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GL04189-2

A. GEOLOGIC SETTING

The Coastal ~~Plain~~ physiographic province covers the entire state of Louisiana. This is an area of low topographic relief, and numerous deep basins containing thick accumulations of Mesozoic to Quaternary sediments. In some of these basins, the fluids contained in the pores of the rocks are under pressures greater than that attributable to the weight of the overlying rocks. This condition is known as a geopressured environment. Some geopressured zones contain hot, saline water with dissolved natural gas, and are hence called geopressured-geothermal systems.

There are numerous geopressured-geothermal areas Louisiana including off-shore and on-shore portions of the Northern Gulf of Mexico Basin (also

known as the Gulf Coast Salt Dome Basin, the northern half of the North Louisiana Salt Dome Basin, and portions of the Mississippi Salt Dome Basin in northeastern Louisiana.

Recent assessment by the U. S. Geological Survey of the geopressured-geothermal zones in the Louisiana portions of the Northern Gulf of Mexico Basin estimates that $19{,}000 \times 10^{18}$ joules (19,000 Quads) of thermal energy and $10{,}000 \times 10^{19}$ joules (10,000 Quads) of methane energy may be present. The recoverability of this energy depends upon the amount of water produced from wells in the geopressured-geothermal zones.

An [illegible] 440 Quads of thermal [illegible] and 270 Quads of methane energy might be recoverable [illegible]

complete reservoir depletion and uncontrolled subsidence. Limited production and controlled subsidence lowers the estimate of recoverable energy to 47 Quads of thermal energy and 26 Quads of methane energy.

U.S. Geological Survey studies have identified the ATCHAFALAYA BAY Prospect in southwestern Terrebonne parish, the LA FOURCHE CROSSING PROSPECT in the southeast Pecan Island Prospect in southeastern Vermilion parish, and the Sweet Lake, Johnsons Bayou and Rockefeller Refuge Prospects in Cameron parish northwestern Lafourche parish as sites with high potential for development of geopressured-geothermal resources. DOE-sponsored studies by Louisiana STATE University have recently identified four additional sites in southern Louisiana having possible high potential. These include the False River field area covering parts of St. Landry Parish Iberville and East and West

Baton Rouge parishes; the Judge Digby field area
in Pointe Coupee parish; the Moncrief Big Cave area
in St. Landry parish; and the Rigolets field area in
St. Bernard parish.

An abandoned gas well, the Edna Delcambre
et al No. 1 in the Tigre Lagoon field of eastern
Vermilion parish was the site of the first DOE-
sponsored geopressured-geothermal well test.
Two sandstone aquifers at approximately 12,600
feet and 12,900 feet were tested. Temperatures of
112°C and 114°C, pressures of 10,600 psi and 10,990
psi, and salinities of 133,400 and 113,300 mg/l were
measured in the upper and lower zones respectively.
Methane at approximate saturation levels was present

in both aquifers. Other DOE-funded geopressured-geothermal well tests are planned for southern Louisiana. Pending final approval, tests will be made at the La Fourche Crossing Prospect ~~east of the Thibodaux area~~ in La Fourche parish, the Sweet Lake Prospect in Cameron parish, and west of the Rockefeller Refuge Prospect in Cameron parish.

In both the Northern Louisiana Salt Dome Basin and the Mississippi Salt Dome Basin, the most extensive geopressured-geothermal zone occurs in the carbonates and sandstones of the Upper Jurassic Smackover Formation. Geopressured-geothermal fluids produced have a depth of 10,900' (3323 m) to 13,500' (4115 m) range from 43 to 147° C. In the

Mississippi Salt Dome Basin, the geopressured-geothermal zones in the Smackover Formation generally occur below 10,000' (3000 m) and contain water that is at least 150° C. Estimates of thermal and methane energy contained in the Northern Louisiana and Mississippi Salt Dome Basins are not yet available.

Although most of the potential geothermal resources in Louisiana are from geopressured systems, there may be an attractive hydrothermal system in northern Louisiana. Wells in adjacent areas of southwestern Arkansas produce thermal waters up to 140° C from depths of about 3500 m. Thermal gradients in this area range from 33° to 40° C/km

Many wells and test holes in northern Louisiana have above normal thermal gradients.

B. High Temperature Resources (>150°c)

Confirmed Reservoirs: None

Prospects: Some deep geopressured-geothermal systems

C. Low Temperature Resources (< 150° c)

Confirmed Reservoirs: None

Prospects: Some geopressured-geothermal systems, possible hydrothermal systems in northern Louisiana

D. Comments

The development of geopressured-geothermal resources presents many problems. Numerous deep and expensive wells are needed for both exploration and development. The highly saline composition of most geopressured-geothermal fluids may present engineering problems. Production of associated natural gas may add additional incentive to the future development of geopressured-geothermal systems.

