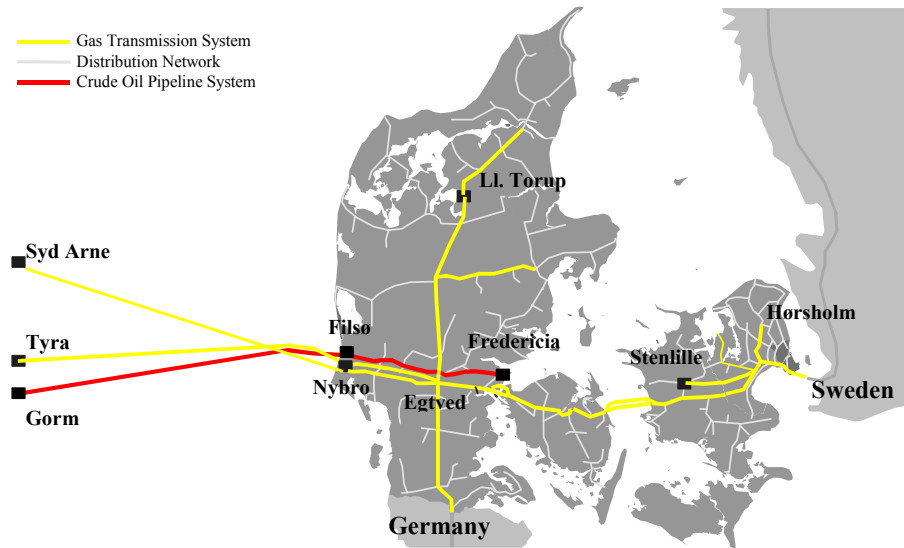


SCADA System 97: The new Control System of DONG Energy Service A/S



Dansk Olie & Naturgas A/S (DONG) is the parent company of a Danish group involved in the trading of oil and natural gas. DONG's headquarters are situated in Hørsholm, which is about 30 kilometres north of Copenhagen, and its shares are held by the Danish State. The company's major business activities include exploration, production, transportation, storage, purchasing and the selling of oil and natural gas.

DONG's oil and natural gas are transported through the company's own gas pipeline network and its own crude oil pipeline. Both pipeline systems are operated by DANGAS, a subsidiary of DONG. Accordingly, DONG purchases natural gas produced at the Danish fields in the North Sea; afterwards it is transported through the company's own natural gas transmission system to the

customer. In the summer, the natural gas is stored in two underground storage facilities. The company also pumps oil produced in the North Sea to its crude oil terminal in Fredericia.

The gas pipeline system consists of an offshore and an onshore pipeline system. The pressure in the 550 km offshore pipeline system is approximately 138 bar. In comparison, the 1000 km onshore pipeline system is operated at a pressure of about 80 bar. Furthermore, the gas transmission system is comprised of a gas treatment plant, two underground storages as well as 50 measurement and regulating stations.

Dong's crude oil pipeline is comprised of a 220 km offshore section and a 110 km onshore section. The onshore section includes a pump station, an oil tank and 15 valve stations.

Task definition

In 1999, a new SCADA system replaced DONG's 15 years old dispatching system in order to improve the following tasks:

- monitoring and controlling of the entire gas transmission network and crude oil pipeline from the dispatching centre in Vejen
- transferring of pressure and quantity values from an Oracle data base to DONG's intranet
- online simulation as well as look ahead simulation and gas quality tracking
- disposition and contract monitoring
- leak detection of the oil pipeline

In addition, DONG required that the new SCADA system be developed with the latest technical standards and provide a high degree of reliability, flexibility, user friendliness and ergonomic in the future.

Realisation

The new dispatching system was based on the GAMOS software system. It was implemented using a client server architecture, whereby the servers consist of two VMS computers with disk mirroring. The process visualisation is performed by PCs equipped with a WindowsNT operating system and a Microsoft user interface.

Apart from the SCADA functions enabling the monitoring and controlling of the pipeline network, the GAMOS system also provides other important functions such as simulation, forecasting and disposition:

System Maintenance

System maintenance enables DONG to visualise present and future contract and supply developments as well as the pipeline topology in a flexible and comfortable way.

Simulation

Simulation assists DONG in the tracking of gas qualities in its gas transmission system. In addition, with the aid of disposition specifications, future pressure developments in the pipeline system can be calculated up to 48 hours in advance.

Forecast and Disposition

The forecasting function (automatic and manual forecast) can be used to simulate the customer's future supply demands. With the aid of the disposition function, the controller is able to specify the operating mode of contacts and resources.

Scope of Services

PSI realised the SCADA system 97 for DONG as the general contractor.

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