

POSSIBLE FUTURE PETROLEUM PROVINCES OF THE UNITED STATES WESTERN GULF BASIN -- PLEISTOCENE

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ABSTRACT

Hydrocarbons in sediments of Pleistocene age have been found in 56 fields located mainly offshore from Louisiana. The Pleistocene of the western Gulf basin has potential for significant additional reserves of hydrocarbons. The sequence consists of three gross depositional facies: deep-water bathyal sediments, overlain by neritic sediments, which in turn are overlain by continental deposits. The maximum thickness of the Pleistocene exceeds 10,000 ft. near the outer edge of the continental shelf in the western Gulf basin. The lithologies, facies, and types of traps in which the accumulations occur are similar to those of the underlying Pliocene and Miocene beds, which contain major reserves.

The greatest potential is in an area of 15,000 sq. mi. on the outer continental shelf offshore from Louisiana and Texas. In this area, the overall objective section, the neritic interbedded sandstone and shale facies, is from 3,000 ft. to more than 8,000 ft. thick. Approximately one-third (4,300 sq. mi.) of this area is in an early stage of development, and two-thirds (10,700 sq. mi.) is unexplored. Most of the reserves found to date occur in the continental and neritic facies of the lower Pleistocene.

The area of greatest potential is indicated by several factors. Potential source and reservoir rocks of the Pleistocene neritic facies are similar to those of the older, highly productive Tertiary section. Structural and stratigraphic conditions favoring the entrapment of oil occur as commonly in the most favorable Pleistocene area as in nearby areas of prolific Tertiary fields. The area of favorable stratigraphy on the outer continental shelf is underlain by many diapiric structures. Significant discoveries from marine Pleistocene sediments in recent years afford direct evidence that the section is a major objective for future exploration. In the past, this section has been downgraded by some workers as a potential source of hydrocarbons because of its relatively young age.

Drilling and producing capabilities are now sufficiently advanced to permit economical operations over most of the continental shelf. However, major hydrocarbon reserves are required to justify the extremely high operating expenses in the deep-water area. The continental slope of the Gulf of Mexico offshore from Texas and Louisiana is also underlain by a large volume of Pleistocene sediments, but its potential cannot be assessed at our current state of knowledge.

Figure 1 is a schematic cross section from southcentral Louisiana to the Sigsbee Escarpment in the central Gulf of Mexico illustrating the thickness and gross facies of Pleistocene sediments. A generalized outline of the present productive interval is shown. The line of section is shown on Figure 2.

Figure 2 is a generalized isopach map of the total Pleistocene in the northern Gulf of Mexico above the base "Upper Marine Shale" as defined by Akers and Holck in 1957.² The location of the South Pass Block 41 well in which the "Upper Marine Shale" was defined is shown. Pleistocene hydrocarbon accumulations are shown, including the location of Ship Shoal Block 269, which is one of the more significant accumulations. The line denoting the seaward extent of drilling emphasizes the large area of the outer continental shelf offshore from Louisiana and Texas which remains to be explored for Pleistocene hydrocarbons.

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²Akers, W. H., and A. J. J. Holck, 1957. Pleistocene beds near the edge of the continental shelf, southeastern Louisiana: Geol. Soc. American Bull., V. 68, p. 983-991.

