

Field development focuses on reservoir, HPHT

GAS HYDRATE EXPLORATION

THE DRILLING OF a dedicated gas hydrate exploration well by continuous coring commenced in 2003. The prospect was evaluated and the well abandoned in the first quarter of 2004. The well was on the North Slope Borough of Alaska, south of the Kuparuk Field, some 60 miles west of Deadhorse, Alaska.

The authors will address the innovative technologies utilized, including the **Anadarko Arctic Platform**, its installation and removal, the continuous coring system, refrigeration chilled drilling fluid system, well monitoring and dynamic kill procedures, and remote audio and video monitoring of the coring operations.

Anadarko Hot-Ice #1 Well: The Planning, Permitting and the Drilling Operations for a Dedicated Gas Hydrate Exploration Well in the Alaskan Arctic (SPE/IADC 92764) **K K Millheim, A G Kadaster, Anadarko Petroleum.**

NJORD FIELD WELLS

The Njord Field is one of the most complex reservoirs in the Norwegian North Sea due to a large number of faults. Seismic quality in the areas is poor, making seismic interpretation difficult.

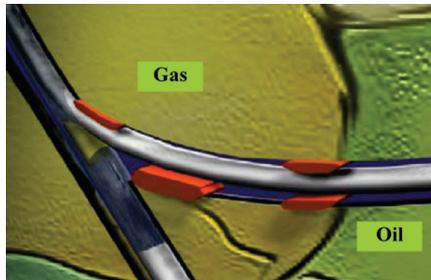
The well design criteria on Njord is dependent upon the structural uncertainty and the availability of new technology. Njord started with relatively simple single-bore horizontal wells, however, this design was not suitable in the intensely faulted areas. High amplitude U-, S- and W-shaped wells have been effective to penetrate all reservoir units in uncertain areas, to minimize the risk of hole instability and to drain oil from multiple fault compartments.

Why So Many Different Types of Wells on Njord? (SPE/IADC 92085) **S Talukdar, Norsk Hydro.**

NEW PLATFORM RIGS

There have been a number of dry tree developments over the past five years where newbuild drilling facilities have been designed and constructed as an integral part of the overall platform. Each project has approached the specification, design and integration of the rig using different arrangements of contracting during the stages at which the

drilling design team, the equipment suppliers, the fabricator and the drilling contractor become involved. The degree of project success in terms of the rig being delivered on time, within budget and then operating as intended has at best been variable. The authors will describe the approach taken for the Benguela Belize project that started detailed design in February 2003. The lessons



The drive for a cheaper way of drilling sparsely located pockets led to a new campaign to find and drill low cost infill targets using through tubing rotary drilling. SPE/IADC 92085.

learned with designing an appropriately specified rig and integrating the rig systems with the topsides contractor throughout the design will be discussed.

New Platform Rigs: Design and Construction (SPE/IADC 91850) **J Nichols, M Evans, KCA DEUTAG; J Morris, ChevronTexaco; D Wilson, National Oilwell.**

HPHT DEVELOPMENT

Compared to other North Sea HPHT development projects, the Jade HPHT field development drilling operation is unique in several respects. It provided the first experience of simultaneous drilling and production, with proven depletion levels up to 1,600-psi. For the HPHT category the field has attained best in class performance. The project successfully demonstrated that 100 MMcf/d HPHT wells could be consistently drilled and completed ready for production within a \$18.5 million total cost.

Jade North Sea HPHT Development: Innovative Well Design Generates Best in Class Performance (SPE/IADC 92218) **I A Palmer, ConocoPhillips.**

RESERVOIR GEOMECHANICS

The unusual stress and depletion levels encountered in HPHT fields make engi-

neering wells in such an environment a technical challenge. The major reason for this is that all the aspects of the well's life, from design and completion issues to operating philosophy, are significantly impacted by the mechanical behavior of the reservoir. It is therefore important to be able to assess with accuracy the evolution with depletion of the in-situ stresses and rock deformations across the entire field in order to optimize the design of the development wells. In that context, the reservoir-geomechanics coupled simulations becomes a corner stone to the well engineering philosophy.

Reservoir-Geomechanics Coupled Simulations: A Powerful Tool for Well Design and Operation in an HPHT Environment (SPE/IADC 92546-Alternate) **P Marchina, A Onaisi, Total.**

PROBABILISTIC ESTIMATING

Not only is risk management critical to the well construction process, but in several jurisdictions around the world, a demonstrated risk management plan is a pre-requisite to doing business. One of the key elements of well risk management is a comprehensive understanding of the inherent risks at each stage of the process, their inter-relationships and the impact on project cycle time and capital cost. The author will describe a probabilistic approach to developing a drilling/completion time and cost model that can be used throughout the well construction life-cycle, from project conception through operations and as a tool for project review.

This process allows for a non-biased, statistically-based approach to project scoping, AFE preparation and management of capital spend through the operating phase, allowing more informed decision making to occur at critical points in the project.

It provides a tool that can be used to enhance senior management and asset team understanding of possible project time and cost outcomes; recognizing the inherent risks and the sensitivity of time and cost to these risks.

Enhancing Drilling Risk & Performance Management Through the Use of Probabilistic Time & Cost Estimating (SPE/IADC 92340-Alternate) **E M Diggins, W M Akins, Nexen; M Abell, The Peak Group.** ■