Refinery Improves FCC Uptime and Reliability with 4200 2-Wire Coriolis on Catalyst Slide Valve Purge Lines

RESULTS

- Improved purge flow control which leads to enhanced reliability of the FCC unit

- Improved FCC slide valve reliability and increased unit uptime

- Material cost savings from installing Micro Motion 2-wire Coriolis technology

- Improved measurement accuracy and turndown ratio

APPLICATION

The Fluid Catalytic Cracking (FCC) unit in a refinery uses a powdered catalyst in the reactor at high process temperatures to crack heavier hydrocarbons into lighter, higher value components that are used in gasoline blending. A specialized slide valve is used to control the feed of catalyst slurry to the reactor. Purge lines (typically air or nitrogen) to the slide valve help ensure the catalyst does not build-up in the valve. Control of the purge line flowrate is critical to the success and reliability of the slide valve and ultimately safe and optimized operation of the FCC unit.

CUSTOMER

A refinery in the United States

CHALLENGE

The refinery wanted to be proactive in improving the reliability and safety of these critical valves in the FCC.

Catalyst is not only expensive, but it is also abrasive and over time can cause wear and damage to equipment and instrumentation. There are many aspects of the slide valve that need to be managed to improve the safety and reliability. One of the areas for improvement was the purge systems.

The valves are purged with air or nitrogen. The purge gas flow needs to be regulated carefully because high purge flows can lead to abrasion and low purge flows lead to catalyst buildup.

A flow meter was one of the components needed to better measure the purge flows. First, the meter needed to measure the large turndown of the high and low purge gas flows. Second, the criticality of the application called for a flow meter that could measure flow rates as accurately as possible.

> "An Micro Motion ELITE Coriolis flow meter has reduced installation costs by reducing piping modification because of its shorter flange to flange distance. It has improved measurement accuracy by providing a larger turndown ratio for better control. By adding the Smart Meter Verification option, structural integrity of the tubes and the transmitter can be verified.
>
> Finally, a 4-20mA ELITE Coriolis flow meter has reduced installation costs of running additional 120V power to the meter."
>
> – Refinery Process Engineer

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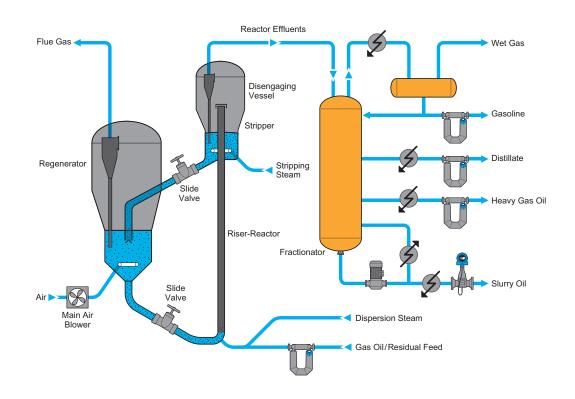www.Emerson.com/MicroMotion4200

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Third, a 2-wire loop powered device was a mandatory requirement because there were no 120 V power sources nearby to provide power to the meter in a cost-effective manner and additional cable power wires would be lengthy, and difficult to install.

The refinery considered several different flow meter technologies, including a 2-wire rotameter and integral orifice meter. However, the technologies presented challengers with less than ideal turndown ratios for the application, required longer straight run piping, and reduced accuracy. Despite these solution challenges with an integral orifice meter, the refinery valued the installation cost savings for a 2-wire solution above all else.

SOLUTION

The refinery installed four Micro Motion ELITE® Coriolis flow meters with 4200 2-wire transmitters on the purge gas flow lines on multiple slide valves. This solution saved the refinery 40-45% on installation costs of the flow meters and ensured accurate flow measurement across the wide turndown of the purge flows. The refinery has improved the reliability of the FCC slide valves through better control and monitoring of the purge rates, which will reduce unplanned shutdowns and increases FCC unit availability.

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