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POTENTIAL STRATIGRAPHIC TRAPS  
IN META SUB-BASIN, PACHAQUIARO AREA  
COLOMBIA, SOUTH AMERICA

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by

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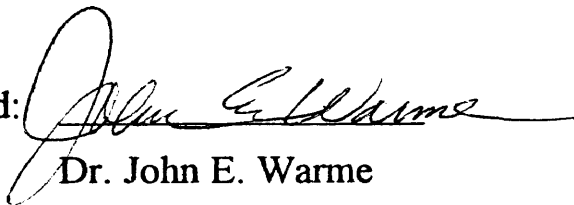
A thesis submitted to the Faculty and the Board of Trustees of the Colorado School of Mines in partial fulfillment of the requirements for the degree of Master of Science (Geology).

Golden, Colorado

Date: December/1992

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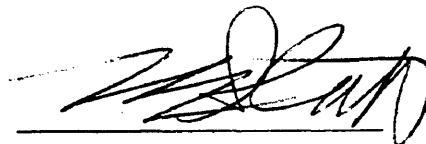
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## ABSTRACT

An integrated study using seismic, well log, paleontological and core data was undertaken to define the possibilities for oil accumulation in the Pachaquiario area, in the Llanos Orientales region, eastern part of Colombia. The focus of this research was on stratigraphic traps that may exist in the area.

A structural-inversion model is proposed involving the Cordillera Central, Magdalena Valley, Cordillera Oriental and Llanos basin.

During Cretaceous and part of Tertiary time, normal faults existed in the present location of the Cordillera Oriental. These faults were reactivated resulting in structural inversion during the late Tertiary uplift of the Cordillera Oriental.

Two structural styles were recognized in the basement: (1) extensional to the east of the Negritos area, which is interpreted as a rift, based on the presence of graben structures, and (2) a high angle dipping surface without faulting to the west of the Negritos area.

For Paleozoic strata, a thrust system is proposed with anticlines generated by fault-bend-folding. The apparent reactivation of these faults during the sedimentation of both Upper Cretaceous and Lower Tertiary rock sequences is of exploratory significance. Because of synsedimentary uplift, small anticlines created by reactivation have thicker deposition on the flanks, with better possibilities for reservoir development. An example is observed in the Camoa-1 well location, where the structural evolution of the anticlines

controlled the sedimentation on the flanks.

The Paleozoic-Cretaceous and Cretaceous-Tertiary boundaries were reevaluated, and new stratigraphic levels for those boundaries are proposed.

A sequence-stratigraphy analysis was made, to identify major sequences and sequence boundaries. This analysis shows the Paleozoic-Cretaceous and Cretaceous-Tertiary as the most evident sequence boundaries.

For Cretaceous sediments a transgressive systems tract, and for the Tertiary a series of transgressive and highstand systems tracts are proposed in the study area. A transgressive systems tract implies fluvial filling of the previous incised valleys during a rise of sea level, making good reservoirs, as happens with the K2 and T2 Sandstones.

Highstand systems tracts were related to periods of highstand sea level when the E4 and E3 Shales were deposited, forming good seals over the T2 and T1 Sandstones.

Three groups of stratigraphic plays were recognized: (1) rift deposits, (2) pinchouts as in the Candilejas area, where Cretaceous and lower Tertiary are pinching out against a Paleozoic paleohigh, and (3) lateral facies changes as in the Camoa area, inferred from T2 Sandstones.

Exploration in the area should concentrate on the high potential of stratigraphic traps, instead of the small-size anticlinal structures.

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