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Characterization of Key Heterogeneities Within the Jurassic Skarv Field, Offshore Mid-Norway

The Skarv Field is a 250-300 mmboe oil & gas discovery undergoing development planning. It is located on the Dønna Terrace, offshore Mid-Norway and operated by BP with partners Statoil, Enterprise and ExxonMobil. The Jurassic Garn Formation is the main reservoir interval and comprises tidally influenced shallow-marine sandstone deposits with generally excellent reservoir quality (18-20% porosity & 1-2-D permeability). Structurally the field is located within a tilted fault block and divided into three faulted segments.

The operator has planned producing the oil using a small number of pre-drilled horizontal wells with immediate pressure support. Gas production is planned through vertical wells.

The pre-drill development plan places increased importance on understanding both static and dynamic uncertainties early on. Therefore, during appraisal drilling emphasis has been placed on a comprehensive integrated data acquisition program, including extensive core coverage.

Despite the overall high quality of the reservoir, well data shows significant sedimentological and structural heterogeneity. High permeability transgressive lags at top reservoir and intra-reservoir channelised deposits represent potential thief zones whilst occasional mudstones, coals and asphaltene deposits represent potential barriers/baffles to vertical flow. Faults with cataclasis analyzed in core also exhibit dramatic permeability reductions with respect to the host rock and therefore indicate the potential for sealing/baffling seismic and sub-seismic faulting.

Detailed reservoir characterization has provided input to reservoir simulation sensitivity studies designed to help the project team understand the potential impact of these uncertainties and thereby optimization of the development strategy.