Disaster Tolerant Network Control System for Thyssengas

Liquid gas storage facility tank in Nievenheim

Thyssengas GmbH, with headquarters in Dortmund, is a group of independent transmission system operators and is one of the leading natural gas transport companies in Germany. Founded in 1921, the company can look back on a long tradition in natural gas logistics and is regarded as a future-oriented pioneer in the industry. Today, the company operates a modern cable system that is more than 4,200 kilometres long.

Every year, this extensive transport network transports up to 10 billion cubic meters of natural gas to distribution system operators, industrial operations and power plants in an environmentally friendly way, primarily in the most densely populated German federal state of North Rhine-Westphalia.

To monitor and control its gas network, Thyssengas operates a PSI network control system based on PSI*control*, with the additional components PSI*ganesi*, PSI*transport* and PSI*comcentre* as integrated functions for network balancing, online simulation and for exchanging business messages. To enable this, an overall redundantly designed computer system is available at two geographically separated sites.

Disaster-tolerant network control system design

In the middle of 2014, Thyssengas contracted PSI to perform a system upgrade and extend the system to make it a disaster-tolerant network control system. The future network control system

consists of two geographically separated sites with equal authority, each with redundant system design. In operation, the operating personnel electively give one system at one site power of command. PSI delivers the complete, turnkey system with hardware and system software, network control system application software and engineering.

Thyssengas awarded the contract on the condition that the new network control system be set up in the commercially operated data centres specified by Thyssengas. The complete project will be implemented in two parts with full consideration of regulatory constraints. The first part was completed in 2014 and the second part will be available to Thyssengas in 2016.

Disaster-tolerant network control system design

A major feature of the new network control system is the site synchronisation which synchronises the complete system automatically. Amongst other things, it ensures that entries made at the main site (which currently has the power of command) are transferred to the replacement site so that both sites have the same database in terms of process image, master data and manual entries (commands and acknowledgements). The network control system at the replacement site can thus be given power of command at any time without the need for manual data alignment and therefore take over management of the network.

The site synchronisation is also used to migrate data from the current release of the operating system to a new version. The systems of both sites can be operated from the existing dispatcher operator stations. This allows the change of leading operating system to be tested regularly and to be used for testing future software updates before operational use. The dispatchers only have to switch to the planned or existing alternative control centre in the event of a disaster or on the rare occurrence of complete trials of serious situations.

With the upgrade of the PSI application software to the latest version, in terms of IT security the new Thyssengas network control system is based on the BDEW white paper and the current requirements of IT security legislation.