

## *Leak Detection and Locating for DOW Pipeline System*



### DOW OLEFINVERBUND GmbH

The company operates a network of ten pipelines for transport of raw materials and products to supply DOW production sites in the industrial area Leuna-Schkopau-Böhlen in Eastern Germany.

The pipelines have a total length of more than 1,200 km.

The 435 km long raw oil pipeline between Rostock and Böhlen (RRB) supplies the steam cracker in Böhlen with **pentane, naphtha, condensate and liquid gas.**

The **hydrogen** pipeline runs from Schkopau to Böhlen (WBB), is 51 km long, and also supplies the cracker.

The PBB and PTB pipelines, also 51 km long, run in the opposite direction and transport **styrene** and **butadiene** from Böhlen to Schkopau.

**Propylene** is pumped in the 65 km long PBT pipeline from its production plant in Böhlen to the polypropylene plants in Leuna and Schkopau, and to the cavern storage facility in Teutschenthal for temporary storage.

**Ethylene** is transported in a **gas** grid between DOW-sites in Böhlen, Teutschenthal Schkopau and Litvinov/CZ (EBT and EBL).

**Ethylene in supercritical flow** is pumped in a 320 km long pipeline (PST) between Stade and Teutschenthal.

These pipelines are monitored and operated from the control center in Böhlen.

#### Objectives

In 2011–2012 a facility supervision and control system rehabilitation project was carried out. As part of this project, a special work package was defined for the rehabilitation of the Leak Detection System (LDS). The project was engineered, implemented, commissioned and tested under supervision of the authorities and the German TÜV (Technischer Überwachungs-Verein – the German Technical Inspection Organization).

With regard to the transport of dangerous gases and liquids, the LDS had to comply with the Technical Regulations for Pipelines] (Technische Regel für Rohrfernleitungen – TRFL) as well as with SIL 1 in accordance with the international standard IEC 61508.

Two continuously operating and independent methods for detecting leaks were required. At the preliminary stage of this project, PSI calculated the LDS performance that could be obtained and presented the results of their findings to the TÜVs concerned.

#### Implementation

The LDS was considered a component of a Safety Instrumented System (SIS). The development of the methodology and corresponding practical

steps, together with the certification of these steps, are the main benefits of our work.

The PSI pipelines LDS was implemented on a redundant computer pair with redundant data acquisition and manages the following tasks:

- Data acquisition from the Honeywell control system
- Simulation of the pipelines hydraulics
- Hydraulics visualization in real-time
- Batch and pig tracking
- Detection and location of leaks
- Logging and reporting of events

#### Services

The LDS is serviced and maintained by PSI. This service includes operational support with hydraulic events analysis as well as the software maintenance. In order to guarantee a permanent monitoring of the LDS functionality and integrity, a software review mechanism was established between PSI and the German TÜV. Within this framework, code changes including software improvements are traced, documented, reported and then approved.

*PSI Aktiengesellschaft für  
Produkte und Systeme der  
Informationstechnologie  
Dircksenstrasse 42-44  
10 178 Berlin  
Germany  
Tel: +49 30 2801 - 0  
Fax: +49 30 2801 - 1000  
<http://www.psi.de>*

#### Contact

PSI Energy Oil & Gas  
Dr. Martin Bürgel  
Tel: +49 30 2801 - 1504  
Fax +49 30 2801 - 1011  
E-mail [mbuergel@psi.de](mailto:mbuergel@psi.de)  
<http://www.psiolandgas.com>

