

# Sakhalin, Caspian experiencing strong E&P activity

**EXPLORATION AND PRODUCTION** activity in Russia, primarily onshore and offshore Sakhalin Island and in the Caspian Sea, which is shared by several countries, appears healthy presently and is expected to remain fairly healthy as E&P programs continue and new projects are expected to begin in the next few years.

New drilling and production platforms are planned for offshore Sakhalin Island and as many as five new platforms are earmarked for the Caspian Sea off Azerbaijan.

## SAKHALIN ISLAND ACTIVITY

**Exxon Neftegas Limited (ENL)**, operator of the Sakhalin-1 consortium developing three fields offshore Sakhalin Island, began drilling the first development well in July 2003 from the Chayvo wellsite located onshore the northeast coastline of the island.

This well marked the beginning of the shore-based extended reach drilling program. Ultimately, 34 wells will be drilled from three sites at the Chayvo and Odoptu fields during Phase 1 of the development project.

The Chayvo field will be developed from both onshore and offshore facilities. Onshore the field will support drilling and production operations for ten wells to develop the northwest flank of the main Chayvo oil zone.

The field's southwestern flank, located too far offshore to be developed from the onshore drilling site, will be developed from the Orlan, that, when installed in 2004, will serve as the offshore drilling and living quarters platform. The Orlan will support drilling and production equipment for an additional 14 wells.

## ORLAN TO DEVELOP OFFSHORE

The Orlan, formerly owned by Global Marine (now **GlobalSantaFe**), which used the unit in the Beaufort Sea offshore Alaska in the 1980s, will be used to develop the southwestern flank of the Chayvo field with directionally drilled wells. The Orlan will be installed in about 45 ft of water. The unit is made up of a steel mud base, concrete mid-section and two steel deck sections that will

support a new world class drilling rig, minimal production equipment and crew living quarters.

The Orlan was towed from Alaska to the Russian port of Sov Gavan in 2001. ENL contracted with Amur Shipbuilding Plant (ASP) in Komsomol'sk-na-amur in the Russian Far East under a turnkey agreement to modify the unit for

largest and most powerful land rig in the industry, according to ENL. The rig was delivered in 2002 and then transported to Sakhalin Island. The unit was sold to ENL while Parker operates the rig under a long-term contract.

The Yastreb will drill vertically to a certain depth and then virtually horizontal below the seabed for a total distance of



The Yastreb, designed and built by Parker Drilling, is drilling extended reach horizontal wells of approximately 36,000 ft to reach the northwestern flank of the Chayvo field offshore Sakhalin Island, making the wells among the longest in the world. The rig was sold to Exxon Neftegas Limited and is operated by Parker. Photo courtesy of Exxon Neftegas Limited.

drilling. The \$140 million contract calls for ASP to provide engineering, procurement, construction and installation.

KCA DEUTAG completed the detailed design of the platform rig to be installed on the Orlan. The rig is presently under construction at the Hyundai shipyard in Korea. Exxon has not yet tendered for a drilling contractor to operate the rig, which will be company-owned, however, a tender is expected to be issued by this summer.

## EXTENDED REACH DRILLING

The Yastreb drilling rig, designed and built in the US by Parker Drilling, is the

approximately 36,000 ft to reach the northwestern flank of the Chayvo field offshore Sakhalin Island, making the wells among the longest in the world.

Perforating guns will be conveyed by coiled tubing, potentially using a hydraulic tractor to reach the longest intervals of the extended reach wells.

Additionally, a deep vertical well was drilled by ENL on Sakhalin Island to inject drilling cuttings from the development wells to keep the island as clean as possible. When all of the extended reach wells have been drilled, the injection well will be completed.

The rig incorporates several innovations in order to work in the harsh environment. It is designed to withstand temperatures as low as 40°C.

The rig, pipe barn and utility packages are completely enclosed and warmed by hot air and steam during the winter, allowing the rig crew to work in shirt-sleeve temperatures.

The drilling module is attached to beams that are driven into the permafrost, allowing the unit to withstand seismic events without catastrophic failure. Seismic activity in the area results from the movement of four tectonic plates, the Eurasian, North American, Pacific and Philippine plates.

The beams also help to prevent subsidence due to thawing and freezing.

Moving the rig from wellsite to wellsite is accomplished while the rig is fully erect. The drilling module is on rails that are "leap frogged" as it moves to the next wellhead.

As the structure is pushed to near the end of the rails, the rails behind the structure are moved to the front and so forth.

Six hydraulic cylinders push the structure from the rear. Because of the structure's weight, anchors attached to the front of the structure allow tractors to pull the drilling structure at the same time. The pipe barn, where the stands of pipe are made up, moves separately in a similar manner. The pipe barn and utility packages are secured to skidding beams placed on matting boards.

Each wellhead is about 33 ft apart and it is anticipated that the move can be made at about 1 ft per minute.

The 23 ft high pipe barn is 130 ft long by 134 ft wide. Two bucking machines make up and break out stands of drillpipe and casing that are racked horizontally inside the barn. The rig uses Range 3 drillpipe, with each joint of pipe 45 ft long rather than the typical 30 ft long joint. This means only one connec-

tion is needed to make up the standard 90 ft stand.

