

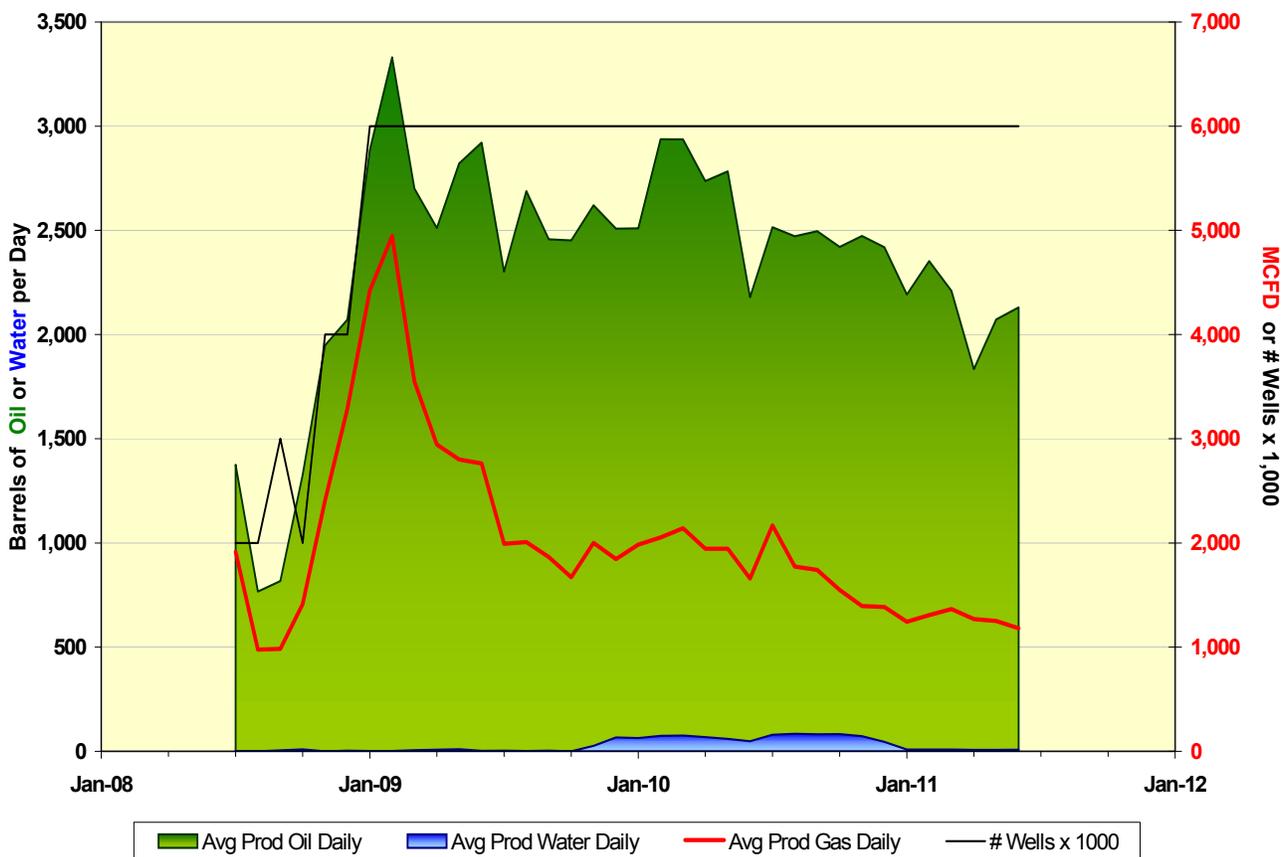
Qannik Oil Pool

Summary

The Qannik Oil Pool is a satellite to the Alpine Oil Field that was first encountered by the Nanuk No. 1 exploratory well in 1996. Initially deemed by the operator to be a thin and tight reservoir, the good quality of the reservoir rock within the pool was demonstrated in 2005 by a conventional core obtained from the CD2-11 well. Production capability was demonstrated by the CD2-404 horizontal appraisal well¹ during 2006. To date, about 130 wells have penetrated the Qannik reservoir,² most of them targeting underlying oil pools.

