SUMMARY STATEMENT

The Bell Star East and West Roadless Areas cover about 11,460 acres in the Ouachita National Forest, west-central Arkansas. The roadless areas are in the southern part of the Arkansas Valley section of the Ouachita physiographic province.

The only rocks that crop out in these roadless areas are Pennsylvanian McAlester and Savanna Formations. The Lower Hartshorne coal bed in the McAlester Formation has a high potential for coal; 47.5 million short tons of inferred resources are thought to underlie the roadless areas at depths of as much as 2,000 ft or more.

Natural gas has been produced from wells in the Mansfield gas field north of the roadless areas, and a small quantity has been produced from the Waldron syncline southeast of the roadless areas. Several wells in the Mansfield field are still producing small amounts of gas. Horizons in the Atoka and Hale Formations are productive zones in Sebastian County, Ark.; these formations are present at depth in the Bell Star East and West Roadless Areas. These roadless areas have a low to moderate potential for small quantities of natural gas. The potential for coal-bed gas from the Lower Hartshorne coal bed is low.

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