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### **Data Constraints in 3-D Reservoir Characterization of Illinois Mt. Simon Gas Storage Fields**

In northern Illinois the Cambrian Mt. Simon Sandstone is a permeable and porous formation that is used for gas storage by the utilities in the state. This U. S. Department of Energy study evaluated the Mt. Simon in Manlove Field, Champaign County, Illinois and Herscher Field, in Kankakee County, Illinois, in order to improve knowledge of the reservoir character and geometry. The reservoir sandstone occurs at 3,900 feet in Manlove Field and 2,200 ft at Herscher Field. There are significantly more data available for a reservoir characterization study at Manlove than for Herscher field. The 3-D porosity model at Manlove Field is well constrained with porosity and permeability measurements from 35 cores and calculated porosity values from modern FDC-CNL logs run in half of the 170 wells in the field. The resulting 3-D model indicates a heterogeneous reservoir with channel-confined, vertically discontinuous, high porosity compartments.

Herscher field modeling is less well constrained, but still provides insight into reservoir compartments. Only six wells have reservoir core data, two wells have FDC-CNL logs, while the remaining wells have only 60's vintage gamma ray-neutron logs, many of which were useless for neutron porosity determination due to "gas effect". An alternative modeling approach is to develop a Vshale-porosity transform. This 3-D model indicates more laterally continuous sandbodies than at Manlove, although vertical continuity remains fairly poor. Thus, although well-constrained models are preferable, models built with older, less constrained data provide an improved understanding of the heterogeneous Mt. Simon reservoir geometry and potential flow units.