

PRUDHOE BAY, ORION SCHR BL OIL

Reference List

Alaska Oil and Gas Conservation Commission, 2003, Conservation Order No. 505, available online at:
http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co500_549/co505.htm

BP Exploration (Alaska) Inc., 2003, Orion Pool Rules and Area Injection Order Application, submitted to the Alaska Oil and Gas Conservation Commission in support of Conservation Order No. 505.

Prudhoe Bay, Orion Oil Pool

Summary

The oil-bearing sands of the Late Cretaceous-aged Schrader Bluff Formation (“Schrader Bluff”) are present in the Milne Point, Kuparuk River, and Prudhoe Bay Units. The Orion Oil Pool (“Orion”) is the portion of the Schrader Bluff Oil Pool located within the Prudhoe Bay Unit (“PBU”). This pool was discovered in 1968 by the Kuparuk State #1 exploratory well, and confirmed in 1998 by Northwest Eileen 2-01. It is defined as the accumulation of hydrocarbons common to, and correlating with, the interval from 4,549’ and 5,106’ measured depth in PBU V-201.¹ The pool ranges in depth from about 3,900’ to 5,000’ true vertical feet subsea.² The pool has been producing continuously since April 2002 from the PBU V- and L-Pads. V-Pad initially dominated production; however, in June 2004, two additional L-Pad wells were brought on-line, and by October L-Pad production abruptly increased to more than 5,000 barrels of oil per day (“BOPD”). In December 2004, Orion averaged 10,423 BOPD: 5,463 BOPD (52%) from L-Pad and 4,960 BOPD (48%) from V-Pad.³

Geology

The pool contains two stratigraphic intervals that are designated, from deepest to shallowest, the O-Sands and the N-Sands. These sediments were deposited in a marine shoreface and shallow shelf environment. They are unconsolidated and display lateral facies changes and local diagenetic alteration. They are present across the entire Orion development area and, as a package, thin slightly from SW to NW. Reservoir quality sand units within each interval are regionally extensive, but are locally characterized by substantial variations in thickness and net-to-gross sand ratio. The O-Sands are subdivided into two intervals that are termed, from deepest to shallowest, the OB and OA. OB ranges in thickness from 220’ to 300’, and OA is 45’ to 80’ thick. Measurements are scarce, but reservoir sand porosity and permeability are thought to range from 25% to 30% and from 50 md to 250 md, respectively.⁴ The N-Sand interval ranges from 140’ to 180’ in thickness,⁵ and it consists mainly of non-reservoir mudstone and siltstone interbedded with a limited number of thin, but generally extensive, unconsolidated reservoir sands. The O-Sands are the main development horizon at Orion because O-Sand oil ranges in API gravity from the low twenties to the mid-teens, and is lighter and higher in quality than that found in the N-Sands. The top of the Schrader Bluff OA sand in the Orion development area has structural dip ranging from 1 to 4 degrees to the E and NE, and it is broken by three sets of normal faults that trend from NW-SE, N-S, and E-W. Collectively, the fault sets subdivide the pool into isolated reservoir compartments. The NW-SE faults, with throws of up to 200 feet, dominate the structural fabric of the pool and form the boundaries of the major structural blocks in the area. N- and O-Sand oil water contacts are thought to vary by sand unit and by fault block. No gas/oil contacts or free gas have been observed. Original-oil-in-place is estimated at 1,070 to 1,785 million stock tank barrels (“MMSTB”), with 845 to 1,410 MMSTB in the O-Sands and 225 to 375 MMSTB in the N-Sands. Solution gas is estimated at 210 to 345 BSCF.⁶

SFD

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¹ Alaska Oil and Gas Conservation Commission, 2003, Conservation Order No. 505, available online at: http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co500_549/co505.htm

² Derived from BP Exploration (Alaska) Inc., 2003, Orion Pool Rules and Area Injection Order Application, submitted to the Alaska Oil and Gas Conservation Commission in support of Conservation Order No. 505: Non-confidential exhibit I-4A shows pool at top of OA sand ranging from about 4,060’ to 4,700’; N-Sands are 140-180’ thick, so top is about 3,880’; O-Sands are about 300’ thick, so base is about 5,000’.

³ Alaska Oil and Gas Conservation Commission, 2005, Production Database

⁴ Alaska Oil and Gas Conservation Commission, 2003, Conservation Order No. 505, available online at: http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co500_549/co505.htm

⁵ BP Exploration (Alaska) Inc., 2003, Orion Pool Rules and Area Injection Order Application, submitted to the Alaska Oil and Gas Conservation Commission in support of Conservation Order No. 505.

⁶ Alaska Oil and Gas Conservation Commission, 2003, Conservation Order No. 505, available online at: http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co500_549/co505.htm