DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT OF 77-76 MAP--G
Mineral resource, geological, and geophysical maps of the New River Gorge area, Fayette, Raleigh and Summers Counties, West Virginia

OIL AND GAS DATA IN NEW RIVER GORGE AREA. WEST VIRGINIA

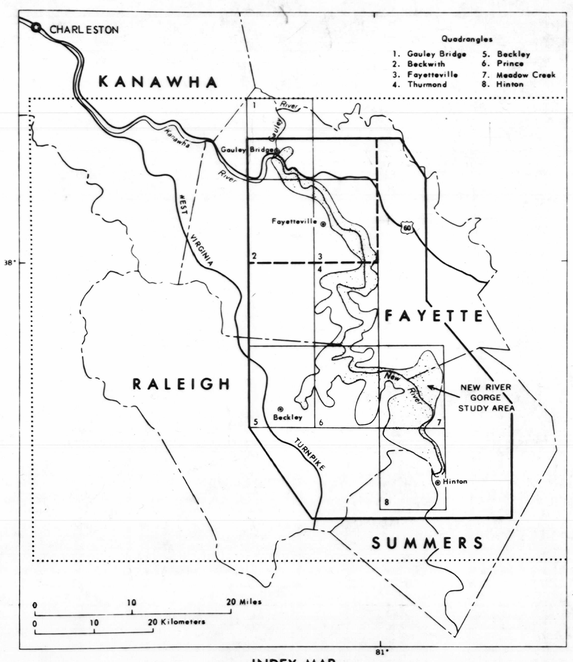
Within the New River gorge and adjoining area (fig. 2) at least 114 wells have been drilled for oil or gas.* 54 of these wells have produced or are currently producing natural gas all in an area west of the towns of Cotton Hill northward to beyond Gauley Bridge in Fayette County. Three recent wells in the northwestern part of the area, north of the New River, have a cumulative average monthly production of 5.7 million cubic feet per well, for the first five months of production. No oil production is present in the study area, nor have significant shows of oil been recorded in this area. Gas production here is restricted to the shallow sequence of Mississippian age: Maccrady and Pocono sandstones below the Greenbrier ("Injun" and "Weir" sands of the driller), the Mississippian Greenbrier Limestone ("Big Lime" of the driller), and overlying sandstones of the Bluefield and Hinton Groups ("Maxon" or "Maxton" and "Salt" sands of the driller). Data from productive wells are summarized in table 1. Although shows of gas have been recorded from many other wells in the area (see maps), the shows have been considered subeconomic from both the deeper Devonian and older beds penetrated and from even the shallow exploratory holes in the central and southern part of the area.

* Old wells, drilled before state permits were required may have inadvertently been omitted.

Five productive gas wells occur within the Bureau of Outdoor Recreation proposed park boundary: Fayette County well permit nos. 119 and 177 south of the river and 222, 231, and 251 north of the river, all in the Cotton Hill - Gauley Bridge vicinity. Depths to productive natural-gas reservoirs in these five wells ranges from 1683 to 2716 feet (513-827.8 m) and initial open flows range from 0.267 to 1.299 million cubic feet of gas per day (see table). Current drilling has been limited to accessible areas outside of but adjacent to the immediate walls and floor of the gorge. We believe that natural gas within the immediate gorge area in the Beckwith-Gauley Bridge area will be drained by existing wells and future wells, should they be permitted, on the flanks of Cotton Hill south of Gauley Bridge.

The stacked natural gas reservoirs of the producing area (figs. 6 and 7) represent stratigraphic traps in fluvial and shoreline sands above and below the Greenbrier Limestone as well as porous lenses in the limestone. To the east and south of the productive area, test wells drilled through these rocks have indicated low porosities and permeabilities in the potential gas reservoir intervals. High water saturations have been encountered in these rocks up-dip, east and south of the productive area. It appears probable that gas was trapped in the Beckwith-Gauley Bridge area prior to the development of the present structural configuration (northwest dip) of the Mississippian strata, and that cementation of the rocks to the east below the original gas/water contact prevented lateral migration of gas into higher structural positions (fig. 2,3) when Alleghanian or later tilting to the west and northwest occured.

