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YEGUA AND WILCOX POTENTIAL, UPPER TEXAS GULF COAST

In the past, the Yegua and Wilcox Formations, of Eocene age, have been major exploration objectives in the Upper Texas Gulf Coast. The Yegua has been a prolific producer and has received widespread investigation along established trends. It has been only within relatively recent times that attention has been given to the downdip potential, especially as concerns the basal sands in that formation.

The Wilcox has not received the same intense exploration in regard to complete penetration of the entire section. In detail the Wilcox is very difficult to correlate, and markers must be established to guide exploration. Marine wedges, or zones with source-bed connections, exist, and a tentative middle marker has been proposed to identify one such zone.

The configuration of the Wilcox and Yegua depositional basin is considered to be important for downdip exploration. Major regional tectonic features had an effect on deposition as did faults and structural movement contemporaneous with deposition. Dip and east-west sections indicate regional sedimentation changes.

The utilization of regional studies along with detailed local investigation helps to explain existing production. The same tools can be used as a guide for future exploration.

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SUBSURFACE GEOLOGY OF ST. HELENA, TANGIPAHOA, WASHINGTON AND ST. TAMMANY PARISHES, LOUISIANA

St. Helena, Tangipahoa, Washington, and St. Tammany Parishes comprise the eastern half of the "Florida Parishes," an area located between two major producing provinces, the Cretaceous and Wilcox of south Mississippi on the north and the prolific Miocene of south Louisiana on the south.

Strata seen to date range in age from surface Pleistocene terraces and Recent alluvium to the Lower Cretaceous. This paper summarizes the stratigraphy, structure, and oil and gas production of the area, and includes a brief discussion of pertinent oil and gas production in the adjacent Mississippi counties.

Subsurface structure is shown on a series of maps contoured on datums of the top of the *Heterostegina* zone, the Wilcox Group, the Clayton-Selma Chalk, the Eutaw Shale, and the lower Tuscaloosa Formation. Four geological cross sections illustrate stratigraphic, structural, and facies relationships. Structural contours demonstrate downflexing of Tertiary strata; show a shifting of strike to a more northerly trend with progressively deeper strata; and are strongly deflected southward by the Hancock County high. Correlation of electric logs shows pronounced structural thinning on the Hancock structure in the Comanchean, Gulfian, Paleocene, Eocene, and Oligocene Series. Truncation of the upper Wilcox, Claiborne, Jackson, and possibly Vicksburg beneath Miocene strata indicates a major period of growth occurred there sometime prior to the early Miocene.

History of development, production, and structure of Angie-East Angie-Sandy Hook field is summarized. A map showing the structure of the top of the producing ower Tuscaloosa is included.

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SIGNIFICANCE OF LOWER TUSCALOOSA SAND PATTERNS IN SOUTHWEST MISSISSIPPI

The lower Tuscaloosa Formation has been a prolific oil producer in southwest Mississippi. Major fields have been found on both large uplifts and very low-relief structural noses. In every case, development of these fields has been somewhat hampered by the erratic sand development.

Sand patterns in these fields indicate deposition in meandering stream channels in a deltaic environment. Recognition and projection of the patterns reduce dry-hole risk in both field development and exploratory drilling.

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FASHING FIELD, ATASCOSA-KARNES COUNTIES, TEXAS

Fashing field, as presently defined, is 10 miles long and 2 miles wide. The field extends from the southeast corner of Atascosa County to the northwest corner of Karnes County, approximately 50 miles southeast of San Antonio, Texas. Lone Star Producing Company discovered gas in the Edwards limestone (Lower Cretaceous) at Fashing in July, 1956, when its No. 1-A L. T. Urbanczyk well reach the top of the Edwards at 10,210 feet and found 580 feet of productive section that had an initial potential of 26,000 MCFGPD plus 24 barrels of 50.6° gravity distillate per MMCF.

The Edwards structure at Fashing field is dominated by a simple, northeast-trending up-to-the-coast fault with effective closure against the high side. This fault has a maximum vertical displacement of approximately 700 feet at the Edwards level, which decreases to a maximum of 320 feet going up the section to the Carrizo Sand (Eocene) level. The fault is responsible for the Weigang field oil production at the Carrizo level. The fault dips northwest, with the angle of dip decreasing from 50° at the Carrizo to 38° at the Edwards.

Edwards gas production at Fashing comes from two separate zones called the "A" and "B" zones, respectively. The "A" zone has an average porosity of 15.5 per cent, an average permeability of 12.6 millidarcys, and an average connate water saturation of 28 per cent. The "B" zone has an average porosity of 13.2 per cent, an average permeability of 4.4 millidarcys, and an average connate water saturation of 24 per cent.

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PERSON FIELD

Person field is in Karnes County, Texas. It is one of a series of fields located along a northeast-trending regional fault system in which oil and gas condensate are produced from Lower Cretaceous, Edwards, carbonate reservoirs.

The field was discovered by Brazos Oil and Gas Company in 1959. Accumulation is trapped on the upthrown sides of three slightly arcuate up-to-the-coast normal faults which intersect the southeast-dipping Edwards strata. The reservoir is divided into the "Upper Edwards" which averages 175 feet in thickness and contains two porous limestone zones and three porous dolomite zones, and the "Lower Edwards," about 375 feet thick and predominantly limestone.

