## GEOLOGY OF THE VENTURA BASIN, CALIFORNIA

## AS AN APPROACH TO OFFSHORE EXPLORATION

by

James M. Cole

## ABSTRACT

Exploratory approaches used in the Ventura Basin can serve as a model for exploration of other offshore areas. In preparation for the 1968 Ventura Basin Federal offshore lease sale, a totally integrated exploration program was required, consisting of stratigraphic tests, modern geophysical surveys for purposes other than, but including structural mapping, paleontologic studies, onshore surface geologic mapping, and ocean-floor geologic mapping and sampling by divers and diving submersibles.

The Ventura Basin, two-thirds of which is offshore, is an east-west trending synclinal trough containing 40,000-50,000 feet of principally Tertiary marine clastic rocks. Structurally, it is characterized by major east-west thrust faults and tightly folded anticlinal trends. Although anticlinal accumulations provide the largest part of the Ventura Basin petroleum, significant reserves occur in a wide variety of traps, including stratigraphic, fault and unconformity. Pliocene turbidite sandstone is the principal reservoir in the eastern part of the basin, and has yielded approximately I billion bbls. of oil from onshore fields. Miocene, Oligocene, and Eocene marine to nonmarine clastic rocks are objectives to the west.

On February 6, 1969, industry bid what was at the time a record high \$1.3 billion and spent \$603 million for 383, 341 acres; 50 percent of the acreage was in water deeper than 600 feet. Currently, deep-water drilling and producing technology is advancing rapidly as evaluation is underway.

Two separate areas in which Humble bought acreage and subsequently drilled wildcats are discussed in detail. One area resulted in a major oil discovery and the other, where Humble paid \$45 million for the lease, is considered a failure. Actual maps and cross-sections that were used prior to the sale are compared with current maps that reflect changes resulting from drilling; in essence, a before and after series of geologic maps are presented along with the "methodology" what was used in the geologic interpretations.

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Biographical Sketch



After graduating from the University of Oklahoma in 1958 with a M.S. Degree in Geology, James M. Cole joined Humble. The following six years were spent in various assignments in Texas including surface, subsurface and production geology.

In 1964 he was transferred to California to be primarily involved with the geology of the Ventura Basin, initially participating directly in geological studies in preparation for the Federal offshore lease sale held in February, 1968. From 1967 to 1969, Mr. Cole served in the supervisory capacity of District Geologist in charge of evaluating acreage acquired in the sale in which Humble spent 218 million dollars for leases. Cn September 1, 1969, he was assigned to the staff of the Western Division Geologist for a special project, which included a series of lectures at thirty major universities

throughout the United States on the subject of the Ventura Basin. In May of 1970, Mr. Cole was transferred to the Exploration Headquarters Analysis Section in Houston as Exploration Coordinator.

In April of 1969, Mr. Cole presented a paper at the National AAPG meeting in Dallas entitled "Geology of the Ventura Basin as an Approach to Exploration of the Continental Margin". After the Dallas presentation, the paper was updated with more emphasis on the technical application of geology and geophysics and results of drilling, prior to offering it to the universities.

Currently, he is a member of the National AAPG and Pacific Section AAPG.