References:

USGS Circular 790

Jones, H. P., 1977, Geopressured geothermal energy in southcentral United States: Frontier Areas and Exploration Techniques: in Geology of Alternate Energy Resources, (Campbell, M. D., ed): Houston Geological Society, p. 215-250.

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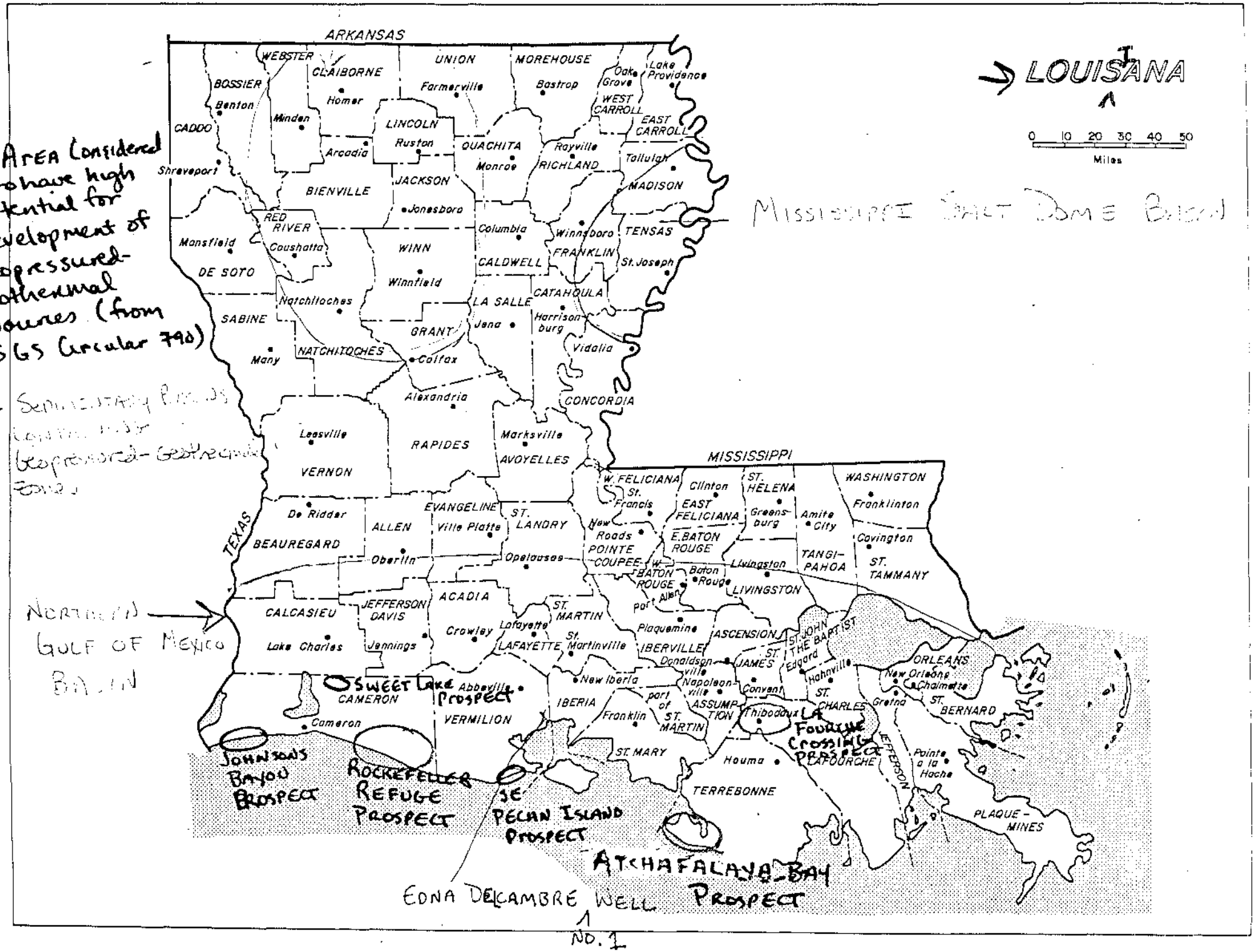

NORTH LOUISIANA [illegible]

LOUISIANA

MISSISSIPPI SALT DOME BASIN

O AREA Considered to have high potential for development of geopressured-geothermal resources (from USGS Circular 790)

O - SEDIMENTARY BASINS [illegible] geopressured-geothermal zones

NORTHERN GULF OF MEXICO BASIN