

Reservoir Water Pipeline Monitoring

Germany

Pipelines can be used to transport reservoir water, which gets pumped back into the ground as a natural by-product of oil and gas production. An AP Sensing Distributed Temperature Sensing solution was selected to monitor a pipeline transporting reservoir water in northern Germany.

A leading energy company's pipeline began operating in December 2017, following the commissioning of an AP Sensing DTS. This pipeline is used to transport deposit water. The water cannot be discarded above ground due to its natural, slight radioactivity and the other substances that it contains. The radioactivity is a result of the depth below the earth's surface from which the water originated. Therefore, the reservoir water must be pumped back into the ground.



Horsehead pump

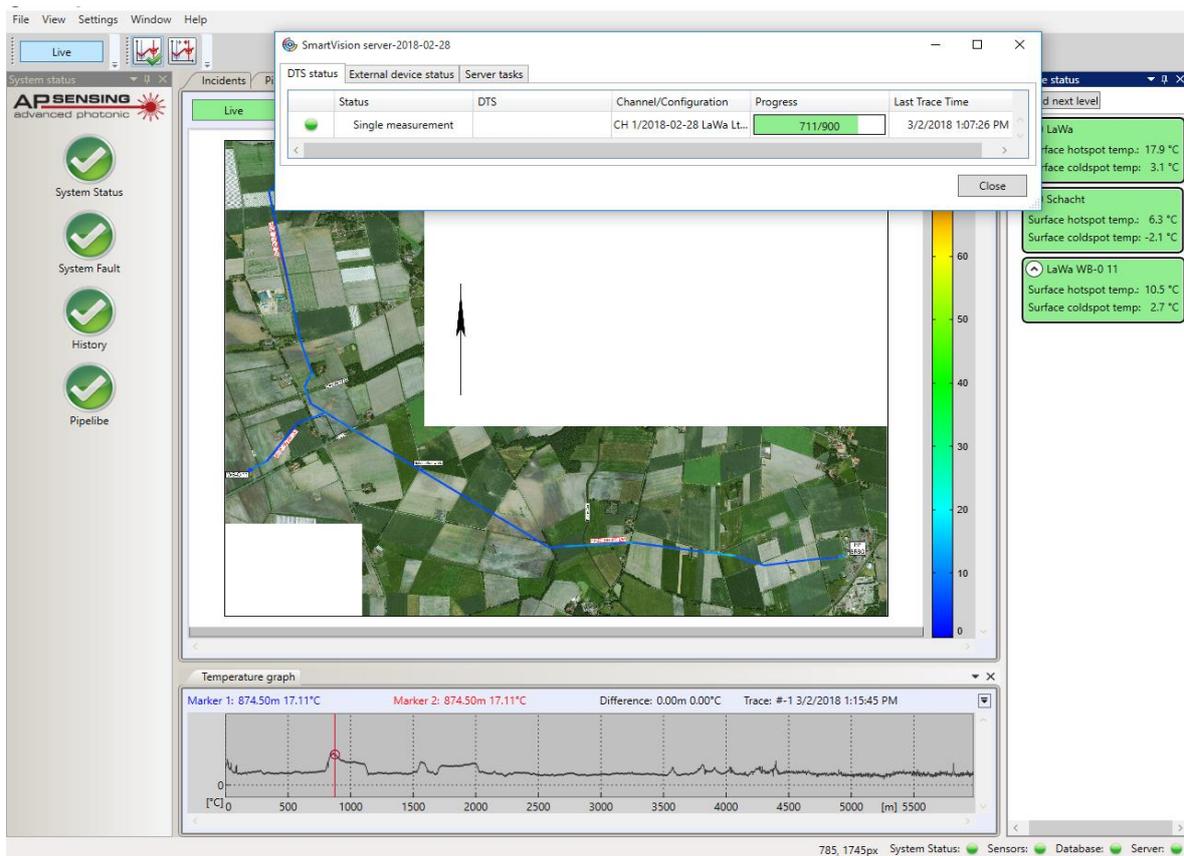
The AP Sensing Linear Pro Series DTS is used to monitor and control the pipeline for leakages from the production facility to the bore wells, as leakages would have regulatory, operational, and safety implications. The N4386B DTS unit monitoring the pipeline has a measurement range of 8 km and one sensor channel, integrated in a compact, custom DTS rack system. The DTS monitors the temperature of the water within the 6 km pipeline, which is approximately 36°C.

SmartVision™

For fast and precise leak detection and monitoring, the AP Sensing SmartVision™ SmartAlarm™ system is used. SmartVision™ is a visual graphical user interface that integrates monitoring data from multiple devices, stores it in a highly secure central database, and makes data analysis and reporting easy. It is connected to SCADA via Modbus TCP, which is integrated in SmartVision™ and has DTS relay contacts, which are also connected to SCADA.

AP Sensing's SmartAlarm™ module has the highest possible probability of detection (POD rate), utilizing alarm algorithms to provide information such as leakage alarming, leak position on the pipeline, general fiber faults, and alarming for a change in loss of the fiber.

The use of AP Sensing's SmartVision™ with SmartAlarm™ ensures pipeline integrity and management, as well as rapid, accurate leak detection so that reservoir water can be pumped safely and efficiently.



SmartVision™ operating in normal 'Live Mode'

A second pipeline with similar parameters was commissioned for the end client in early 2018. The DTS and PC with SmartVision™ software are located in a control room at the start of the pipeline for one project, and in a building at the end of the pipeline for the second one.



Leak detection test vehicle

Leakage Trials

A leakage trial was conducted on the second pipeline in 2018. The simulated leaks used warm water with a similar temperature to the reservoir water in the pipeline, which was slowly applied to the pipeline and sensor cable. The trials indicated that both small and larger leaks are measured and detected with the AP Sensing DTS. Another leakage test took place in 2019 at both pipelines and successfully detected simulated leaks at both locations.

All training sessions for both pipeline operators have taken place, and AP Sensing's reservoir water pipeline monitoring system has been operating effectively at both sites since commissioning.