Refinery Improves Reliability of Crude Charge Heater Pass Measurements and SIS with Quad Vortex Meters

Results

- Improved reliability of Safety Instrumented System (SIS) and preventing spurious trips by adding redundancy for both the electronics and sensors
- Eliminated frequent maintenance caused from plugging and freezing of impulse lines on DP orifice meters
- Single device solution in a solid, welded meter body with no leak points

Rosemount Quad Vortex Flow Meters provide measurement redundancy and reliability for critical safety applications while reducing maintenance time and costs.

Application

Accurate and reliable flow measurement is important in multi-pass fired heaters to guard against heater damage and to avoid false heater trips. It is important to know that heater pass flow measurement is reliable. These measurements are typically part of a Safety Instrumented System (SIS) loop due to the implications of mismeasurement. If a flow meter indicates there is adequate flow when the flow has really stopped or is significantly reduced, this could pose potential risk as the heater tube could rupture with no fluid to take the heat away. On the other hand, if the flow meter falsely indicates there is no flow when there really is flow, that will trip the heater when it shouldn't, causing operational as well as safety concerns.

Customer

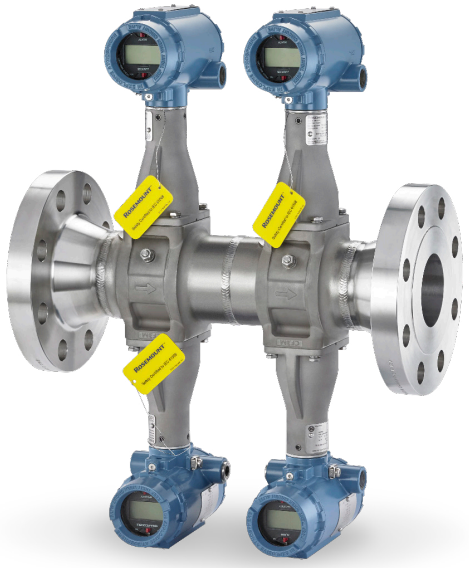
North American Refinery

Challenge

The refinery's crude unit charge heater utilized a single orifice plate with four transmitters on each of the four feed passes into the heater. Due to challenges with steam tracing, the refinery regularly faced plugging and freezing of impulse lines causing significant maintenance issues on these DP orifice meters.

Solution

The refinery replaced their DP Orifice meters with four, 4-inch reducer Rosemount™ Quad Vortex Flow Meters. The meters were installed with remote transmitters on each heater feed pass line to the crude charge heater. Since the meters were installed in hard to reach locations, the remote capable electronics allowed for easier access and process control.



Rosemount 8800 Quad Vortex Flow Meter

The Rosemount Quad Vortex Flow Meter is constructed of four independent transmitters and sensors and a dual shedder bar integrated into a single meter body. The Quad Vortex Flow Meter is calibrated to provide an accurate single flow meter with four independent measurements enabling the 2oo3 voting needs the refinery SIS required. Unlike the original installation which had a single primary element and multiple transmitters, this meter has four independent sensors in a single meter enabling both redundancy of the hardware and electronics of the meter.

The vortex meters have been operating for over a year and have had no measurement issues. In addition, because vortex meters are designed to be extremely reliable with a gasket free, non-clog meter body and no impulse lines, the refinery did not have maintenance issues anymore with freezing or plugged impulse lines. Should the sensors ever need to be replaced, Rosemount Vortex meters have a unique sensor design that is isolated from the process and enables replacement of the sensor without disrupting operations.

The customer is satisfied with the Emerson solution as the meter does not need regular recalibration and no heat tracing for impulse lines is needed. Because the Rosemount Quad Vortex Flow Meter is a complete solution, the customer didn't need to source any additional materials from other vendors. Not only is the meter SIL3 capable, but it also has basic process control capabilities through the use of the fourth transmitter.

Resources

Emerson Automation Solutions Industries
Emerson.com/Refining

Rosemount Quad Vortex Flow Meters
Emerson.com/RosemountQuadVortex

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