

PRUDHOE BAY, BOREALIS OIL

Reference List

Alaska Oil and Gas Conservation Commission, 2002, Conservation Order No. 471, available online at:
http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co400_499/co471.htm

Alaska Oil and Gas Conservation Commission, 2005, Production Database

Borealis Oil Pool

Summary

The Borealis Oil Pool is located within the western portion of the Prudhoe Bay Unit ("PBU"). It lies within the early Cretaceous-aged Kuparuk River Formation ("Kuparuk"), and is an accumulation of hydrocarbons common to and correlating with the interval between 6534' and 6952' measured depths in the West Kuparuk State 3-11-11 Well.¹ This pool is developed from the PBU L-, V- and Z-Pads. The pool has been producing continuously since May 2001. L-Pad provided most of the production from November 2001 to November 2002. V-Pad came on line in April 2002, and by February of 2003 it was producing an average of 15,500 barrels per day (46% of the oil from Borealis Pool). Z-Pad was brought on line in March of 2004. In December 2004, production from Borealis Pool averaged 19,711 barrels of oil per day. Of that, L-Pad produced 59%, V-Pad produced 29%, and Z-Pad produced 12%.²

Geology

Within the pool, the Kuparuk consists of mid to lower marine shoreface sediments: very fine to medium grained, quartz-rich sandstone interbedded with siltstone and mudstone. The Kuparuk is stratigraphically complex, characterized by multiple unconformities and changes in thickness, sedimentary facies, and local diagenetic cementation. It is divided into four intervals that are named, from deepest to shallowest, A, B, C and D. The C interval contains the primary reservoir sands of the pool, with secondary accumulations in the A interval. Porosities range from 18 to 22%, and average permeabilities range from 5 md to 216 md. The Kuparuk structure within the pool is a NW-to-SE trending antiform that lies between 6,200 and 6,900 feet below sea level. Two sets of normal faults cut this antiform, one set trending NW-SE and a younger striking N-S. Both sets of faults are en echelon, resulting in a series of intersecting relay ramps. The pool oil accumulation is highly compartmentalized. Reservoir thickness and stratigraphy are affected by two unconformities that truncate downward to the south and east. Within the pool, oil is trapped by a combination of structural and stratigraphic features. The accumulation is bounded to the SW by NW and N-S trending faults and the oil-water contact. To the N and NW, increasing fines degrade the primary reservoir sand units. To the NE, the pool limit is defined down structure by the oil-water contact. The SE limit of the pool occurs where the reservoir is truncated by the unconformities. Oil-water contacts appear to vary in depth across the pool. No gas cap has been observed. At 6600' true vertical depth, the reservoir temperature is about 158 degrees F. API oil gravities range from 25.6 to 27.5 degrees. Original oil in place ("OOIP") is estimated between 195 and 277 MMSTBO. Associated formation gas in place ranges from 85 to 125 BSCF. There are no indications of a free gas column in the pool.³

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¹ Alaska Oil and Gas Conservation Commission, 2002, Conservation Order No. 471, available online at: http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co400_499/co471.htm

² Alaska Oil and Gas Conservation Commission, 2005, Production Database

³ Alaska Oil and Gas Conservation Commission, 2002, Conservation Order No. 471, available online at: http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co400_499/co471.htm