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Seismically Driven Reservoir Monitoring at the Heidrun Field

The Heidrun field, located off-shore mid-Norway has produced over 500 million barrels of oil and exported nearly 5 billion m³ of gas. To maintain Heidrun on plateau nearly 100 production wells have been drilled. Infill drilling, targeting smaller and smaller reserves is a major challenge for the subsurface team.

The present time-lapse study at Heidrun focuses on the south flank, utilizing a towed streamer 3D survey from 1986 as base survey. A time-lapse pilot acquired in 1998 revealed important technical constraints and led to a second monitoring survey in 2001. This survey was acquired using WesternGeco's Q-marine technology.

The 1986-2001 monitor survey was analyzed in a multi-disciplinary project incorporating all available data into a series of drainage maps. Each of these maps is based on a multitude of data where 4D-seismic is important, but not dominating (well logs, initial /repeated saturation logs, structure and simulation models, history matching, pressure data, seismic attributes and staff's experience are all taken into account).

The drainage maps provide an important tool for identifying and ranking infill well locations. At present two successful wells have been drilled and put on production. Three other wells are in the design phase and will most likely be drilled during 2003. Plans for the next monitoring survey in 2004 are already established.

In this talk we will show examples of the input data to the drainage maps, focusing on the seismic aspects; show examples of pre-drill predictions and post-drill evaluations and discuss the upside and downside of seismically driven reservoir monitoring at Heidrun.