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James R. Derby<sup>1</sup>, Jason C. Andrews<sup>2</sup>, Joe Podpechan<sup>2</sup>, Sandeep Ramakrishna<sup>3</sup> (1) Consulting Geologist, Tulsa, OK  
(2) Independent Geologist, Tulsa, OK (3) University of Tulsa, Tulsa, OK

**U.S. DOE-Sponsored Development Case Study of a Karsted Carbonate "Island" Hydrocarbon Reservoir: West Carney Hunton Field, Lincoln and Logan Counties, Oklahoma**

The West Carney Hunton Field (WCHF) produces oil and gas from the Silurian Hunton Group, a carbonate unit lying between the Ordovician Sylvan Shale below and the Upper Devonian Woodford Shale above. The field is unique in its manner of production; a typical well initially appears uneconomical in that it produces very large quantities of water, with some hydrocarbons. Reservoir rock in the field can best be described as a heterogeneous system composed of an erratic distribution of "high" and "low" permeability carbonates with varying amounts of porosity. The field is made commercial only by significantly dropping reservoir pressure, which allows hydrocarbons stored in the "low" permeability component of the reservoir to flow into the "high" permeability component where it can be efficiently produced. This is accomplished by pumping very large quantities of water; hundreds to in some cases thousands of barrels a day. Within days to weeks the quantity of hydrocarbons produced increases while the quantity of water produced decreases, ultimately resulting in a profitable well. Field development and production history is complicated by an unusual distribution of reservoir quality dolomite and limestone across the field. The recent trend of operators in the field is to drill horizontally, increasing the quantity of "good" reservoir rock intersected by the borehole. Distribution of porosity types, lithologies, and production is best understood by a model for two distinctly different reservoirs in the same stratigraphic horizon and of slightly different geological ages.