

/ Expro Excellence Meters

Expro solution fundamental in mitigating risk of spills on shuttle tankers



Objectives

The Statfjord field is one of the largest and oldest in production, located predominantly in the Norwegian sector of the North Sea, currently operated by Statoil. Transportation of oil is by means of an offshore loading system (OLS) where oil is loaded onto a shuttle tanker and taken direct to refineries.

While being operated by **StatoilHydro (now Statoil)** during December 2007, an incident took place during the transfer of oil which resulted in a rupture of a valve. Unaware of the rupture, operations continued and consequently the platform ended up pumping close to 4000m³ of crude oil into the sea for 45 minutes.

Following in-depth investigations (by Statoil and the Norwegian Petroleum Safety Authorities), corrective actions were recommended however the challenge arose due to the fact that the OLS was subsurface and therefore visual inspections could not be implemented. Other suggestions such as human inspections, including listening for flow or monitoring tanker levels which would constantly fluctuate in a rough sea environment, were deemed insufficient.

The challenge was to achieve fairly high accuracy measurements in a multiphase (bubbly liquid) flow in a large diameter pipeline (20" – 32") that is not always completely full of liquid. High costs and difficulties in making modifications to the Norwegian shuttle tanker fleet were also a key consideration.

Technology used

20" - 32" diameter **PassiveSONAR™** and **ActiveSONAR™** flow meters

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An independent evaluation of flow meters was undertaken by SINTEF (Selskapet for Industriell og Teknisk Forskning ved Norges tekniske høgskole/The Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology) with Statoil and determined that Expro's **PassiveSONAR™** meter provided the best solution balancing ease of installation, accuracy and installed cost.

A 20" **PassiveSONAR™** meter system was installed on the shuttle tanker Navion Hispania (operated by Teekay) and connected to the tankers real time data acquisition system and the data collected over several offloading operations, with the flow measurements on the shuttle tanker being compared to the exported volumes.

Value to client

Statoil and Teekay verified that the data provided by the **PassiveSONAR™** was reliable and acceptable for the purposes of mitigation for future spills. The installation of sonar meters on shuttle tankers operating in the Norwegian sector of the North Sea has been adopted as an important part of Statoil's spill mitigation strategy.

Since the initial installation on the Navion Hispania, Expro's **PassiveSONAR™** and **ActiveSONAR™** meters have been installed on 32 shuttle tankers (correct as June 2013). Expro install the SONAR meters on existing tankers and new build vessels in one day (approximately), while the tanker is in port on normal rotation. An Expro technician will then sail with the vessel for one or more offloading operations to verify the SONAR meter operation and integration with the ship's data acquisition system.

Key deliverables

- Easy installation – one day required and no production down time
- Accuracy of data
- Wide range of sizes for large diameter pipelines
- Key element of spill mitigation strategy
- Endorsed by SINTEF via independent evaluation of flow meters

Contact

For further information, please visit exprometers.com/contact or call **+1 (203) 303-5686**.