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Production of Heavy Crude Oil – Topside Experiences on Grane

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Abstract

At current production, Grane delivers more than 220,000 barrels per day vs the design rate of 214,000. The development demanded innovative solutions both with respect to how the installation should be designed and what experiences the organization needed at start-up. Some of the major experiences in the short history of Grane are discussed in this article/presentation.

The Grane field started production on September 23, 2003. Oil is exported to the onshore terminal at Sture in a 28", 212-kilometer long pipeline. Gas for injection is imported in an 18", 50-km long pipeline, coming from the Heimdal field center (gas export juncture from Norway). It is the first oil field on the Norwegian Continental Shelf producing heavy crude (19°API). Close cooperation between Hydro's operations department, project development team, contractors and partners forms the basis for completing the Grane facilities. The project was delivered on schedule, below budget and without any high-potential incidents.



Figure 1: The Grane Platform started production September 2003

Transferring operational experience to the engineering staff was a success. This is a.o. seen in the man/machine interface of the control system, and the general work environment with respect to operations and maintenance of equipment. The separation system should be able to deliver high volume in a challenging environment and with the topside process exposed to sand production and creation of emulsions.

Hydro's "zero discharge philosophy" was the basis used in the design and so far the experience is encouraging. Both drill cuttings and produced water is injected into dedicated wells. All operations and equipment have performed as expected in respect to reduced environmental impact.

Introduction

Grane is Hydro's tenth field put into production, and with crude at 19°API, it is the first heavy crude oil field in the North Sea area. It was determined early to achieve maximum benefit from the experiences encountered during previous project realizations and to ensure maximum transfer of knowledge from our other field operations. This paper presents some of the challenges and experiences that Hydro as an operator has faced during the field development and production ramp-up period. Most of the challenges were well known beforehand and both the facility and the organization were prepared accordingly. History has shown that some of these challenges were underestimated. The production facility (including the organization) has however been able to use the flexibility present, either to adjust directly, or prepare temporary solutions while permanent solutions were developed and implemented.

Safety, Health and Environment

Highlights from the first 30 months

After the first 30 months of production the following achievements can be highlighted:

- No serious personal injuries during hook-up, commissioning or production/drilling activity
- The environmentally friendly design of the platform with its drilling and production facility has fulfilled expectations both in respect of design and flexibility
 - No serious emissions to the environment (sea/air)