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Characterization of the Mt. Simon Sandstone Gas Storage Reservoirs at Herscher and Herscher Northwest Fields, Kankakee County, Illinois

Herscher Field in Kankakee County was originally an Ordovician-age Trenton oil field that was abandoned in the early 1900's. In 1952, the storage of natural gas for peak delivery to the Chicago market was begun in the Cambrian-age Galesville Sandstone. In 1956, storage of natural gas was begun in the underlying Cambrian-age Mt. Simon Sandstone and Elmhurst sandstone member of the Eau Claire Shale, which provided a better-sealed reservoir. Geologic characterization of the Mt. Simon/Elmhurst reservoir at Herscher has been fraught with difficulty because of the lack of modern wireline logs. Core data from seven wells, and neutron and gamma ray curve data, the only wireline logs available, were used for petrophysical analysis. Most of the wells were drilled and logged after the initial storage of gas had begun; therefore, many of the neutron logs were influenced by the 'gas effect' and resulting calculated porosity values were too pessimistic. An alternative empirical methodology using Vshale to estimate porosity was used to improve models in gas effected intervals. Even this method does not fully capture the porosity variation seen in core for the cleanest sandstone. Nevertheless, three-dimensional modeling of the Mt. Simon/Elmhurst reservoir, using Vshale, shows shale interval baffles and porosity variation within the fields, but there are no laterally extensive shales that would vertically compartmentalize the reservoir. Methodologies used in this project can be applied to other gas storage reservoir characterization projects where data quality is an issue.