

# Sulfur Pipeline Flow Assurance

## Habshan Region, United Arab Emirates

*Pipeline transporting of sulfur requires heated pipelines, so the sulfur remains in liquid form. A skin effect heating system is used and supervised by a heat tracing system to maintain and protect the pipelines, vessels, and instrumentation at pre-defined temperatures. AP Sensing's fiber-optic based DTS system provides insight into the temperature along the entire length of the pipeline.*

The Habshan region is located in southwestern United Arab Emirates. **Two sulfur transport pipelines with a total length of 76 km** use a heat management system to ensure safe and reliable temperatures along the route. Although pipeline transport is more cost-effective than road or rail – and the cost-effectiveness increases with the pipeline length – the pipeline and heat management systems have their own unique challenges.



*Splicing and installing fiber optic sensor cable*

Working together with our global partner Pentair Thermal Management, AP Sensing's DTS (distributed temperature sensing) solution was selected to **monitor the temperature profile down to 1°C and 1m spatial resolution**. AP Sensing was selected due to its pipeline expertise, project management capabilities, design proposals and the quality and reliability of our DTS systems.

Additionally AP Sensing's design and instrument feature allow to deal with potential issues like higher optical loss of the fibers, without impacting the overall system performance and accuracy.

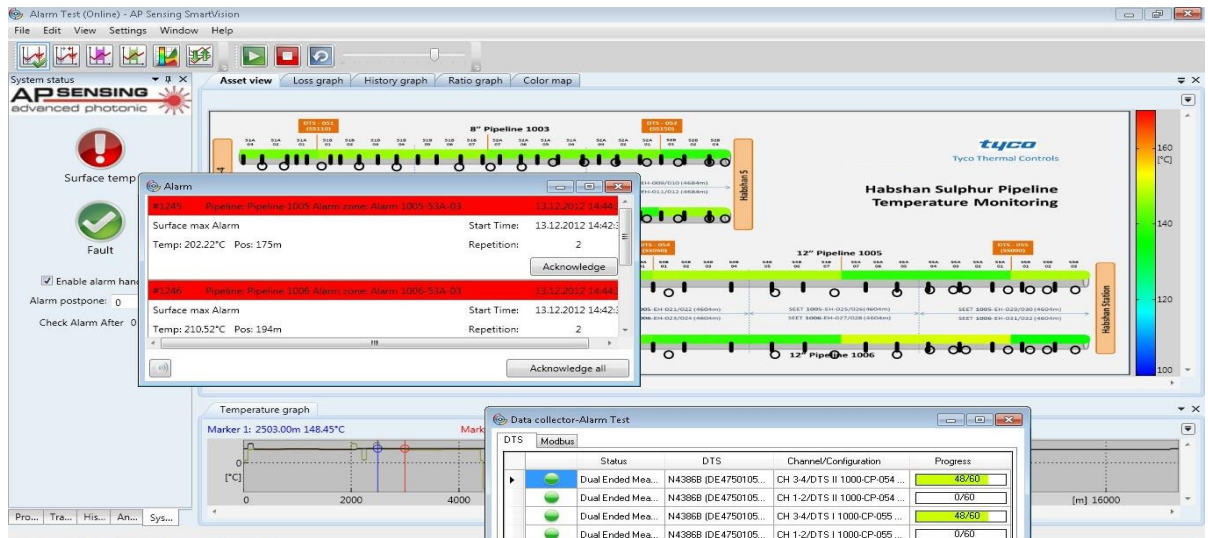
A total of 5 DTS devices were installed, each with 4 channels. A dual-ended measurement setup was employed, ensuring cable redundancy.

Together with our expert partners **AP Sensing has defined a special sensor cable**, which can handle the rough installation demands and keeps the optical loss of the fiber at an acceptable level during heat up and cool down cycles. This required very specific FOL (fiber over length) for the 250 °C rated sensor cable. In addition the design of the pull-in ducts, pull-boxes and other deployment aspects had to be taken into account.



*Sensor cable installed between the pipe and insulation*

The pipeline operators have the complete overview of the entire length of the pipeline in the remote control room, located several kilometers away from the pipeline. AP Sensing's **asset-visualization software SmartVision** provides multi-user and multi-DTS device capabilities and database measurement storage. A clear graphical user interface shows the operators color-coded sensor cable routes, indicates the temperature conditions along the lines, and issues alarms if any of the pre-defined conditions for any zone are exceeded.



**SmartVision: Trace details of a heated pipeline**

A Modbus protocol running over TCP/IP was used to smoothly integrate into the onsite IT infrastructure.

AP Sensing's experienced Project Engineering team ensured that **no onsite integration time** would be needed: the complete rack systems and all the remote unit systems were fully built, assembled and tested in advance at our headquarters in Germany. Our **pipeline monitoring expertise and our high quality standards** are one reason why all of our systems are shipped with a 2-year factory warranty.

The installation was carried out with our expert worldwide partners TopSide and Pentair.

The initial phase of this large pipeline transport project was **completed to everyone's satisfaction**, but it is only a start, because 3 similar projects are in deployment. Valuable assets are protected, thanks to AP Sensing's fiber optic pipeline integrity and heat tracing solution and expertise in designing, integrating and supervising such complex projects.

