



Case Study: SIL 2 Heat Tracing for Natural Gas Pipelines

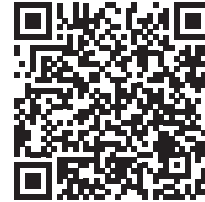


Industry
NATURAL GAS PIPELINE DISTRIBUTION

CHALLENGE:

National Grid operates city gate stations delivering natural gas to commercial and residential customers. High-pressure gas exceeding 1000 PSI is supplied to maximize throughput in transmission pipelines. Prior to delivery, supply pressure must be reduced to less than 100 PSI at the gate station. This is done with pressure-reducing valves and regulators.

Transmission line gas temperatures at the gate station can fall to the freezing point due to the combination of ambient temperatures and the Joule-Thompson effect (the thermodynamic phenomenon that causes temperature changes of a gas when forced through a valve.) This combination can freeze pipeline assets rendering them inoperable, leading to overpressure conditions and a potentially explosive event. National Grid identified that heating system safety controls should be upgraded to the newest corporate standards with SIL certified equipment to reduce this risk.



**ONE SERIES
FIELD SAFETY SYSTEM
FOR REMOTE
HEATER CONTROL**

SOLUTION:

The One Series is a Class I, Div. 1 safety system that supplies both a loop powered 4 to 20 mA output for continuous monitoring and a high capacity safety relay, all driven by a programmable logic in a single hazloc enclosure. Certified for use in SIL 2 safety instrumented systems, the One Series Safety System not only controls the heater locally, it alarms remote "Gas Control" operations when the temperature of the pressure-reducing valve drops below 40°F. This signals freezing temperatures of trace water in the natural gas stream.

The one Series Safety System replaces a temperature transmitter, process temperature switch and gauge. Certified smart temperature transmitters with embedded SIL-level relays and logic allows operators to achieve additional risk reduction in the heating control circuit. This 3-in-1 field mounted Safety System cost-effectively upgrades legacy heating control circuits without changing the host system. It eliminates interconnected equipment and wiring to reduce overall cost of ownership.

This new technology has led National Grid to standardize on the One Series Safety System for new and modernization projects.



**Risk reduction in the
heating control circuit**



3-in-1 Safety System



Cost-effective upgrade