Closed structural contours on the eastern part of figure 2 define the axial area of the Mann Mountain anticline at shallow depths. Wells to date drilled on this anticline have been dry (nonproductive of hydrocarbons). A deep structure map (fig. 4) shows that this anticline does not exist at the level of the Oriskany Sandstone. Although deep well control is sparse in the New River Gorge area, necessitating an expanded area of consideration (fig. 4) to include much of southern West Virginia, the elevation of the top of the Oriskany in wells Fay-241 and Fay-106 on the crest of the Mann Mountain anticline is deeper than Fay-176 drilled off the structure near the New River and nearly the same as Fay-42 7 miles (11.2 km) east of the Mann Mountain anticline. These wells indicate that the anticline is developed above a decollement, a flat-lying thrust fault, in the Devonian shales above the Oriskany Sandstone.



INDEX MAP

FIGURE 1. INDEX MAP OF NEW RIVER GORGE STUDY AREA. HEAVY LINE DEFINES AREA OF SHALLOW SUBSURFACE STRUCTURE MAP (FIG. 2), STRUCTURE OF TOP OF THE GREENBRIER LIMESTONE. HEAVY DASHED LINE DEFINES SOUTH AND WEST BOUNDARY OF LARGER SCALE BASE MAPS (FIGS. 3,6, AND 7) OF NATURAL GAS PRODUCTIVE AREA. HEAVY DOTTED LINE INDICATES NORTHERN, WESTERN AND SOUTHERN BOUNDARY OF LOWER DEVONIAN STRUCTURE MAP (FIG. 4).

