APPLICATION REPORT

Oil & Gas

Leak detection of a crude oil pipeline

- Safety concept for a bi-directional 6.4 km / 4 mi long transport pipeline (28")
- Redundant process for leak detection and leak localisation according to TRFL (Technical Rule for Pipeline Systems)
- Independent detection and evaluation of stationary and non-stationary conditions
- Integration into existing instrumentation and control system

NWKG

1. Background

Nord-West Kavernengesellschaft mbH (NWKG) based in the port city of Wilhelmshaven, Germany, is one of Europe's largest cavern operators. NWKG stores approximately 10 million m³ / 25 million bbl of crude oil and mineral oil products for the Petroleum Stockholding Association (EBV). It also operates a 6.408 km / 4 mi long crude oil pipeline with a diameter of 28" (DN 700).

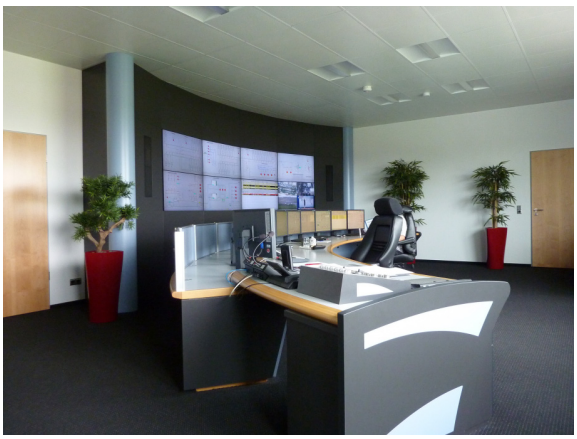
2. Measurement requirements

To ensure constant monitoring for the protection of the environment, a redundant state-of-the-art leak detection system in accordance with the Technical Rule for Pipelines (TRFL) needed to be installed. The reliability of the system was the top priority. Despite virtually non-existent hydraulics in the pipeline, the system needed to provide accurate, repeatable results with no false alarms. Further, seamless integration into the existing PCS7 control system was a requirement to guarantee standardised, familiar operation for the user.

KROHNE

3. KROHNE solution

NWKG decided on the PipePatrol leak detection system to monitor this pipeline. It was manufactured by KROHNE while adhering to the requirements of the DIN ISO 9001. The system was started up, configured and calibrated on-site and integrated into the process control system for the pipeline. It meets the requirements of the TRFL 2010 and the current state of the art. PipePatrol is designed to be completely redundant and accesses the data that the existing instrumentation provides. Together with NWKG an intuitive user interface was also designed in the control system. This system provides the operating personnel with all of the relevant information for leak detection in an easy-to-understand way and contains a graphic representation of the leak parameters.



Leak detection in the control room

4. Customer benefits

The operator is very satisfied with the KROHNE system. Thanks to an upgrade of the model-based process to include classification by way of pattern recognition, all requirements of the application were met in full. This is how PipePatrol overcomes the limitations of classical leak detection systems. It takes into consideration the different crude oils without losses during detection. Since the system acceptance on-site, the leak detection system has been guaranteeing fault-free operation despite the virtually non-existent hydraulics in the pipeline. The guaranteed performance parameters were tested and confirmed by an independent expert from the technical inspection association TÜV NORD in stationary and non-stationary operations.

5. Product used

PipePatrol

- Pipeline leak detection system for liquids and gases
- E-RTTM (Extended Real Time Transient Model) based leak detection and localisation
- Meets API 1130 and TRFL standards
- Can be a completely independent solution or integrated into existing instrumentation and control systems

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