

Parker's Sakhalin Island project rig ready for drilling

PARKER DRILLING'S SPECIALLY-designed and purpose built rig, dubbed Yastreb, is part of the largest foreign direct investment project in Russia. The rig will operate on Sakhalin Island, one of the world's most promising oil prospects, and is preparing to begin the first of 10 long-reach wells that will be drilled over the next 5 years. The first well is scheduled to be spud in January 2003.

The wells, some as long as 35,000 ft, will be drilled from the island to an offshore bottom hole location in the Chayvo field,



The Yastreb will drill extended reach wells from Sakhalin Island to offshore bottom hole locations six miles away. The rig is designed to withstand seismic events and temperatures as low as -40 degrees C.

5-15 kilometers offshore in the Sea of Okhotsk. This will be the first of three fields to be developed, Chayvo, Odoptu and Arkutun-dagi fields that were discovered from the late 1970s through the 1980s. The fields, declared commercial in October 2001, are located off the northeast shelf of Sakhalin Island in 10-60 meters of water.

ExxonMobil plans to perforate the wells with coiled tubing and has con-

tracted with Halliburton to perform that task.

Parker's contract with **Exxon Neftegas Limited** (ENL), operator of the Sakhalin I consortium developing the fields, actually consisted of two parts. The first contract was for the design, fabrication and transportation of the rig to Russia. The second contract is for the operation of the rig, which will be owned by the consortium.

Parker began working on the design before it had a contract in hand under the assumption that in order to meet ENL's ambitious schedule design work needed to begin immediately.

"Parker made the decision to start doing the design work realizing that we may not get the work," said **Denis J Graham**, Vice President of Engineering for Parker. "We had to jump out there and take some chances under the assumption that we were going to win the bid."

"Our presentation strategy was that we know what it takes to get this done by (ExxonMobil's schedule) and the way we are going to do it is to get after it."

Parker and ExxonMobil engineers worked closely together, sharing ideas and concepts and producing a final product.

"It was one of the best operator/contractor design phase operations that I have experienced," Mr Graham noted. "And the reason is they knew in order to make their schedule we had to get to the meat of the design phase right away or we wouldn't make it."

The final contract was signed in September 2001, but the contractor was already well along with design engineering.

The Yastreb arrived on Sakhalin Island in mid-August. Rig up is expected to take about three months. Its first well is expected to be spud January 2003.

The unique design of the Yastreb (originally Parker Rig 262) has taken the

region's extremely harsh environment into consideration, which includes seismic activity in the area. The movement of four tectonic plates, the Eurasian, North American, Pacific and Philippine plates affects the area. The rig can also withstand temperatures as low as -40°C.

The rig is fully enclosed and installed on skid rails. The drilling module is secured to beams attached to pilings driven into the permafrost. This allows the rig to withstand severe seismic events without catastrophic failure and also help prevent any subsidence due to thawing and freezing.

The rails for the drilling structure are "leap frogged" as it moves to the next well. The structure is pushed to near the end of the rails and the rails behind it are moved in front, and so on. The pipe barn is moved in a similar manner. It is anticipated that the move can be made at about 1 ft per minute. Each well is about 33 ft apart. The entire drilling area is about 300 ft wide and 740 ft long.

Six hydraulic cylinders push the train from the rear of the structure. Because the structure is so heavy, it is also anchored at the front so it can be pulled along while being pushed by the hydraulic cylinders.

The pipe barn and utility packages are secured to skidding beams that are placed on matting boards and are skid independently of the drilling package as it moves from one well to the next.

The rig, pipe barn and utility packages are fully enclosed and warmed by hot air and steam during the winter to allow employees to move about and work in a shirt sleeve environment.

The 130 ft long by 134 ft wide pipe barn has a 23 ft clear height inside. Two bucking machines inside the pipe barn allow stands of pipe and casing to be made up and racked horizontally. The machines can handle drill pipe and casing up to 20-in. diameter. The pipe barn can accommodate 11,000 meters of 5 7/8-in. diameter drill pipe and 8,000 meters of 9 5/8-in. casing.

The mast's vertical racking capacity is 3,000 meters but the drill pipe or casing will be stored horizontally in the pipe barn until ready for use to keep as much

pipe as possible out of the derrick in the event of an earthquake.

The bucking machines make up 90 ft stands of Range 3 pipe, so only two 45 ft joints of pipe are connected. The drilling package is 35 ft wide and 230 ft tall.

It takes special logistics even to transport the rig to the island. Since there is no port on the island, a set of cargo barges and temporary barges will be utilized for the rig's mobilization to Sakhalin Island.

The temporary barges will sink and form a road to transport the rig from a cargo barge onto the beach. The cargo barges will be ballasted and rest on the seafloor.

In addition to the Yastreb rig, ENL is using the Orlan, a concrete and steel gravity-based structure formerly owned by Global Marine and used in the Beaufort Sea offshore Alaska in the 1980s. It will also be used to drill in the Chayvo field.

The Orlan is at the Amur Shipbuilding Plant (ASP) in the Russian Far East for refurbishment. Platform installation is scheduled for 2004. The contract is valued at \$140 million.

In addition to Exxon (30%), the Sakhalin I consortium partners include **ONGC Videsh Limited** (20%); **RN-Astra** (8.5%), a subsidiary of Russian national oil company Rosneft; **Sakhalin-morneftegas-Shelf** (11.5%), a subsidiary of Rosneft-Sakhalinmorneftegas; and **Sakhalin Oil and Gas Development Ltd.** (30%) a Japanese investment company whose principal shareholders are JNOC, JAPEX, Itochou and Marubeni.

The Sakhalin I project consists of three fields, Chayvo, Odoptu and Arkutun-dagi that were discovered from the late 1970s through the 1980s.

They are located off the northeast shelf of Sakhalin Island in 10-60 meters of water. Sea ice is present about half the year.

Total recoverable reserves are estimated at 2.3 billion barrels of oil and 17.1 trillion cubic ft of natural gas. Oil production is anticipated to reach a peak of about 250,000 b/d.

The first phase of development will

focus on the Chayvo and Odoptu fields, with first oil from the Chayvo field expected by the end of 2005 and from the Odoptu field in early 2008.

Limited gas production will be available during the initial phase to help meet Russian demand.

The Chayvo field is estimated to contain enough gas to produce 1 billion cubic ft

per day for more than 25 years, according to the consortium. With the Odoptu and Arkutun-dagi resources, a production rate of 1 billion cubic ft per day can be achieved for more than 40 years.

Future development includes a natural gas pipeline to Japan and development of the Arkutun-dagi field. As much as \$12 billion will be invested by the consortium during the life of the project. ■