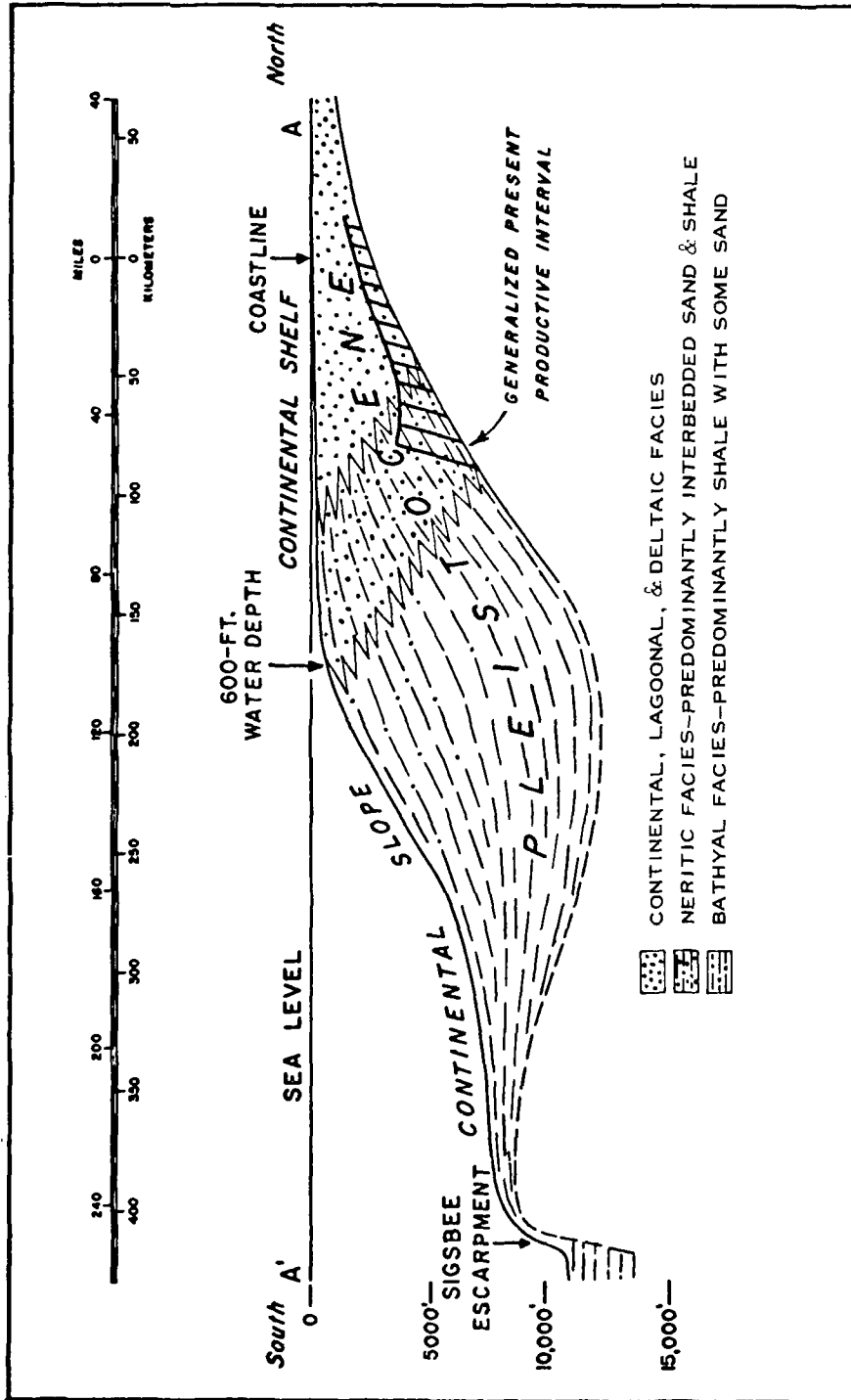


Figure 1 - Schematic north-south cross section of total Pleistocene in northern Gulf basin illustrating gross facies and lithology of unit. Line of section shown on Figure 2.

