



Valanginian Knowles Limestone, East Texas: Biostratigraphy and Potential Hydrocarbon Reservoir

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ABSTRACT

The Lower Cretaceous Knowles Limestone is the uppermost unit of the Cotton Valley Group in the northeastern Texas Gulf Coast. It is the oldest Cretaceous carbonate shelf deposit that is a prospective reservoir. This shallow shelf-to-ramp shoaling-up complex is an arcuate lenticular lithosome that trends from East Texas across northwestern Louisiana. It is up to 330 m (1080 ft) thick and thins both landward and basinward. Landward lagoonal inner ramp facies are mollusk wackestone and peloidal packstone. The thickest buildup facies are coral-chlorophyte-calcimicrobial boundstone and bioclast grainstone, and the basinward facies is pelagic oncolite wackestone. The base of the Knowles is apparently conformable with the Bossier/Hico dark gray shale. The top contact in East Texas is disconformable with the overlying Travis Peak/Hosston formations. Porosity resulted from successive diagenetic stages including early marine fringing cements, dissolution of aragonitic bioclasts, micrite encrustation, later mosaic cement, and local fine crystalline dolomitization.

The age of the Knowles Limestone is early Valanginian based on a calpionellid-calcareous dinoflagellate-calcareous nannofossil assemblage in the lower part and a coral-stromatoporoid assemblage in its upper part. The intra-Valanginian hiatus represented by the Knowles/Travis Peak unconformity correlates with the Valanginian "Weissert" oceanic anoxic event. Possibly organic-rich source rocks were deposited downdip during that oceanic low-oxygen event.

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