Since the initial discovery of hydrocarbons in Jurassic strata in the 1930s, rocks of this age have produced prolific amounts of oil and gas. Most of the exploration, and all of the production to date, have been in Upper Jurassic strata above the Louann Salt. This "post-salt" section appears to provide significant future Jurassic hydrocarbon potential. Available well control fails to provide favorable clues to reservoir potential at reachable depths in "pre-salt" Jurassic rocks.

The Smackover, Haynesville, and Schuler Formations have provided most of the Upper Jurassic production predominantly from relatively simple structural traps (anticlinal and fault closures). Exploration for these traps will continue along the entire length of the Jurassic trend with the emphasis of the search being intensified in sparsely drilled areas such as South Texas and the trend from Mississippi eastward to Florida. More complicated structural traps (*e.g.*, the flanks of salt piercements), combination structural-stratigraphic traps, and wholly stratigraphic traps offer increasing potential in the well-developed area of East Texas, southern Arkansas, and North Louisiana. Stratigraphic traps are important in the Schuler Formation.

Other formations such as the Denkman Sandstone, Cotton Valley Limestone, and Knowles Limestone are prospective at least within local areas. These units have not been heavily explored to date, but may provide important reserves in the future.

Reservoir variability, differing gas quality, and area of deep drilling depth add to the cost and risk of finding profitable hydrocarbons in much of the Jurassic province; however, it is anticipated that significant reserves will be discovered in the sparsely developed areas to justify the exploration. The essentials for entrapment that have resulted in important accumulations in the well-developed areas also are present in the sparsely drilled areas.

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CAUSES OF DOMINANTLY ARENACEOUS FORAMINIFERAL ASSEMBLAGES IN DOWNDIP WILCOX OF LOUISIANA

Studies of cores and cuttings from 9 wells reveal a predominantly *Haplophragmoides-Trochammina-Ammomarginulina* assemblage. *Spiroplectammina, Bigenerina,* and *Bathysiphon* are less common. These forms are best represented in the more shaly and deeper water intervals of a marginal, shallow, marine section deposited under the influence of intermittently active deltaic conditions. Foraminifera, lithology, minerals, sedimentary structures, and electric-log character reflect persistently shallow and turbid water with low-oxygen and high-organic content resulting in a reducing paleoenvironment. The water chemistry inhibited $CaCO_3$ formation and the presence in quantity of calcareous Foraminifera. An abundant supply of clastic material and the lack of competition from calcareous types caused arenaceous Foraminifera to prevail in Wilcox microfossil populations.

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UPPER CRETACEOUS-CENOZOIC PALEOBATHYMETRIC CYCLES, EASTERN PANAMÁ AND NORTHERN COLOMBIA

Analysis of planktonic microfossils and benthic Foraminifera indicates 1 deep-water depositional cycle in the Late Cretaceous of northern Colombia and 2 major deep-water sequences in the Cenozoic of both northern Colombia and eastern Panamá. Only slight evidence of a Late Cretaceous deep-water cycle was found in eastern Panamá. The Upper Cretaceous deep-water cycle in the radiolarian-rich Campanian sequence of northern Colombia is characterized by a *Dictyomitra multicostata* radiolarian assemblage. Deep-water or abyssal depths of the next younger cycle (upper Paleocene-lower Eocene) are suggested by a *Pleurostomella-Nuttallides* fauna in combination with a rich radiolarian assemblage. A third abyssal sequence or cycle, in middle Oligocene to lower Miocene strata, is indicated by a *Melonis pompilioides* fauna together with a rich radiolarian assemblage.

The shallowest water facies, separating the deep-water cycles, represent mostly neritic or upper bathyal depths. These are characteristics of the basal Paleocene, the upper Eocene-lower Oligocene, and the upper Miocene through Quaternary sequences of eastern Panamá and northern Colombia. Locally, unconformities and/or nonmarine beds may represent these geologic ages.

In contrast to the deep-water cycles of eastern Panamá, the sections of the Gatún Lake area west of the Río Limón fault show relatively shallow-water marine facies (neritic to upper bathyal depths at the most). These shallow-marine facies are present in the Eocene, upper Oligocene, and upper Miocene-Pliocene sections. They are separated by either paralic beds or unconformities. Faults, such as the Río Limón fault, separate tectonic blocks that have contrasting stratigraphic and depositional records throughout most of the Cenozoic.

In eastern Panamá and northern Colombia, the shallowest water zone of each paleobathymetric cycle may represent times conductive to the migration of land faunas. These times are latest Cretaceous-earliest Paleocene, late Eocene-early Oligocene, and Pliocene and Quaternary.

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CRITERIA FOR IDENTIFICATION OF SEDIMENTARY ENVIRONMENTS IN RESERVOIR SANDSTONES

The interpretation of depositional environments for reservoir sandstones requires a knowledge of primary rock properties: composition, texture, sedimentary structure, and morphology. Each property has special significance in interpretation. Compositional and textural changes in vertical sequence are the most important criteria, but because these properties are interdependent, composition alone may be a key indicator of environment. The use of compositional criteria is illustrated by the Lower Cretaceous Muddy Sandstone in the Powder River basin, Wyoming and Montana, where fluvio-deltaic and marine-bar sandstones are clearly separated by compositional differences. Sedimentary structures are also significant. Largely on the basis of bedding, Muddy barrier island strata can be divided into 4 distinct subenvironments even though the unit is only 25 ft thick. These facies represent lower shoreface, middle shoreface, beach-upper shoreface, and dune environments. Morphology of sandstone bodies, commonly suggests environment of deposition, but this criterion is the least reliable unless it is applied with a knowledge of other rock properties.

The interpretation of morphology is commonly the principal exploration problem in stratigraphic traps. Where details of rock character are absent, the secondary properties of porosity and permeability may reflect compositional and textural changes because these