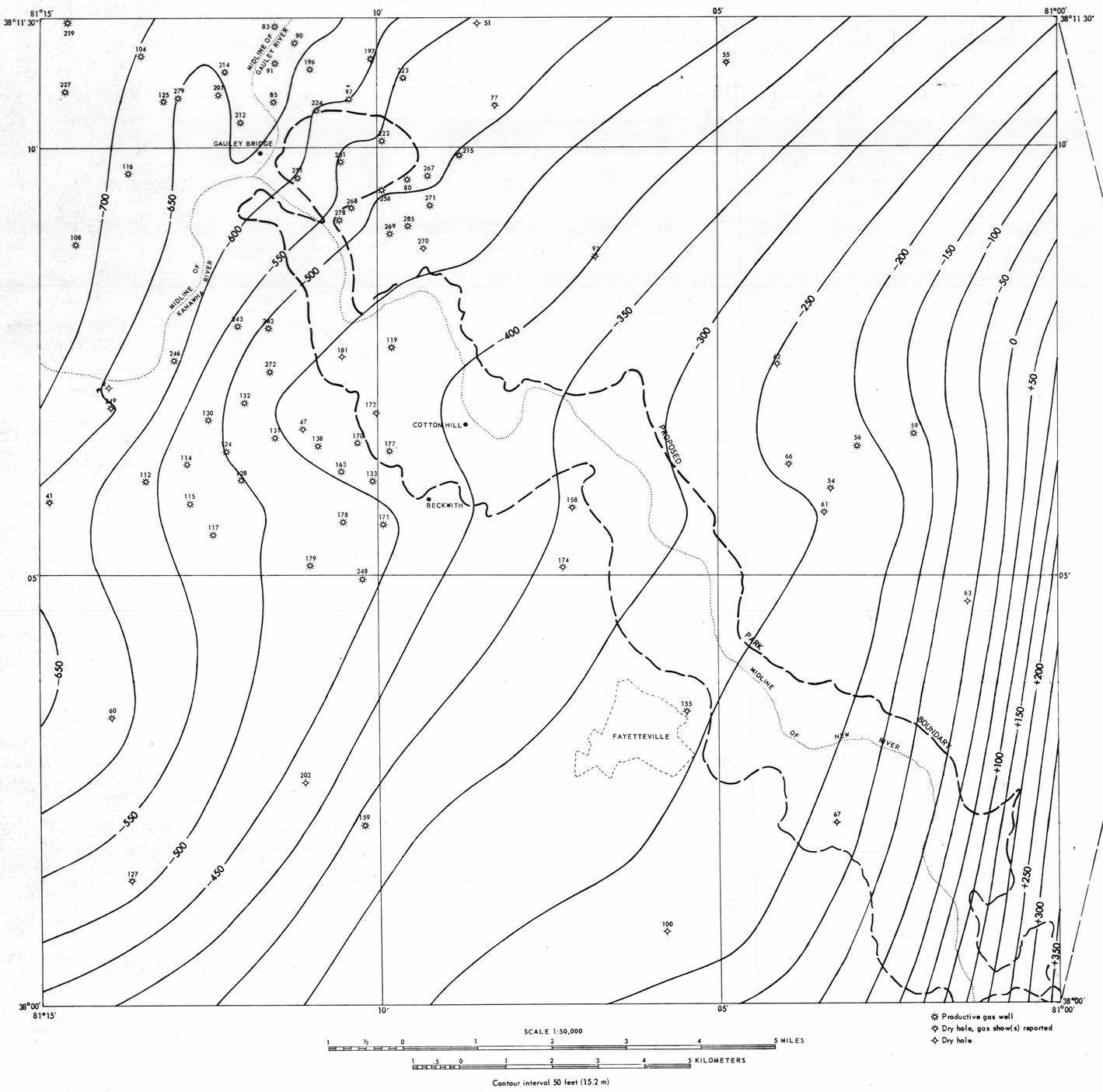


FIGURE 3. STRUCTURE MAP OF TOP OF THE MISSISSIPPIAN GREENBRIER LIMESTONE IN NATURAL GAS PRODUCTIVE AREA.

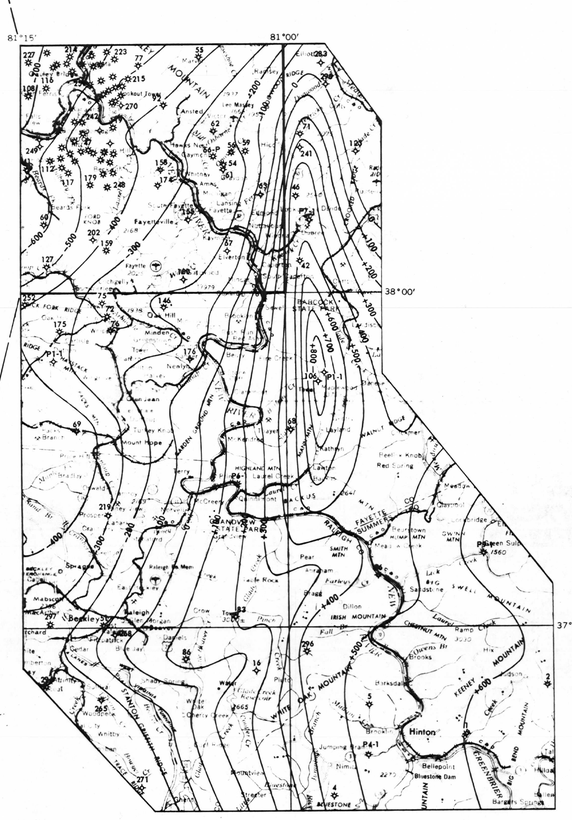
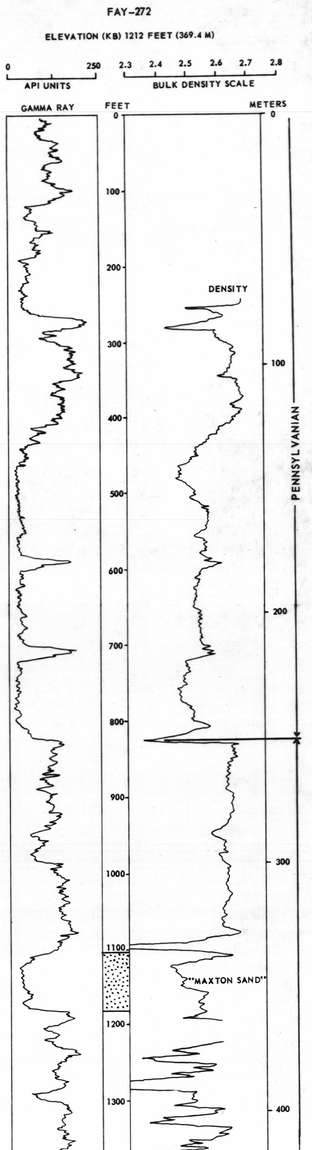


FIGURE 2. REGIONAL SUBSURFACE STRUCTURE MAP ON TOP OF MISSISSIPPIAN GREENBRIER LIMESTONE. WELL SYMBOLS AS IN FIGURE 3.



* NATURAL GAS PRODUCING INTERVALS IN THIS WELL.

FIGURE 5. TYPICAL WELL (FAY-272) IN NATURAL GAS PRODUCTIVE AREA. LOCATION GIVEN IN FIGURE 3. DRILLERS' TERMS FOR GAS BEARING INTERVALS ARE GIVEN IN QUOTES.

