PALEOSTRUCTURAL ANALYSIS OF OLD OCEAN FIELD

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ABSTRACT

The petroleum geologist's search for energy sources leads him to prospective areas where he conceives structural or stratigraphic traps. This is only the beginning, however, for in order to understand and delineate the potential of an area one needs a clear and concise concept of the depth – burial – migration sequence of the prospect. In an effort to clarify and relate this concept to future prospects, the writers have chosen to analyze Old Ocean Field.

An explanation is offered for the absence of significant hydrocarbons in pre-F-21 sands. The F-21 is local nomenclature for a producing sand body found approximately 300 feet below the top of the Lower Frio.

One gas-condensate reservoir (F-21) and one oil reservoir (F-12) with a sizeable gas cap are analyzed by following their structural development from the time of earliest closure to the completion time of hydrocarbon migration. This is done through the presentation of a series of cumulative isopach maps.

In the case of the F-21 reservoir, a small anticlinal trap was available to migrating hydrocarbons as early as the time of deposition of the F-19 sand. In the instance of the F-12 reservoir, closure was established by the time of deposition of the *Nodosaria blanpiedi* marker. Migration could have started this early, provided a supply of hydrocarbons was available.

Based on the size of the traps then available, the depth of burial at that time and the associated pressure – volume – temperature relationships, it was deduced that accumulation in both reservoirs could have been completed by the beginning of Miocene deposition, but not much earlier. This time coincides approximately with cessation of movement on the principal fault.

The structure was located in an area of drainage that was large enough and sufficiently rich in hydrocarbon source rocks to provide the known reserves. It is further concluded that a trap existed at such time as physical and chemical conditions permitted release of oil and gas from the source material, and they became free to migrate.

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GULF COAST PHOTOGEOLOGIC APPLICATIONS

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ABSTRACT

The Gulf Coast is an important province for photogeologic applications even though much of it is of low dip and low relief and often covered by Pleistocene terrace deposits.

The Gulf Coast is a very active and dynamic province, characterized by clastic sediments that were laid down very rapidly. As a result the sediments are out of equilibrium and considerable compaction and settling has occured, which has formed many structures. It is this movement and adjustment, acting throughout geologic time, that allows a subsurface structure to continually propagate to the surface, where it can be detected by subtle photogeologic techniques.

Photogeologic or photo geomorphic techniques, including analyses of drainage, topography, vegetation, deposition, and lineation, can definitively locate surface structures. A large number of oil and gas fields throughout the Gulf Coast have surface expression. Fields with good expression include those located in areas of current exploration interest, such as Sunniland and Felda in South Florida, Flomaton and Blackjack Creek in the Alabama-Florida Jurassic play, Edgewood and Fruitvale in East Texas, and Big Wells and Los Tiendos in Southwest Texas. Many other fields have good expression including Citronelle, Blacklake, Neale, Reyes, Mathis and North Government Wells to name a few.

Normally, photogeologic interpretation must terminate at the coastlines, but a relatively new sonar-subsea mapping device now allows exploration to continue on into the shelf areas. The Institut Francais du Petrole, or IFP, has developed a wide-range scanning sonar that can provide sea-bottom sonar images that rival aerial photographs.

[1] Photogravity Company, Inc.