Colville River Unit, Qannik Oil Pool

Average Daily Production Rates



The pool is currently being developed from the CRU CD2 drill site, which lies about 2-1/2 miles west of the Alpine Central Facility. The operator is conducting a phased development, with nine horizontal wells: the CD2-404 well and eight additional wells. The producer-to-injector ratio will be about 2:1. The production and injection wells will range in length from 6,000' to 9,000' within the reservoir, and will be parallel to one another. Three central, north-trending injection wells will be arranged end-to-end and flanked on both sides by outboard production wells. This alternating arrangement will form a line-drive flood pattern, with individual wells spaced about 2,700' to 3,400' apart and oriented to maximize use of the expansion drive and minimize gas

influx from the gas cap, which lies to the east. Extra producers and injectors may be added at a later date based on net oil pay and reservoir performance.³

Development of this oil pool will be conducted as a water-injection enhanced oil recovery project, supplemented by expansion of the gas cap. Production and injection will be balanced to maintain reservoir pressure at or near the original measured pressure.⁴

Regular production began in July 2008 with two wells. By January 2009, a total of six producers were online, and production averaged 2,885 barrels of oil per day. Production peaked at 2,937 barrels of oil per day in February and March 2010. During the first six months of 2011, daily production averaged 2,132 barrels of oil, 1.27 million cubic feet of gas, and 8 barrels of water.⁵

Geology⁶

The Qannik Oil Pool is the accumulation of hydrocarbons common to, and correlating with, the interval between the measured depths of 6,086' and 6,249' on the EWR log recorded in well CRU CD2-11. This pool encompasses late Cretaceous-aged sediments deposited as top-set beds in a shallow, north-trending, eastward-migrating marine shelf environment that is the age-equivalent to the Nanushuk Group of the central Arctic Slope. The Qannik sediments consist of very fine-to fine-grained sandstone deposited as thin, elongate deposits that extend at least 12 miles north-to-south, along depositional strike, and about 6 miles west-to-east, along depositional dip.

Within the CRU, the Qannik sandstone is very fine-grained and lithic-rich. Net pay is up to 22 feet thick, and averages 10 to 15 feet. Porosity is 20 to 25 percent, and permeability ranges from 10 to 50 millidarcies.

Within the proposed development area, the Qannik reservoir sandstone occurs in a north-south, very low-relief syncline. No seismically mappable faults are present.

Well log and seismic information indicate that the Qannik accumulation is a stratigraphic trap. The Qannik sandstone is truncated to the west and shales out to the east. A gas-oil contact exists at about -4,000 feet true vertical depth subsea (TVDSS). An oil-water contact has not been observed in the proposed development area.

The Qannik Oil Pool is overlain and underlain by thick accumulations of marine shale and siltstone that are assigned to the Torok Formation and laterally continuous throughout the proposed development area.

Qannik reservoir fluid samples recovered from the Nanuk No. 2 and Nanuq No. 5 exploratory wells and the CD2-11 and CD2-404 service wells measured between 27° and 32° API gravity, with viscosity of about 2.0 centipoise at 1,850 psig and 89° F. The solution gas-oil ratio (GOR) measured 404 standard cubic feet per stock tank barrel, and the bubble point pressure is about 1,850 psig. At the datum depth of 4,000' TVDSS the Qannik reservoir pressure is about 1,850 psi and the reservoir temperature is about 89° F.

¹ ConocoPhillips, Inc., 2008, Testimony in Support of Conservation Order No. 605, May 15, 2008, p. 15-16, in Alaska Oil and Gas Conservation Commission, 2008, Conservation Order File No. 605.

² Alaska Oil and Gas Conservation Commission, 2008, Conservation Order No. 605.

³ ConocoPhillips, Inc., 2008, Testimony in Support of Conservation Order No. 605, May 15, 2008, Slide 21, in Alaska Oil and Gas Conservation Commission, 2008, Conservation Order File No. 605.

⁴ ConocoPhillips, Inc., 2008, Testimony in Support of Conservation Order No. 605, May 15, 2008, Slide 21, in Alaska Oil and Gas Conservation Commission, 2008, Conservation Order File No. 605.

⁵ Alaska Oil and Gas Conservation Commission, 2011, Well and Production Information Database

⁶ Alaska Oil and Gas Conservation Commission, 2008, Conservation Order No. 605.