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Depositional Model for the Oligocene Deltaic Succession of El Furrial Field, Northern Monagas, Venezuela

El Furrial field is located within the Maturín sub-basin in northeast Venezuela. It comprises a 7600 mmstb-oil accumulation with recoverable reserves of 3800 mmstb. Daily production is approximately 400 MBO. Three stratigraphic reservoir intervals, representing 2200 feet of section, are identified as Upper Naricual, Lower Naricual and Cretaceous. Oligocene rocks are found in Upper Naricual and the top of Lower Naricual.

Using 4300 feet of conventional cores, 150 well logs and paleontology from 8 wells, a detailed depositional model was built for the Oligocene section. This section was subdivided into three major units: 1) A prograding unit composed of shoreface deposits encased by marine mudstones, accompanied by distributary channels capped by brackish bays, 2) An aggrading unit composed of distributary channels and crevasse splays, limited by brackish bay mudstones commonly associated with paleosols and marshes, and 3) A transgressive unit towards the top of the Oligocene, composed of marine-influenced distributary channels alternating with shoreface and mouth bar deposits. Atop of this unit, subsidence increases and the deltaic system is drowned and back-stepped to the southeast of the basin.

Twenty-eight sedimentary units are mapped across the field to determine the aerial distribution of each depositional facies. Also, stratigraphic sections with environmental interpretation are made to understand reservoir geometry and architecture. In terms of reservoir quality, there is a good relationship between lithofacies and rock quality, which impacts flow behavior. Production and injection are favored in the coarser sand bodies with high-energy sedimentary structures, commonly identified as the megaporous, high-flow capacity rock.