The oil column is about 120 feet, and the gas column is approximately 350 feet. Total cumulative production as of March 1, 1962, was 1,553 000 barrels of oil Ob-

jective sections above the Edwards have been found water-bearing, and in three deep tests (to the Sligo) porous sections were of too low permeability to be commercial. The field limits are essentially defined, at a length of about 7½ miles and a width slightly more than a mile.

Shell Oil Company is currently completing a 15 million cubic foot capacity gas treating plant at Person for the extraction of sulphur and sale of sulphur and sweetened gas. The plant will be owned by all of the operators in the field.

LAFAYETTE GEOLOGICAL SOCIETY STUDY GROUP, Lafayette, La.

CAMERINA AND CIBICIDES HAZZARDI STRATIGRAPHIC INTERVALS OF SOUTHWEST LOUISIANA

The economic significance of the *Camerina* and *Cibicides hazzardi* zones and the numerous unanswered questions relative to possible areas of reservoir sand development, areas of maximum and minimum sedimentary accumulations and sand percentages, and downdip lithofacies developments prompted the preparation of electric log correlation sections and lithofacies study of the intervals.

Three west-east (strike) and five north-south (dip) electric log correlation sections are presented. These sections show the correlation points used, depths at which various zones occur, and the relationship between the lithologic and paleontological markers. The correlations are extended as deep as possible and include the tops of the Hackberry, *Nonion struma* and *Nodosaria blanpiedi*.

Isopachous maps of the *Camerina* and *Cibicides hazzardi* intervals, isopachous maps of the net effective porous and permeable sand found in each interval, and sand percentage maps were constructed. In addition to providing lithofacies data, these maps add a third dimension to the correlation sections. The primary purpose of the study was to develop data to be make available for individual interpretation. For this reason, only general observations relative to the findings are recorded in the text.

Sedimentation within the *Cibicides hazzardi* interval was influenced markedly by regional growth faults. Pronounced thickening and net sand increase occur on the downthrown side of these faults. Sedimentation within this interval has also been affected locally by the older Hackberry negative area and by *Nodosaria blanpiedi* growth faults. *Cibicides hazzardi* sediments are best developed along northeast-southwest-trending axes which exhibit thickening and a decrease in net sand and sand percentage gulfward. The downdip limit of *Cibicides hazzardi* sand development exists in the southeast part of the area studied.

The *Camerina* zone is characterized by the existence of large positive areas north of regional growth faults and tremendous thickening and net sand increases on the downthrown side of these faults. *Camerina* sands show good development as far south as the study was extended.

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BIG JOHN (EDWARDS) FIELD

Big John (Edwards) field is in northwestern Karnes County, Texas. Its productive limits are north of and adjacent to the now abandoned Hobson field that had produced more than 3½ million barrels of oil from Reklaw and Carrizo sands. Both accumulations were trapped on the upthrown side of an up-to-the-coast fault that is a part of the Fashing-Persons fault system.

Big John field was discovered in 1960, as the result of subsurface surface mapping and trend drilling, with the assistance of major company seismic leads. The gas column is approximately 200 feet thick, and the effective oil column only 25 feet thick. Vertical closure in the reservoir is at least 250 feet. The areal extent of the field is approximately 2,600 acres.

Cumulative production as of March, 1962, has been 117,400 barrels of oil and 425 million cubic feet of gas.

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COMPUTER APPLICATIONS TO LOG INTERPRETATION

Modern stored-program electronic computers are adaptable to statistical studies and other repetitive arithmetic operations relative to log interpretation. This paper touches on several applications in practical use within the industry today. An effort is made to assess both the validity and the economics of machine computation.

Machine speeds are unbelievably fast, permitting an investigation of a large spectrum of possible interpretations. It must be recognized, however, that each problem must be very well defined before taking it to the computer. This suggests that each program must evolve slowly starting with a few simple operations and decisions. Modifications are then based on previous results.

In order to justify the expenditures for the programming and operation of the computer, the answers produced must be valid and of increasing utility in the search for oil.

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STRATIGRAPHIC IMPLICATIONS FROM STUDIES OF THE MESOZOIC OF CENTRAL AND SOUTHERN MISSISSIPPI

Beds of Mesozoic age hold much promise of further oil and gas production in central and southern Mississippi without "getting farther downdip and drilling deeper." Examination of cuttings and cores from many wells in this area, and correlation with electrical logs of these wells, point out some areas which may contain favorable facies for oil and gas accumulation.

In southwestern Mississippi, sediments from the upper Tuscaloosa suggest a return to depositional environments prevalent in lower Tuscaloosa time. The lower Tuscaloosa is productive in this area from deltaic and stream channel deposits. Some production is already established from the upper Tuscaloosa.

Recent deep tests have added to knowledge of the Lower Cretaceous carbonate section in southern Mississippi and this information can be used in interpreting the environment of deposition of this section. No porosity trends have been established but a few zones with some porosity are present.

In central Mississippi, beds of Jurassic age can be reached at depths which are economically feasible to drill. The Cotton Valley is for the most part continental, but a few wells contain beds which may be rich enough in organic material to be source beds . The Smackover Formation has possible objective zones in this area, but the belt of possible porosity is very narrow.

Stratigraphic cross sections in these favorable areas show the possible extent of favorable zones and help to explain the depositional history of these areas. Lack of identifiable fossils makes paleontological determinations very difficult. Lithologic studies with consideration of the environment and paleogeography are the most useful tools of study in this area.