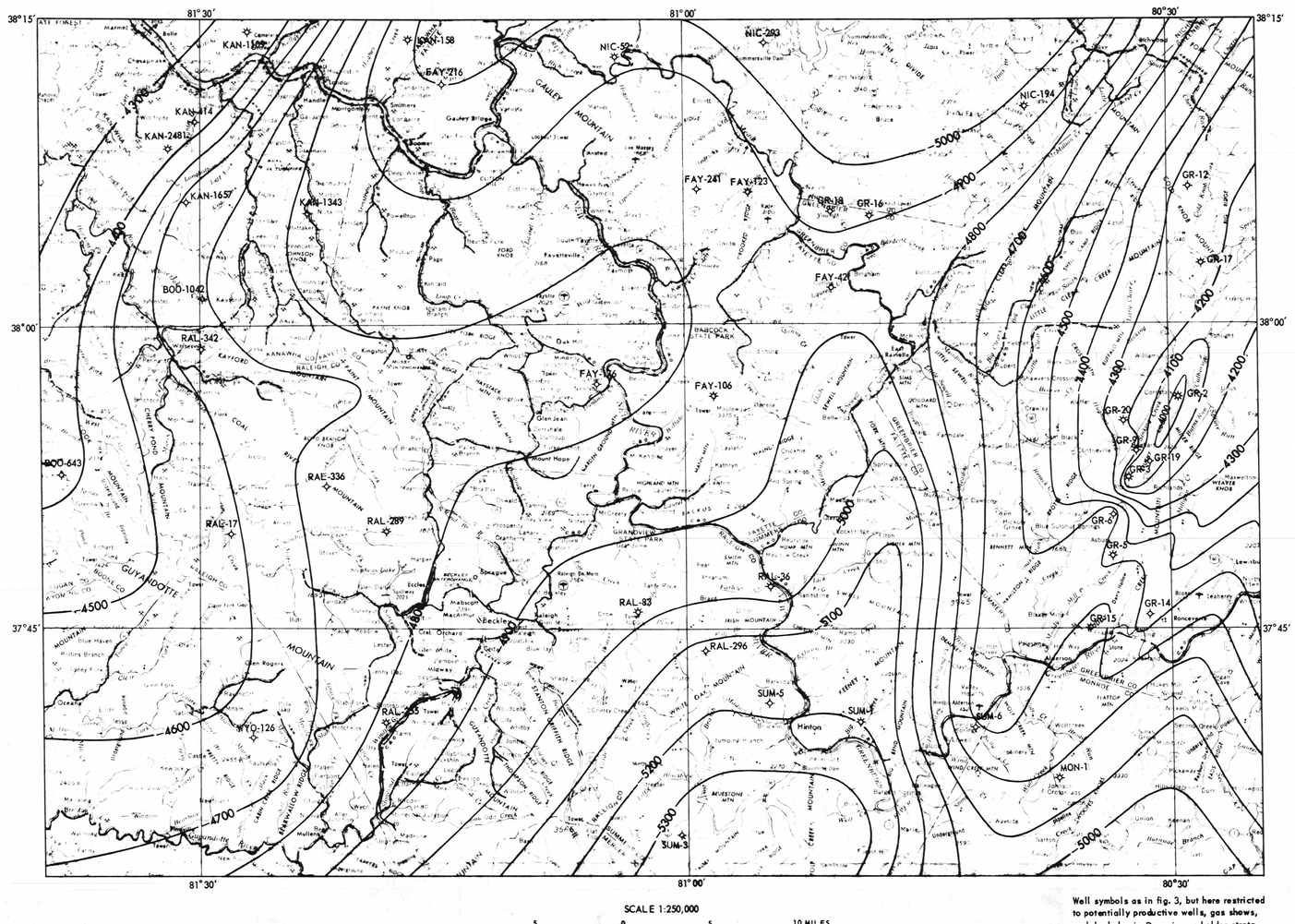


FIGURE 4. SUBSURFACE STRUCTURE MAP OF (UPPER SURFACE) LOWER DEVONIAN ORISKANY SANDSTONE. DATA AMENDED FROM CARDWELL (1974).

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This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.

SUBSURFACE MAPS OF THE NEW RIVER GORGE AREA AND ADJOINING REGION, WEST VIRGINIA

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