Project Profile – Qatargas Sulfur Transfer Line

Project Description
- **Client:** Qatargas
- **Location:** Ras Laffan, Qatar
- **Application:** 12" Sulfur Transfer Pipeline
- **Technology:** Skin-effect Tracing System, Fiber-optic Distributed Temperature Sensing, FEA 3D Modeling
- **Date Initiated / Completed:** December 2005 / May 2009
- **Contract Scope:** Design, Specification, Engineering, Procurement, Construction, Commissioning

Project Details
This project consisted of a 35 km, dual, 12-inch sulfur pipeline constructed to transfer molten sulfur from 11 producers to a sulfur pelletizer facility. Heat management system challenges included:

- Tight range of allowable temperature from 125°C to 145°C for molten sulfur with a set point of 135°C along the entire length of pipeline.
- Outdoor large pipeline with significant weight, multiple flow paths, and vertical expansion loops at every 150 m.
- Capability to re-melt and re-heat solidified sulfur without causing overheating or over-expansion.
- A 100% redundant heating system for the pipeline.

Tyco Thermal Controls Solutions
To meet the needs of this challenging application, Tyco Thermal Controls employed the following heat management system:

- Inherently safe Tracer Skin-effect Tracing System which has high exposure temperatures and efficient heat transfer to the pipe.
- State-of-the-art DigiTrace® control and monitoring system with vacuum contactors.
- Finite element analysis to determine the temperature profile of sulfur across the cross-section of the pipe.
- Fiber-optic based distributed temperature sensing system that provides dynamic pipeline temperature profile at each meter with 1°C accuracy for the entire length.
Benefits

Tyco Thermal Controls’ ability to engineer and integrate multiple technologies with its expertise in construction and commissioning heat management systems resulted in a world-class, safe, reliable, and efficient electrically traced sulfur pipeline.

By utilizing a Tyco Thermal Controls Heat Management System, the Qatargas Sulfur Transfer Line received the following benefits:

• The Tracer Skin-effect Tracing 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 DigiTrace control and monitoring solutions ensured that the sulfur temperatures did not go outside the tight control temperature range under normal operating conditions.
• The fiber-optic distributed temperature sensing 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 sulfur.
• 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, Tyco Thermal Controls ensured that the project was completed on time, safely and to the satisfaction of the customer.