

MINIMISING HSE IMPACTS DURING DESIGN AND CONSTRUCTION OF A MAJOR GAS PIPELINE THROUGH THE BALTIC SEA

Jens Rosendal Valeur and Neel Strøbæk, Ramboll Oil & Gas, Nicklas Andersson, Nord Stream AG

Abstract of paper presented at Offshore Europe in Aberdeen 2011. Also issued as a peer reviewed paper in the June 2012 issue of the SPE Journal *Oil & Gas Facilities* (<http://www.spe.org/ogf/print/>)

During the period 2010-2012, two parallel gas pipelines (the Nord Stream Project) are being installed in the Baltic Sea, between Vyborg in Russia and Greifswald in Germany. The pipeline system will enable an annual transport of 55 bcm of natural gas from the large Russian gas fields to the European gas grid.

Comprehensive environmental and safety studies were carried out already in the design phase. The outcome of these studies was used in iterations with the pipeline design process, ensuring that the final pipeline design has minimal impact on the environment as well as on human activities in the Baltic Sea. Also, due consideration has been given to ensuring the health and safety of construction personnel and minimizing the environmental impacts during construction.

Major changes to the design were made in order to minimise project impacts, i.e.

- An originally planned intermediate service platform was "engineered out", eliminating the risk of ship collisions in the operation phase,
- The pipeline route was optimised to avoid sensitive nature areas and heavily used ship traffic routes,
- Extensive geophysical surveys were carried out in order to identify and mitigate interaction with dumped chemical and conventional munitions and cultural heritage objects,
- It was insured by theoretical analysis verified by measurements that the pipeline with the chosen route did not have a negative impact on inflow and mixing of water in the Baltic Sea,
- Environmental monitoring and subsequent feedback to the construction vessels were carried out during seabed intervention works near sensitive habitats.

Unique for this project is the major design changes that have taken place as a result of the HSE analysis. One outcome of this has been that all five affected countries have given permit to the project in a relatively short time period, even though it is the first major pipeline project in the Baltic Sea.

