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Sakhalin-1: Key Chayvo Drilling Results and Planning the Interfield Move of the World's Largest Land Rig on Sakhalin Island

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Abstract

The drilling program at the Chayvo field has concluded after five years of operations. This paper highlights the world-class extended reach drilling (ERD) and completion results achieved at Chayvo using Yastreb, the world's largest land rig. During this time, Yastreb drilled and completed 12 out of the 16 longest ERD wells worldwide to date. At the conclusion of the drilling program, Yastreb and its support infrastructure were moved from the Chayvo location to the new Sakhalin-1 Odoptu field. This paper also describes the significant planning and execution effort required to successfully accomplish the Yastreb rig move in a remote location like Sakhalin Island.

The scope of work to move Yastreb from Chayvo to Odoptu includes disassembling, moving, and rigging up and commissioning the rig and associated infrastructure in a harsh arctic environment with limited logistical support ~200 km away at its new location at Odoptu. Due to the additional requirements of the more challenging Odoptu wells, significant brownfield modifications were also needed, including a new higher torque top drive system and a larger drilling mast. A key focus area during the rig move was executing the scope of work safely with minimum impact to the environment.

The Yastreb rig move started in July 2008 and transportation of the rig and related material was completed in January 2009. Rig up and commissioning is ongoing. The rig is expected to be ready to drill its first well at Odoptu approximately seven months after starting the rig down operation at Chayvo. The application of Chayvo ERD learnings to the Odoptu well design will also be discussed.

Introduction

Sakhalin Island is located north of Japan off the east coast of Russia. The Chayvo and Odoptu fields are located near the northeast coast of the island approximately 10 km offshore (**Fig. 1**). The climate is sub-arctic with temperatures lower than freezing over half the year, and minimum temperatures below -40°C . Sakhalin Island is also at the northeastern edge of the Eurasian tectonic plate and is subject to significant tectonic stresses resulting in movements along nearby faults. An earthquake of 7.6 on the Richter scale was experienced in 1995. In addition to factoring in potential thermal and seismic effects on the rig and its equipment, both the Chayvo and Odoptu wellsites are on the beach, which contributes significantly to increased "wear and tear" and creates additional transportation challenges.

Exxon Neftegas Limited (ENL), an ExxonMobil affiliate, is the operator of the Sakhalin-1 Consortium in partnership with SODECO of Japan, ONGC Videsh Ltd of India, Sakhalinmorneftegas-Shelf of Russia, and RN-Astra of Russia.¹ To save the significant cost of building and operating an offshore platform, the Yastreb land rig was built as part of the Phase-1 development program, which focused on the Chayvo field. At the outset of the Chayvo Project in 2002, there were significant uncertainties about the drillability of the record-setting ERD wells required to develop the Chayvo field from land, as well as logistical issues related to operating in a remote arctic

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