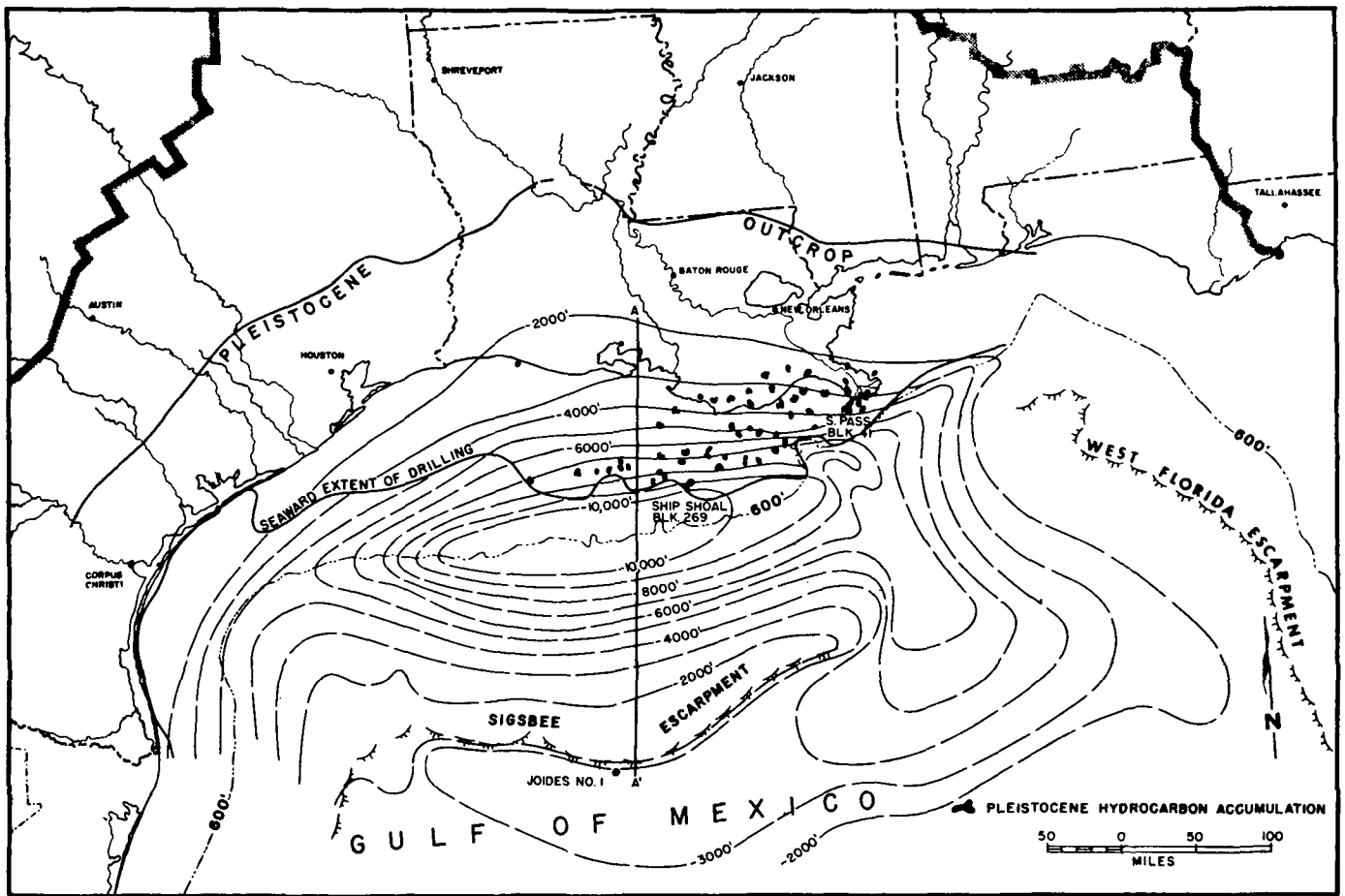


Figure 2 - Generalized isopach map of Pleistocene. The base of the unit is the base of the "Upper Marine Shale" (Akers and Holck, 1957). The top of the unit is the surface outcrop or the floor of the Gulf of Mexico. Locally thick and thin areas related to growth faults or diapiric uplifts are not illustrated. Contour interval - 1,000 ft.