Depositional Environments, Diagenesis, Cyclicity, and Facies Distribution of the Abo Formation, Billy (Abo) Field, Lamb County, Texas

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The Abo Formation (Permian, Leonardian) is a time-transgressive shallow marine succession that formed along a rimmed shelf margin on the northwest and north shelf of the Permian Basin, Texas. This study is based on core and thin section examination of one cored well from the Billy (Abo) Field in Lamb County, Texas. The core samples from this study area have been completely dolomitized. In addition to the main perforated reservoir, there are intervals that display characteristics of reservoir quality rocks. The best measured porosity and permeability is found between in the open marine facies of the Burlington Resources William W #1. Although these rocks exhibit characteristics of reservoir quality rocks, they are below the oil/water contact at this location and thus are not productive.

The identified depositional facies were 4 types of depositional cycles: tidal flat, ooid shoals, restricted marine subtidal capped, and open marine. The reservoir rocks consist mostly of shoal capped and restricted marine cycles with ooid/peloid dolowackestones to dolopackstones and skeletal dolowackestones to dolopackstones. The tidal flat cycles act as the reservoir seal and contain stromatolitic algal laminations and fenestral porosity can be observed. Karst overprint is prominent throughout most of the Burlington Resources William W #1.

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