The bucking machines that make up and break out the pipe can accommodate tubulars up to 20 in. diameter. A total of 11,000 meters of 5 ½ in. drillpipe and 8,000 meters of 9 ⅝-in. casing can be stored inside the barn.

While the mast's vertical racking capacity is 3,000 meters, the tubulars are stored in the barn until needed to keep as much pipe as possible out of the derrick in the event of an earthquake.

## **SAKHALIN DEVELOPMENT**

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Additional development activities at Chayvo include construction of an onshore processing facility to separate the oil and gas from the field and treat 250,000 barrels per day of crude.

The Sakhalin Island project also includes the Odoptu and Arktun-Dagi fields offshore the island. The Odoptu field will be developed by drilling

extended reach wells from two onshore sites with a total of nine oil production wells currently planned over a 7-8 year period. The wellsites will be about 80 km north of the Chayvo onshore production facilities. First oil from the Odoptu field is currently scheduled for 2008.

Phase 2 of the development project involves construction of a subsea natu-



**KCA DEUTAG's Rig T-47 has been drilling deep high pressure wells from an artificial island in the Caspian Sea since 2002. The rig was previously used on BP's Wytsch Farm field drilling extended reach horizontal wells as long as 30,000 ft or longer.**

ral gas pipeline to Japan. The current plan is to commence gas sales to Japan in 2008.

Phase 3 includes the Arktun-Dagi field east of the Chayvo field. A 40-slot drilling and quarters platform will be installed to develop the field.

Phase 4 envisions further development of the Arktun-Dagi field with the installation of subsea templates. Wellhead platforms will also be installed on the Odoptu field to extend the gas sales life. ENL says Phase 4 will enable gas production to continue beyond 2050.

## SAKHALIN ENERGY

The **Sakhalin Energy Investment Company (SEIC)** also is developing several fields offshore the island, which eventually will include three offshore platforms an onshore processing facility and an LNG plant.

SEIC is currently operating the Molikpaq platform with KCA DEUTAG as the drilling contractor operating the plat-

form rig during phase I. The Molikpaq, built specifically to operate in severe ice conditions, was originally used in Arctic waters offshore Canada and towed to Korea where it was upgraded for the SEIC project.

Two new drilling and production platforms are being planned to extend the project into phase 2. KCA DEUTAG will operate the platform rigs on both platforms. The Lunskeye platform, a four-leg concrete gravity base structure, will have minimum processing facilities with oil and condensate and natural gas separation being conducted onshore for transport to the LNG plant. The platform will produce the majority of the gas for the LNG facility. Construction of the Lunskeye platform began in July 2003 and is expected to begin operation in the first quarter of 2007.

The Piltun Astokhskeye platform is expected to begin production during the first quarter 2007 and will produce oil and associated gas from the Piltun reservoir.

This platform will also be a four-leg concrete gravity base structure.

KCA DEUTAG has a team of engineers based in London providing drilling operation input into the rig design under a seven-year contract that began in June 2003 with the design phase.

## CASPIAN SEA

Offshore Azerbaijan is one of the most active areas of the Caspian Sea, followed by Kazakhstan. Both areas boast field development projects.

Offshore Azerbaijan operator **AIOC (Azerbaijan International Operating Company)** led by BP is developing the Azeri, Chirag and deepwater Gunashi field (ACG) with proven reserves of approximately 5.4 billion barrels of recoverable oil. It presently produces about 140,000 b/d and is expected to increase to 1 million b/d by 2009.

The rig on the Chirag platform is owned and operated by KCA DEUTAG, Rig T105, which is a converted land rig that has been on the platform since 2000 and

has drilled development wells continuously. AIOC will be developing the area with four new platforms, the Azeri Central, East and West units plus a platform for Phase III development of the deepwater Gunashi field. KCA DEUTAG has been working with AIOC for detailed design of the drilling rigs to be installed on the platforms.

Central Azeri is currently under construction and is planned for installation in 2004, with the Western Azeri platform to be installed in 2005, East Azeri in 2007 and the deepwater Gunashi platform sometime after that.

BP is also operator of the Shah Deniz development project, one of the largest natural gas discoveries in recent years, with a production facility planned for installation in 2006.

KCA DEUTAG is also heavily involved in this development having been awarded a conceptual study contract in 2000 followed by a contract for front end engineering design (FEED) a year later and now the contract for detailed design, procurement, construction and commissioning of the drilling facilities. The development scheme is based upon the Technip TPG 500 design self-elevating drilling and production platform.

Offshore Kazakhstan, **AgipKCO** is developing the Kashagan field which was declared commercial in 2000. The Kazakhstan petroleum authority and the production sharing consortium approved a development plan for the field, which is estimated to contain approximately 38 billion barrels of oil.

Development costs are estimated at \$29 billion. First oil is scheduled for 2008 with initial production targeted at 7,000 b/d and increasing to about 450,000 b/d during the first development phase. Additional development phases are estimated to increase that figure to 1.2 million b/d.

KCA DEUTAG's T-47 rig has been drilling deep high pressure wells from an artificial island off kazakhstan since 2002. The T-47 was previously used on BP's Wytsch Farm field drilling extended reach horizontal wells as long as 30,000 ft or longer. The facility was originally planned with only three well slots, the last of which is presently being drilled. However, an extension was constructed with four additional well slots. ■