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LOWER CRETACEOUS (NEOCOMIAN AGE) CALVIN LIMESTONE SHELF-MARGIN COMPLEX, NATCHITOCHES PARISH, LOUISIANA

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Abstract

The Calvin Limestone is a lower Cretaceous (Neocomian age) carbonate shelf margin complex. This carbonate complex is stratigraphically located between the Winn Limestone and the Knowles Limestone (Tithonian age). Regional geologic and seismic correlations show this shelf margin to be stratigraphically equivalent with the Calvin Sandstone, Calvin Field Winn Parish, Louisiana.

The potential reservoirs in the Calvin Limestone are identified as *Lithocodium* encrusted coral/stromatoporoid boundstone and as rubbly coral/stromatoporoid grainstones formed in areas of high wave energy associated with the reef growth along the shelf margin. These shelf margin facies are limited in an updip (shelfal) direction, as they grade into a wackestone inner shelf lithofacies. The cores from the ARCO Huffman-McNeely Natchitoches Parish, Louisiana, represent slope (grainstones and packstones), shelf-margin (boundstone and grainstone), and the inner shelf (wackestone) carbonate facies.

The Calvin Limestone contains microporosity, resulting from the recrystallization of former Mg-Calcite allochems to subhedral to euhedral microrhombic calcite crystals ranging from 1 to 5u in size. The predominant recrystallized material is *Lithocodium*, a problematical green algae. The excellent textural preservation and minimicrite crystal size of the nonporous portions of *Lithocodium* grains suggest that these grains were originally Mg-Calcite. No originally aragonite allochem or equant calcite cements are now microrhomic calcite.

The paragenetic relationships and minor elemental analysis of the microrhombic calcite in the Calvin Limestone point to an origin in the shallow subsurface, meteroic ground water system after the initial stabilization of the metastable carbonate sediments.

The microporosity associated with the boundstone and grainstone facies is the predominant pore network present in the deeply buried Calvin Limestone (>15,000'). This deep occurrence suggests that microporosity associated with microrhombic calcite may have excellent preservation potential with burial.

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