



Wellbore History

GENERAL

Well 16/1-11 and the subsequent 16/1-11 A sidetrack was drilled to appraise the 16/1-9 discovery on the Gudrun Terrace just west of the Utsira High in the North Sea. The discovery well 16/1-9 was completed in April 2008 and revealed oil shows in the Middle Jurassic Vestland Group, but neither coring or logging was completed according to programme due to hole problems. In well 16/1-11, the Sleipner Formation proved to be hydrocarbon bearing with a gas cap of approximately 25 m thickness and a gas-oil contact interpreted at approximately 2407 m in the Skagerrak Formation. However, acquisition of pressure data and sampling in the water zone in the Skagerrak Formation proved to be difficult due to very low porosity and permeability. Thus, no reliable water gradient could be established from the RCI sampling programme.

The 16/1-11 A geological sidetrack was drilled down flank on the structure. The main objectives were to obtain pressure samples in order to delineate the oil/water contact and to obtain water samples from the Skagerrak Formation in order to establish reservoir properties. A sidetrack would also give useful facies and thickness variation input. Another objective was to acquire sidewall cores to pin down the expected hiatus on top of the Sleipner Formation.

OPERATIONS AND RESULTS

Well 16/1-11 A was drilled with the semi-submersible installation Songa Delta. It was kicked off on 26 April 2010, with kick-off point at 1744 m in the parent well. It was drilled to TD at 2595 m (2528 m TVD), 94 m MD into the Late Triassic Skagerrak Formation. The well was drilled with Carbotech oil based mud from kick-off to TD.

The reservoir of the Sleipner Formation was penetrated at 2476 m (2393.2 TVD MSL) approximately 300 m down flank westward relative to the parent well, with an inclination of 27.6 degrees. Pressure data proved an oil gradient throughout. Top Skagerrak formation was penetrated at 2500.5 m (2414.9 m TVD MSL). Gas and oil shows were present through the reservoir interval and a possible OWC at 2526.1 m (2433.6 m TVD MSL) in the Skagerrak Formation was defined by pressure points and fluid samples. Oil shows above the OBM was recorded down to 2533 m.

The planned wire line logging program including pressure points, fluid samples, mini-DST and sidewall cores was performed. No conventional cores were cut. RCI oil samples were collected at 2478.02 m and 2510.52 m. Contamination from oil base in these samples was estimated to be between 2.5% and 8.5% by weight. Draw-down was 1.6 to 4.0 bar. RCI samples with both oil and water was collected at 2521.13 m. In these samples the mud contamination was estimated to be ca 76% by weight and the draw-down was 66 - 70 bar. Water samples were collected at 2522.1 m during a mini-DST with the MRCH-JAR-TTRm-GR-Straddle packer-Observation probe.

The well was permanently abandoned on 9 May 2010 as an oil and gas appraisal well.

TESTING

No drill stem test was performed.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 16/1-11 A