

Stratigraphy, Lithology and Geographic Extent of the Collingwood Member of the Trenton Limestone in North-Central Lower Michigan

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The recent discovery of commercial quantities of natural gas in the upper part (Collingwood Member) of the Trenton Limestone in north-central Michigan has spurred extensive leasing and renewed interest in the deep hydrocarbon potential of the central Michigan basin. Examination of several cores that cover the basal Utica Shale and Upper Trenton Limestone allows for delineation of the Collingwood Member based on lithology and organic content. The Collingwood in these cores is primarily a fine-grained, organic-rich, black limestone interbedded with thin, less organic-rich beds of brachiopod shell limestone. The Collingwood is abruptly overlain by the siliciclastic, clay-rich Utica Shale and grades gradually downward into micritic and skeletal limestones of the Trenton.

Detailed examination of wireline logs from nearby wells show that the Collingwood is identified by an interval of lower density and higher porosity than the underlying Trenton Limestone. Resistivity values are also significantly higher through the Collingwood interval. The contact with the overlying Utica Shale can be easily identified by the sharp increase in gamma ray and neutron porosity values typical of shale. Correlation of these log attributes throughout northern Lower Michigan indicated the Collingwood is both geographically and stratigraphically, a wedge-shaped package of strata occupying only the central portion of the north half of Lower Michigan. The Collingwood appears entirely absent west of a line from Traverse City to Mt. Pleasant. Thickness ranges from near zero in southern Isabella County to over 30 feet in northern Emmet County. The Collingwood member is also apparently absent in eastern counties north of Saginaw Bay and south of Alpena.