

# Extended reach enables E&P of remote fields

## REMOTE OFFSHORE FIELD

**TO PROVE THE** feasibility of land based development for the offshore Chayvo field, two extended reach drilling (ERD) wells were drilled under a pilot program to a measured depth of 9,375 m and 10,182 m. Horizontal displacements of the wells are 8,419 m, and 9,246 m, respectively, at a total vertical depth of 2613m.

These first Chayvo ERD wells are currently the 7th and 4th longest ERD wells in the world. Other highlights include the world's first 13 5/8-in. casing installation using "mud over air" floatation, and world record coiled tubing runs.

A comprehensive directional plan to successfully intersect the reservoir target objective at a precise depth and location was developed. The wells were drilled using rotary steerable systems and PDC bits. Formation Evaluation was achieved using Logging-While-Drilling tools.

*Extended Reach Drilling Technology Enables Economical Development of Remote Offshore Field in Russia* (SPE/IADC 92783) **J R McDermott, R A Viktorin, M W Barrera, S R Keller, J H Schamp, ExxonMobil.**

## RECORD HIBERNIA WELL

**Hibernia Management and Development Company (HMDC)** embarked on development of the northern most compartment of the Hibernia reservoir. To access these reserves, it was proposed to drill and complete a 31,000 ft MD extended reach oil producer with a horizontal departure and vertical depth that would exceed the present day industry extended reach drilling (ERD) envelope.

Successfully drilling this world-class well would require the application and extension of currently available drilling and completion technology. Meeting project goals would demand the installation of a large monobore completion with offshore-Canada's deepest downhole telemetry system.

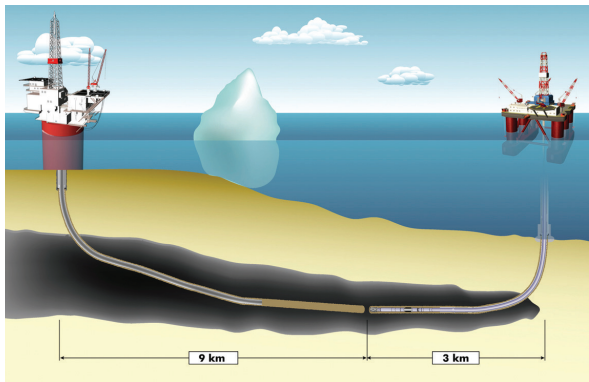
The proposed trajectory would require management of weak and unstable intervals across an extended 17,000 ft measured depth intermediate section. This trajectory would necessitate the installa-

tion of record production casing and liner strings under high friction load.

*Hibernia Record Well Breaks Extended Reach Drilling and Completion Envelope* (SPE/IADC 92347) **P C Schuberth, C C Elsborg, ExxonMobil.**

## U-TUBE WELLS

Although well bores have been intersected before, both through planned intersections for the purpose of well control and through unplanned well bore collisions, they have not been intersected for the purpose of actually joining their cas-



The planning and execution of what is believed to be the world's first planned successful joining of casing strings for two horizontal wells will be discussed at the conference. SPE/IADC 92685.

ing strings. The authors will review the planning and execution of what is believed to be the world's first planned successful joining of the casing strings for two horizontal wells.

The authors review the scope of this project and of its desired outcome, a description of the plans for the wells including their trajectories and depths, and a discussion of pre-planning activities with emphasis on the technology that was expected to make the planned intersection a success.

They will discuss specialized equipment to enable the intersection, mock ranging tests necessary to know the positions of the wells relative to each other, and the accuracy achieved through modified use of the magnetic guidance tools.

*U-Tube Wells-Connecting Horizontal Wells End to End* (SPE/IADC 92685) **F J Brandon, Halliburton Energy Services; R T Hay, Sperry Sun Drilling Services; D C Lee, Landmark Graphics.**

## TORQUE & DRAG

The authors will describe how torque and drag (T&D) analysis was used to successfully drill extended reach (ER) wells on the Captain Field in the North Sea. The issues and best practices associated with using this basic real time drilling technique, particularly on the Captain subsea development wells from 2000 to 2003, will be explained. The applicability of T&D reduction technologies available and why many of them were eliminated as possible solutions re-enforced the criticality of good T&D analysis on this project.

The authors will outline torque and drag analysis, why it is important, the parameters such as BHA/drilling string design, drilling string buckling, friction factor (FF) analysis, casing sanding considerations, the trajectory design and wellbore tortuosity, all of which must be considered in the correct application in the field of this basic technique.

Other issues such as why it is often misunderstood or badly applied, the importance of calibration with offset data, and the factors which affect FF determination are explained.

*Understanding Torque and Drag, Best Practices and Lessons Learned from the Captain Field's Extended Reach Wells* (SPE/IADC 91854) **G Rae, ChevronTexaco; M Sapijanskas, Schlumberger.**

## FRAC PACK IN ERD

The challenge facing the drilling and completion team was to reach an exploration target and perform a frac pack in a 26,000 ft measured depth extended reach well. This was the A-9 well (6,300 mechanical risk index) from the Ram Power TLP in the Gulf of Mexico with a new rig and the first well of the drilling program. The design challenges included developing ways to maintain borehole stability at high angle in unstable formations with low fracture gradient, and cleaning long 76° tangent sections.

*Extended Reach Drilling In The Gulf of Mexico-Ram Powell Case Study* (SPE/IADC 92371-Alternate) **D R Algu, Shell E&P Americas; S N Landgrave, Shell Oil.**