Hydrocarbon Potential of the Silurian and Lower Devonian Biohermal Dolomite in East-Central Illinois

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The Silurian and Lower Devonian carbonates in east-central Illinois contain porous and permeable biohermal dolomite and associated facies that exhibit significant oil shows. The Silurian biohermal facies consists of a massive, porous and fossiliferous dolomite that is capped by a highly porous, heavily oil-stained, pale brown fossiliferous dolomite. The biohermal facies typically is a light gray, pure, very finely crystalline dolomite that contains some fossil-moldic porosity, and is primarily comprised of bryozoans and crinozoans. It occurs just above the deeper water, argillaceous dolomite facies of the Moccasin Springs Formation and was probably initiated as mud mounds that were populated by bryozoans and crinozoans. Another biohermal dolomite with significant oil show occurs within the Lower Devonian carbonates, which underlies the Grand Tower Formation tidal flat facies in the area and uncomformably overlies the Silurian succession. This Lower Devonian biohermal unit ranges between 5 and 45 feet in thickness; it is very vuggy with abundant fossil-moldic porosity. Recognizable fossils include large rugose corals, stromataporoids, brachiopods, and echinoderm fragments. The unit is lenticular and grades laterally into a dense, bluish gray, slightly argillaceous dolomite. Detailed subsurface examination indicates that both the Silurian and Lower Devonian biohermal units and associated facies could be potential new targets for hydrocarbon exploration in east-central Illinois. Further work is underway to determine the distribution of these bioherms and their relationship to other important hydrocarbon reservoirs, such as the overlying productive Middle Devonian Geneva Dolomite.