

NORTHSTAR, NORTHSTAR OIL

Reference List

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Minerals Management Service, 2005, Annual Production Totals for the Federal OCS Northstar Project: available online at http://www.mms.gov/alaska/fo/annual_production.pdf

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Northstar, Northstar Oil

Summary

Northstar Island is a five-acre,¹ man-made island located in the Beaufort Sea, 12 miles northwest of Prudhoe Bay and 6 miles offshore. Discovered by the Shell Island BF-47 No. 1 exploration well in 1984, construction of the development island began during the winter of 1999-2000, and the first production modules were installed during 2000.² Northstar is connected to onshore processing facilities by a pipeline that is buried 7 to 11 feet below the seafloor to avoid ice impacts.³ This pipeline has a wall thickness triple those of typical onshore North Slope pipelines, and three separate leak detection systems.⁴ Regular production began in November 2001, and climbed rapidly, regularly exceeding 50,000 barrels of oil per day ("BOPD") by June 2002 and 70,000 BOPD by June 2003.⁵ During mid-February, 2004, failure of a compressor motor shut down production from Northstar for two weeks, resulting a "loss" (delay) of about 1 million barrels of oil production.⁶ For all of 2004, the pool produced at an average rate of 68,700 BOPD.⁷ The Northstar development area spans the boundary between State of Alaska and Federal waters, and the Federal percentage Northstar production is allocated at 17.840%. During 2004, the Federal portion of Northstar oil production was 4,474,097 barrels for an average rate of 12,224 BOPD.⁸

Geology

The Northstar Oil Pool is defined as the accumulation of hydrocarbons common to and correlating with the interval between measured depths of 12,418 feet and 13,044 feet the Seal A-01 well. The reservoir interval consists of the Sag River, Shublik, and Ivishak Formations. The Sag River Formation is typically 100 feet thick in this area, and it was deposited as Triassic-aged transgressive marine sandstone, siltstone and shale. The sandstone mineralogy is mature: quartz with minor amounts of feldspar and authigenic clay. The primary cementing agents are calcite, silica and siderite. The Shublik Formation is also Triassic-aged, and is stratigraphically complex, being characterized by marine siltstone, shale, sandstone and phosphatic limestone. Within the Shublik Formation, reservoir quality rock is limited to a basal sandstone member, the Shublik D. The Ivishak Formation comprises a series of Permian and Triassic-aged delta-front sandstones and shales that grade upward to fluvial sandstone and medium to coarse-grained pebbly conglomerates. Within the pool, the Ivishak is about 325 feet thick, and it is more proximal, coarser grained, more deeply buried and cemented than at the Prudhoe Bay Field. Here, the Ivishak is primarily cemented with calcite, silica and siderite. The pool structure consists of a faulted anticline defined by three-way dip closure on west, south and east. Closure to the north is obtained through fault seal or structural dip. Faults within the pool have interpreted maximum vertical displacements of less than 200 feet, and they are not expected to significantly effect reservoir performance. The oil-water contact is placed at 11,100 feet true vertical depth subsea, based on core, RFT, MDT and well test data.⁹ Operator-provided estimates of hydrocarbons in place for the Northstar Oil Pool suggest an original oil in place of 247 million stock tank barrels, 7 billion cubic feet ("BCF") of gas in an inferred gas cap, and 480 BCF total gas including solution gas.¹⁰

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¹ BP, 2003, North Slope Oil Fields, published as [alaska_north_slope_oilfields\[1\].pdf](http://www.bp.com/sectiongenericarticle.do?categoryId=2011310&contentId=2016538) available online through link on BP Web Site at <http://www.bp.com/sectiongenericarticle.do?categoryId=2011310&contentId=2016538>, p. 2

² PI/Dwights, 2004, Beaufort Sea's Northstar Field Resumes Production; in PI/Dwights Drilling Wire, V. 50, No. 9, March 3, 2004

³ PI/Dwights, 2004, Beaufort Sea's Northstar Field Resumes Production; in PI/Dwights Drilling Wire, V. 50, No. 9, March 3, 2004

⁴ BP, 2003, North Slope Oil Fields, published as [alaska_north_slope_oilfields\[1\].pdf](#) available online through link on BP Web Site at <http://www.bp.com/sectiongenericarticle.do?categoryId=2011310&contentId=2016538>, p. 2

⁵ Alaska Oil and Gas Conservation Commission, 2005, Well and Production Information Database

⁶ PI/Dwights, 2004, Beaufort Sea's Northstar Field Resumes Production; in PI/Dwights Drilling Wire, V. 50, No. 9, March 3, 2004

⁷ Alaska Oil and Gas Conservation Commission, 2005, Well and Production Information Database

⁸ Minerals Management Service, 2005, Annual Production Totals for the Federal OCS Northstar Project: available online at http://www.mms.gov/alaska/fo/annual_production.pdf

⁹ Alaska Oil and Gas Conservation Commission, 2001, Conservation Order No. 458, Northstar Field, Northstar Oil Pool ; http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co400_499/co458.htm

¹⁰ BP, 2001, Public Information, Northstar Unit, Beaufort Sea, Alaska, in Alaska Oil and Gas Conservation Commission, 2001, Conservation Order No. 458 File, p. 119.