Shallow Gas Isolation
- Exploration Well
Location: North Sea, Norway

**CHALLENGE** – Shallow gas was experienced during pilot hole drilling of a subsea exploration well in the North Sea. The zone needed reliable isolation to ensure efficient plug and abandonment (P&A) after the main well was drilled. Previously, the operator had experienced gas lifting of the cement column into the previous casing, causing costly remedial work during the P&A operation. Another potential problem was the migration of gas above the cement, which would increase rig time and require the circulating out of the gas prior to cutting and pulling the casing for P&A.

**SOLUTION** – The operator chose to use Swell Technology systems combined with the conventional cementing methods. The top of cement was designed to have a sufficient height to secure 200 m of isolation from the shoe. The newly developed Swellpacker® Slip-On WS (Water-Swelling) system that swells in low temperature and high salinity was installed just above the shallow gas zone, using water-based mud as the swelling fluid.

The 13 3/8-in. casing with the Swellpacker Slip-On WS system was run to TD with no additional friction observed. The cementing operation was performed with the expected pump pressures and without losses to the formation.

The exploration drilling was performed and the P&A program started. After plugging back the reservoir, a bridge plug was run and set inside the 13 3/8-in. casing. The casing was cut above the Swellpacker system area, and the well was flow checked for 30 minutes. An annular seal was confirmed. The 13 3/8-in. casing was pulled out of the well, and a cement plug was set on top of the Swellpacker system and the bridge plug.

**RESULT** – Reliable isolation of the shallow gas was achieved for the exploration drilling phase. The Swellpacker system was used as annular retainer for the surface cement plug. Previous well operations had experienced lengthy delays in pulling the casing since they were cemented in after gas lifted the cement column. Rig time was saved since a squeeze job was not required, and gas did not have to be circulated out. Over $1M per day in rig time was saved.

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