

FACT SHEET

November 2013

Tie-Ins for the Nord Stream Pipeline

Connecting Three Pressure Sections

The Nord Stream Pipeline consists of three sections with different wall thicknesses. Each section is designed for a different design pressure due to the pressure drop during transportation.¹ During pre-commissioning, each section was pressure-tested separately before being connected under water, using hyperbaric tie-ins.

Tie-In Process

Hyperbaric tie-ins were conducted at KP 297 at a water depth of about 80 metres, and at KP 675, where water depth is about 110 metres. At both sites, rock berms have been installed on the sea bed to provide stability during tie-in operations. Tie-ins of Line 1 were completed in June 2011 and of Line 2 in June 2012.

- Once a section of the parallel pipelines was finished, a lay down head was welded to the end of the pipeline before the pipelay vessel laid it down. This head provides an air- and water-tight seal.
- At tie-in locations, the ends of the two pipeline sections overlapped. For hyperbaric welding they were aligned using large H-frames and then cut back.
- An underwater habitat or 'hyperbaric chamber' was placed over the pipeline ends and the pipelines were welded together inside the habitat; the entire operation was remotely controlled from a vessel and assisted by divers.
- Once the tie-ins were finished, the habitat was removed and a survey confirmed the correct position of the pipeline.
- The Norwegian Offshore Contractor Technip Norge AS has been contracted to conduct the tie-ins. Norwegian Statoil supplied the welding habitat and the H-frames. Tie-in equipment used for Nord Stream has been specially adapted for the large diameter pipeline.

Hyperbaric welding

- To ensure all equipment is correctly positioned during welding, four teams of three divers each rotated in shifts of up to eight hours under water. The divers lived in a high pressure environment for the duration of the tie-in operation.
- The welds connecting the three sections of the pipeline are so called "golden welds". As they are not pressure tested, these welds are subject to inspection techniques in compliance with DNV codes.
- The process involved the removal of the lay down heads that seal the pipeline ends, cutting and bevelling the pipeline ends, welding and non-destructive testing (NDT), such as automated ultrasonic testing (AUT). The welding itself inside the habitat takes up to 34 hours – compared to around 15 minutes for a typical weld on a pipelay vessel.

More information at www.nord-stream.com

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¹ Section 1 from KP 0 to KP 297: 220 bar, section 2 from KP 297 to KP 675: 200 bar, and section 3 from KP 675 to KP 1,223: 177.5 bar.