

Discovery and Development of Prolific Reservoirs in the Geneva Dolomite Result from the Application of Advanced Technologies Along the Silurian Reef Trend in the Illinois Basin

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Participants in workshops on three innovative technologies, sponsored by the Midwest PTTC, have successfully employed these technologies to discover a new field and to enhance field development in a mature basin. The combined use of 3-D seismic, horizontal drilling, and underbalanced drilling resulted in a new Geneva Dolomite discovery at Stephen A. Forbes State Park in Marion County, Illinois. The initial well was completed flowing nearly 3,000 barrels of oil per day from a depth of 4,000 feet. Successful development wells in multiple pays have since been added using the same technologies, producing up to five times the rate of nearby vertical wells.

Oil is trapped in the Geneva Dolomite on pronounced, closed structures. Closure on these deformational structures is enhanced by Silurian reefs which selectively grew on tectonically related paleostructural highs. This combination of reef/deformation structure is common to most of the Geneva reservoirs.

Three-dimensional (3-D) seismic technology was used at nearby Tonti Field to accurately delineate the subtleties of reef structures in the field, establishing the presence of multiple Geneva high areas that likely mimic an undulatory surface of the underlying Silurian pinnacle reef. Details of the topography of a pinnacle reef show clustered high areas that are key to exploration and development of Geneva Dolomite reservoirs. By-passed incremental oil has been produced from these clustered highs. Implementation of 3-D seismic and horizontal drilling technology should significantly improve the drilling success rate and recoverable reserve figures for these reservoirs.