

Refinery Improves Vacuum Tower Level Measurement with Rosemount 3051S ERS and Thermal Range Expander

Results

- Reliable DP Level measurement to complement current nuclear device
- Cost savings from the elimination of heat tracing
- Reduced maintenance costs



Application

Vacuum tower level measurement

Application Characteristics

The customer's cracker towers contain excessive upward vapor flow that impedes downward liquid flow. This causes accumulation of liquid in the column and as a result, separation suffers.

Flooding forces operators to reduce vapor rates and reboiler duty, and rework off-spec products. Severe flooding harms tray effectiveness, which reduces column capacity, increases maintenance costs, and can force a shutdown.

Customer

A major refinery in North America

Challenge

The customer's tower level measurement had been made using nuclear technology, which introduces complexity due to regulation of nuclear source and requires the customer to have a secondary verification of level. They needed secondary verification because of the challenges with the reliability of the original measurement. The customer was experiencing significant issues with ambient temperature changes causing drift. Fill fluid could be vaporized due to vacuum and high temperature – up to 770 °F.

This application can utilize DP Level technology though would have required the 30-foot capillary to be heat traced. This, in general, introduces challenges due to its reliability and requirement for significant maintenance. Some of the heat tracing had failed over the previous winter with temperatures dropping below -14 °F. The fill fluid froze and unknowingly provided bad data as the pressure readings were "stuck".

In addition, there were catwalks in the process connection areas which interfered with the space required for impulse piping. This made it extremely difficult to route pipe away from the process and protect the instrument since the connections were close to the ground.

Nuclear requirements, confined space, and extreme temperature changes created unique challenges.



Rosemount™ 3051S Electronic Remote Sensor (ERS)™ System with Thermal Range Expander for challenging level applications

Solution

The Rosemount 3051S Electronic Remote Sensor (ERS) System paired with the Thermal Range Expander provided the ideal DP Level solution in this case. Rosemount ERS Sensors eliminated maintenance issues related to wet or dry leg installations, eliminated the need for heat tracing, and minimized drift caused by temperature changes. The Thermal Range Expander's compact installation removes the need for extensive piping and also significantly simplified the installation while protecting the electronics in the transmitter from the extreme temperatures. The UltraTherm™ 805 fill fluid provides the capabilities to serve this high-temperature vacuum application.

The customer has installed this complementary solution so they now have dual measurements to get reliable readings. They have realized significant cost savings from the 30+ feet of heat tracing is no longer required. This is especially important since the temperatures dropping to -14 °F previously caused the refinery to experience freeze ups due to failed heat tracing.

Resources

Emerson Automation Solutions Industries

[Emerson.com/Refining](https://emerson.com/Refining)

Rosemount 3051S ERS System

[Emerson.com/Rosemount3051SERS](https://emerson.com/Rosemount3051SERS)

Rosemount 3051S Thermal Range Expander

[Emerson.com/RosemountThermalRangeExpander](https://emerson.com/RosemountThermalRangeExpander)

The Rosemount ERS Sensors eliminated the need for heat tracing.

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