



# **THE VALUE OF GEOLOGIC MAPPING IN MISSISSIPPI**

## **Pamphlet 2**

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# **THE VALUE OF GEOLOGIC MAPPING IN MISSISSIPPI**

The Bureau of Geology is the state geological survey, created in 1850 to map the geology and mineral resources of Mississippi.

## **What is the value of mineral production in Mississippi?**

Oil and gas production in Mississippi in recent years has added \$1.5 billion annually to the state's economy. Non-fuel mineral production provides an additional \$100,000,000 each year.

## **How are these minerals discovered?**

Mineral wealth is discovered by geologic exploration. In its basic, most fundamental form, geologic exploration involves the plotting of rock and mineral information and the making of geologic maps. The State of Mississippi has had an agency since 1850 that has been making geologic maps of the state — the Mississippi Geological Survey (now called the Bureau of Geology of the Mississippi Department of Environmental Quality). These efforts have had massive financial returns to the state through the discovery of oil and gas fields, the development of clay and gravel deposits, the identification of geologic hazards, and much more. Following are a few examples of some returns on the investment in geologic mapping.

In 1860, State Geologist Eugene W. Hilgard suggested that a local uplift at Jackson was responsible for the reappearance of the same geologic units that crop out 27 miles to the north. Later drilling confirmed the Jackson Dome and the presence of a rock unit containing natural gas. As of 1987, the Jackson Gas Field has produced 118 billion cubic feet of gas, which would have been worth \$230 million if produced in that year. The Gas Rock is utilized also as a gas storage facility, providing tremendous cost savings.

Tinsley Field is a giant oil field. In 1938, Frederic F. Mellen of the Mississippi Geological Survey was

mapping the geology and mineral resources of Yazoo County when he noticed anomalies in the geologic units exposed near Tinsley. Evidence of a structural high led the Survey to issue a press release suggesting the area be drilled. The suggestion was taken and the first well in the giant oil field came in on August 29, 1939. Since then, the field has produced 219 million barrels of oil. At today's prices, this oil would be worth over \$3.7 billion. The field has also produced 6.7 billion cubic feet of gas.

Surface geologic mapping led to the discovery of not only Mississippi's largest oil field, but the state's largest gas field as well. While mapping Adams County in 1940 (report published in 1942), Survey geologist Franklin E. Vestal described a faulted area near Cranfield and recommended the location for a test well. In 1943 the California Company drilled and completed an oil and gas well, discovery well for Cranfield Field. Cranfield to date has produced 47.3 million barrels of oil, which at today's price would have been worth \$804 million, and over 700 billion cubic feet of gas.

Geologic mapping by the state has resulted in establishment of non-fuel mineral industries as well. Starting in 1907, the first issues in the Bulletin series of publications dealt with cement materials, brick clays, pottery clays, structural materials (limestone, sandstone, sand, chert, and gravel), and iron ores. Mapping of Warren County led to the establishment of the Mississippi Valley Portland Cement Company, which produced millions of tons of cement. County bulletins around the state have assisted the utilization of brick clay, specialty clays (bentonite, ball clay, fuller's earth), sand, and gravel deposits.

### **What are some other applications of geologic maps?**

Geologic maps provide basic information vital to a wide variety of endeavors, from agriculture and forestry to construction and water resources management.

In the 1930's when the Mississippi State Highway Department was siting a new bridge at Yazoo City, the state geological survey condemned the selected site on the basis of unstable slope conditions. The State Geologist pointed out that this 1935 report saved the state \$100,000, "an amount almost equal to the State Geological Survey's appropriation in 15 years."

An individual's largest investment is his house. Geologic maps can assist the homebuilder in selecting

a proper homesite by avoiding flood-prone areas, unstable slopes, and swelling clays that could damage the foundation.

Water is arguably Mississippi's most valuable natural resource. Geologic maps can assist water management work by providing information about the strike and dip of beds, aquifer recharge areas, and confining beds. Waste disposal facilities, from sanitary landfills in every county to hazardous waste sites, must be carefully sited geologically in order to prevent contamination of ground water. State survey county maps have been used extensively to locate favorable areas for landfills. The availability of a geologic map can save tens of thousands of dollars in a single landfill site investigation.

### **Are existing geologic maps adequate?**

The first geologic map of Mississippi was published in 1854. The present state geologic map, at the scale 1:500,000, was published in 1969. These maps provide an overview of the geology of the state. Approximately half of the state's counties have been mapped at a larger scale. These maps are much more useful for mineral exploration and site-specific work. However, some of these maps are old and many areas have not been mapped at large scale. The Bureau of Geology has continued the mapping programs of previous decades, but much more needs to be done.

The words of William H. Moore in the 1974 commemorative bulletin on Tinsley Field are food for thought:

“Tinsley Field was discovered as a result of the application of the basic principles of geology in a project not specifically directed to oil and gas exploration. The follow-up development of the field utilized much of today's sophisticated petroleum technology. Most of the giant fields in this Country may have been found, and the set of circumstances which led to the Tinsley discovery may not present themselves again. While the possibility may be small, that is what makes the oil industry exciting; the one faint hope that even now another young geologist may be approaching that anomalous outcrop whose discovery may lead to another Tinsley.”