The Silurian Racine Formation at Forsyth Field, central Illinois: Potential for significant petroleum recovery in a mature oil field

DR. YAGHOOB LASEMI
Petroleum Geologist
Illinois State Geological Survey

Forsyth Field lies in the extreme northeast part of the Mt. Auburn trend of the Sangamon Arch in the northwest of the Illinois Basin, central Illinois. Discovered in 1963, the field has accumulated over 750,000 barrels of oil essentially from a dolomite reservoir in the upper part of the Racine Formation. The Racine (over 240 ft.) consists of interbedded limestone, dolomite, silty argillaceous dolomite or limestone, and calcareous shale. An unconformity subdivides the formation into two sequences and the reservoir interval at Forsyth occurs in the upper part of the upper Racine sequence. The reservoir is a lenticular, locally compartmentalized, dolomite body reaching a maximum net thickness of nearly 12 feet and an average porosity of 16%. A combination of depositional and diagenetic processes and updip pinch out of the reservoir against the Sangamon Arch was responsible for Petroleum entrapment.

Original oil in place at Forsyth is over 11 million barrels and the field has produced approximately 7% of its OOIP. Poor reservoir performance and below average cumulative primary production (nearly 10,000 barrels per well) suggest poor permeability for the dolomite reservoir interval at Forsyth. However, there is a great potential for improving petroleum recovery from the field. There are over 20 undrilled locations and in the developed areas, the reservoir was stimulated with relatively small volume fracturing. Development of the undrilled areas, infill drilling, and larger volume hydraulic fracturing will undoubtedly improve recovery from the field. The reservoir at Forsyth Field has never been waterflooded; the field is close to a commercial source of CO₂, and is a potential candidate for CO₂ enhanced oil recovery, which could result in storage of anthropogenic carbon dioxide and increased oil production.