

SULPHUR TRANSFER LINE PELLETIZER FACILITY

PROJECT DETAILS

Location:	Ras Laffan, Qatar
Completion Date:	May 2009
Contract Scope:	Design, Specification, Engineering, Procurement, Construction, Commissioning
Applications:	12" Sulphur Transfer Pipeline
Technology:	Skin-effect Trace-Heating System (STS), Fiber-optic Distributed Temperature Sensing (DTS), FEA 3D Modeling



KEY CHALLENGES

This project consisted of a 35 km, dual, 12-inch sulphur pipeline constructed to transfer molten sulphur from 11 producers to a sulphur pelletizer facility. The Sulphur Transfer Line's heat management system challenges included:

- A tight range of allowable temperature from 125°C to 145°C for molten sulphur with a set point of 135°C along the entire length of pipeline.
- A large outdoor pipeline with significant weight, multiple flow paths, and vertical expansion loops at every 150 m.

The customer also required the capability to re-melt and re-heat solidified sulphur without causing overheating or over-expansion. Additionally they needed a redundant heating system that would cover 100 percent of the pipeline.

SOLUTION

nVent's TRACER Turnkey Solutions team with its expertise in construction and commissioning heat management systems engineered and bundled multiple technologies, resulting in a world-class, safe, reliable and efficient electrically traced sulphur pipeline.

PRODUCTS

To meet the needs of this challenging application, nVent employed the following heat management system:

- An inherently safe nVent RAYCHEM Skin-effect Trace-Heating System (STS) which has high exposure temperatures and efficient heat transfer to the pipe.
- A state-of-the-art RAYCHEM control and monitoring system with vacuum contactors.



Fiber-optic control panel



Pipe cross section

- Finite element analysis to determine the temperature profile of sulphur across the cross-section of the pipe.
- Fiber-optic based Distributed Temperature Sensing (DTS) System that provides a dynamic pipeline temperature profile at each meter with 1°C accuracy for the entire length.
- A multi-power heat delivery mechanism with 70% of installed power for normal operating conditions and 100% of installed power for heat-up/re-melt conditions.
- A multi-layer thermal insulation system with a high temperature expanded perlite inner layer, load bearing closed cell foam outer layer and UV resistant jacket.
- Full service procurement of materials, project management, construction and commissioning of the pipeline.

BENEFITS

nVent's ability to engineer and integrate multiple technologies with its expertise in constructing and commissioning heat management systems resulted in a world-class, safe, reliable, and efficient electrically traced sulphur pipeline.

By utilizing a nVent Heat Management System, the Sulphur Transfer Line received the following benefits:

- The RAYCHEM (STS) Skin-effect Trace-Heating System not only minimized the number of circuits but also resulted in better heat transfer and low temperature differential between the pipe and cable sheath, thus leading to a safer design.
- The finite element analysis and RAYCHEM control and monitoring solutions ensured that the sulphur temperatures did not deviate outside the tight control temperature range under normal operating conditions.
- The Fiber-optic Distributed Temperature Sensing (DTS) System provided continuous monitoring of the temperature along the entire length of the pipe. This helped to locate hotspots along the length of pipe during the re-melting process and in-turn avoided excessive pressure generated by melting sulphur.
- Multi-power heat delivery mechanism and multi-layer insulation systems not only optimized the total operating costs of the system but also contributed to a shorter re-melt duration.
- By assuming total responsibility of the heat management system, nVent's TRACER Turnkey Solutions team ensured that the project was completed on time, safely and to the satisfaction of the customer.

With decades of experience in designing, manufacturing and installing heat management systems, nVent has satisfied the unique requirements of various applications.

Sulphur transfer pipeline is an example where, by strategically bundling various state-of-the-art technologies with construction and commissioning services, nVent's turnkey solutions resulted in a safe, reliable and efficient electrically traced Sulphur transfer pipeline – with the most advanced re-melt program.

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