

Subsurface Facies Analysis of the Cambrian Mt. Simon Sandstone in Western Ohio

By

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In Ohio, the Cambrian sedimentary section can only be studied in the subsurface. The Cambrian Mt. Simon Sandstone was the first sedimentary unit deposited above the basal Precambrian unconformity, and is of interest as a potential hydrocarbon reservoir and as a target for hazardous waste deep-well injection. Detailed subsurface facies analysis of the Mt. Simon Sandstone was conducted from continuous cores and geophysical logs from two wells: the Ohio Department of Natural Resources Warren County well (DGS-2627) and the British Petroleum Company Allen County well (BP-4).

In the ODNR well, the Mt. Simon Sandstone shows a generally coarsening- and thickening-upward sequence of sandstone, siltstone, and minor mudstone. Tidal rhythmites, flaser, lenticular, and wavy bedding, mud drapes, intraclasts, and significant bioturbation structures attest to a shallow marine, tidally-influenced, depositional setting. The Mt. Simon Sandstone is interpreted as a transgressive barrier sequence, documenting migration of the barrier itself above a basal lagoonal/estuarine succession. Independent tests of the geophysical logs shows a characteristic signature of the facies described and interpreted from core samples.

On the basis of the geophysical logs, depositional facies were predicted in the BP-4 well, and then confirmed by facies analysis of the core samples from that well. Facies were predictably recognized, however it became apparent that previous workers had misidentified the upper contact between the Mt. Simon Sandstone and Eau Claire Formation in this well. A regional interpretation suggests that the Cambrian coastline in Ohio was generally oriented north south, and transgression proceeded to the NW and NE.