

American Gas Processing Company Improves Performance and Stability in Three Hours with Rosemount™ X-well™ Technology

RESULTS

- Improved plant efficiency
- Avoided compressor shutdown
- Estimated 75 percent reduction in total installation time
- Early warnings enable predictive maintenance
- Saved an estimated four hours of operations time

APPLICATION

Residue gas compressor discharge temperature monitoring at gas plant

CUSTOMER

An American gas processing company with an interstate gas pipeline as well as gathering and processing operations that span the United States.

CHALLENGE

An American gas plant wanted to monitor temperature conditions inside the discharge pipes from seven residue gas compressors feeding the customer delivery system. "Our company is committed to maintaining the highest standards of operational reliability," said the Plant Engineer at the facility. "Although we monitored temperature on the residue gas header, we had no way of knowing the discharge temperature out of each individual compressor. If we had changes in ambient temperature or other process conditions or upsets, there was potential for low temperature excursions in the pipes that could impact plant efficiency/operations."

Gaining insight on temperature for each individual unit would enable operations to verify the efficiencies on each individual cooler. On-line monitoring would also enable them to initiate manual control of the louvers to prevent discharge gas from low temperature excursions and minimize production disruptions. Unfortunately, a compressor shutdown and changeover (to a backup) was required with conventional methods, and the plant did not want to incur those labor and material costs.

SOLUTION

The plant installed a pre-assembled temperature solution consisting of a surface mount Rosemount 85 Pipe Clamp RTD Sensor and Rosemount 648 Wireless Temperature Transmitter with Rosemount X-well Technology on the discharge pipe of each of seven residue gas compressors feeding the customer air-cooled heat exchanger units.



"With X-well and wireless technology we were able to install all seven compressor discharge temperature measurement devices in about three hours without a single compressor shutdown."

Plant Engineer

American Gas Processing Company

A surface temperature measurement has many advantages. For one, it eliminates the need for wake frequency calculations and other complex design considerations associated with thermowell installations. Users also don't have to design, size or maintain thermowells. Insertion length, profile, process compatibility, and other related design decisions are all eliminated. More importantly to the customer, the installation does not require a compressor shutdown. The downside of surface temperature measurement technologies has typically been poor accuracy when measuring process temperature inside a pipe or vessel.

This issue is addressed by the X-well's innovative heat flux algorithm that improves the accuracy of the surface-mount sensor. The algorithm applies the following measured and entered variables to calculate an accurate and repeatable gas discharge temperature inside the pipe:

- known thermal conductivity properties of both the process pipe or vessel
- the ambient temperature, as measured by an RTD in the transmitter
- the surface temperature, as measured by the surface-mounted RTD

"We bought the X-well Technology so we could add measurement points without a compressor shutdown or hot work permit," said the plant engineer. "Ordinarily, it would take a couple of days to complete the piping modifications necessary to make the temperature measurements on each discharge pipe. It would also take a couple of days up front to pull the wires. With wireless and X-well, we could use ordinary tools and didn't need skilled labor to add the measurement points. In fact, it only took three hours to install all seven devices, and most of the labor and other costs associated with conventional thermowell and RTD instrument installation was eliminated." He noted that about four hours of operator time to shut down the compressors for process changes was saved as well.

There was some programming work that was done up front, both for the transmitter assemblies and the DeltaV™ control system, to facilitate the installation. "Emerson™ sent us a data sheet that we filled out for each specific application," he stated. "Things like pipe size, wall thickness, pipe coating details, etc. When the pre-assembled transmitters and sensors were shipped to us, the heat flux algorithm was already integrated and characterized with thermal conductivity properties specific to each application. We had already configured each of the points in DeltaV, so when the transmitter and sensor assemblies were installed, all we had to do was connect the transmitters to our existing wireless gateway and implement the changes to the DCS operator graphics and other displays." The measurement assembly was also insulated to ensure a consistent heat flow pattern emanating from the pipe and to minimize the effects of ambient conditions. The consistency of the heat flow pattern is important to the accuracy of the heat flux algorithm.

The transmitters were factory calibrated with low and upper limit alarm settings. This gives operators plenty of warning of low temperature excursions and enables them to act in a timely manner to prevent any impact on operations. "We have not had a low excursion yet, because anytime the ambient temperature cools down operators take a look at the discharge temperatures and proactively adjust the fin fan louvers," the engineer said. "With accurate, real-time temperatures readily available to operators, the plant has improved plant efficiency."

"The X-well is a fast and easy solution that does not require downtime or much in the way of engineering," he concluded. "For installation alone, we reduced our labor by an estimated 75 percent and avoided about two-days of compressor shutdowns. There was no welding, and no wires to pull. We just filled out a datasheet and the product came assembled, calibrated, and configured with the application-specific heat flux algorithm already loaded and ready to go. We have improved operations reliability and enabled predictive maintenance over reactive methods with about three hours of labor."

"With wireless and X-well, we could use ordinary tools and didn't need skilled labor to add the measurement points."

RESOURCES

Emerson Oil & Gas Industry

Emerson.com/Industries/Oil-Gas

Rosemount 648 Wireless Temperature Transmitter

Emerson.com/Automation-Solutions/648-Wireless-Temperature-Transmitter

White Paper - Achieve Accurate Process Temperature Measurement with Surface Sensor Innovation

Emerson.com/Rosemount/White-Papers/Temperature



Rosemount X-well Technology provides a complete point solution to accurately measure process temperature without the need to shut down the process.

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