

# EFFECTS OF SYNDEPOSITIONAL STRUCTURES ON LOWER VICKSBURG (OLIGOCENE), FLUVIAL-DELTAIC SEDIMENTATION, McALLEN RANCH FIELD AREA, HIDALGO COUNTY, SOUTH TEXAS<sup>1</sup>

by

Jong H. Han<sup>2</sup> and Alan J. Scott<sup>3</sup>

The Lower Vicksburg sandstones of the McAllen Ranch field area (including McAllen Ranch, Santa Anita, and Guadalupe fields) in south Texas have been significant gas producers for almost four decades. However the relationship of syndepositional structures to the type and distribution of depositional systems is still not fully understood. The importance of growth faults, especially major regional faults, has long been recognized. Further detailed studies concentrating on deeper sandstones of the Vicksburg Formation indicate that these faults in the lower Vicksburg are characterized by low angle fault-planes and greatly expanded stratigraphic intervals with plunging rollover structures on the downthrown fault blocks. Greatest stratigraphic expansion is associated with channel mouth bar or delta front facies.

Extensive drilling and acquisition of high resolution seismic data in this area has provided the necessary stratigraphic control to determine the significance of more subtle structural effects on sedimentation. The present study is based on the analysis of 142 well-logs, 10 cores, and several seismic lines.

The information from cores, characteristic log patterns and net-sandstone maps of discrete genetic subunits strongly suggests a high constructive deltaic origin for the reservoir facies. The maps show areas of rapid subsidence associated with large-scale mud movements. These movements result in the formation of sediment withdrawal basins and fringing syndepositional anticlinal-ridges. The localized basins have a profound effect on the style of deltaic sedimentation. Most significant is the exceptional thickening of the distal delta plain facies characterized by interdistributary bay mud and crevasse splay sands. The splay sands contain abundant macerated plant material. Individual splays have a limited lateral extent, are stacked vertically, and form complex imbricated sand bodies which are gas-prone stratigraphic traps. Such an area presents an ideal target for explorationists and a complex set of problems for the production staffs contemplating secondary recovery projects.

---

<sup>1</sup>Publication authorized by the Director, Bureau of Economic Geology, The University of Texas at Austin.

<sup>2</sup>Bureau of Economic Geology, The University of Texas at Austin.

<sup>3</sup>Department of Geological Sciences, The University of Texas at Austin.