

Slave Point Conventional Light Oil Limestone Play, Nipisi Alberta

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Abstract

There has been significant industry activity in recent years chasing the fringes of the traditional Devonian Swan Hills formation and Beaverhill Lake Group carbonate banks. Oil has been historically produced from dolomitized Beaverhill Lake reefal reservoirs in northern Alberta (Jansa et al, 1974). The Nipisi area (Townships 75-79 Ranges 9 to 12 W5) has been targeted for high-energy reservoirs in the Devonian Slave Point formation carbonates as well as Devonian Gilwood formation sandstones. Although there is no dolomite present in the Slave Point at Nipisi, light oil production occurs from primary porosity preserved in fossiliferous limestones. The Nipisi Slave Point “D” pool has produced over 185 e3m3 of light oil (1.1 million barrels) from several recently drilled horizontal wells.

Examination of cores and cuttings in the area show excellent examples of primary porosity and permeability in reef and high energy shoal reservoir associated with amphipora-rich, bulbous and tabular stromatoporoid-bearing framestones, floatstones, rudstones and grainstones. Most of the porosity is oil stained and pay ranges from 1-16m with up to 15% porosity.

Shallow water restricted tidal facies were initially deposited on the anhydritic Fort Vermillion formation. These rocks were subsequently drowned as transgression occurred and high-energy zones were localized on paleotopographic highs. A typical progression of facies from intertidal flats to amphipora-rich lagoons to higher energy back reef/reef flat /reef slope can be identified in many cores and cuttings. Facies mapping and correlation work has indicated that the paleotopography of the Slave Point and subsequent energy of deposition were influenced by basement structures associated with faulting on the flank of Peace River High. As cycles backstepped to the west, the traditional reef margin evolved into ramp type models as accommodation space was filled up. Wells to the west are interpreted to penetrate younger back-stepping cycles, with less relief.

Three horizontal wells were recently drilled to the south and west of the main oil production. Two are currently producing from seismically defined structural highs. Oil production is characterized as a depletion drive and water generally tracks the oil production. Seismic mapping indicates additional structural highs are present. There may be additional prospectivity associated with stratigraphic traps formed by updip pinchouts as cycles backstepped and were drowned. Excellent oil stained reservoir has been encountered in a structurally low horizontal well in the southeast corner of the area.

Reference Cited

Jansa, L.F., and Fischbuch, N.R., 1974, Evolution of a Middle and Upper Devonian sequence from a clastic coastal plain-deltaic complex into overlying carbonate reef complexes and banks, Sturgeon-Mistue Area, Alberta. Geological Survey of Canada, Bulletin 234.