Refinery Reduces Maintenance and Increases Product Quality and Throughput with Guided Wave Radar

RESULTS

- Reliable readings
- Maintenance calls eliminated
- Downtime reduced by 200%
- Improved operations and quality of the product

The Rosemount 5300 reduced downtime by 200%. The reliable level reading resulted in improved operation of the tower and better quality of the product.

APPLICATION

Vacuum Tower Bottom level Measurement

CHARACTERISTICS

- High temperature 343 °C (649 °F) to 423 °C (703 °F)
- Vacuum conditions
- Steam hammering
- Extremely arduous environment inside the chamber

CUSTOMER

Saudi Aramco Luberef- Jeddah, Saudi Arabia

CHALLENGE

Saudi Aramco Luberef - Jeddah was facing unreliable level indication of vacuum tower bottom level. Obtaining a reliable level reading in the tower bottom was crucial for the operation of the tower. The high temperature and vacuum conditions combined with heavy crude caused frequent coating and damage to the existing DP transmitter and seal. This led to unreliable level readings. Frequent preventive maintenance was necessary and resulted in excessive downtime.

SOLUTION

A Rosemount 5300 Guided Wave Radar (GWR) was chosen for a test. Due to the product's viscous and sticky nature, the single rigid probe was selected in order to better withstand possible build-up on the probe. It was installed in an insulated bypass chamber in order to access the measurement and to be able to service the device without taking the column out of service.

Rosemount 5301 Guided Wave Radar

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Applications like this can be tricky to measure because the signal can become very weak and even disappear due to the combination of low reflective, low dielectric fluid and high turbulence resulting from boiling. The Rosemount 5300 GWR has a built-in redundant measurement method called Probe End Projection (PEP). When this feature is activated, it provides a level measurement that is based on the dielectric of the fluid and the length of the probe. It provides a backup measurement and prevents the transmitter from alarming in the event the surface signal is lost. Since microwaves propagate slower through a fluid than through air, the probe end echo will appear below the probe end when there is fluid in the tank. By using the fluid's dielectric constant, it is possible to calculate the surface echo position. In addition, when a surface peak is present, the transmitter will constantly compare and update the fluid's dielectric to the stored value. This allows the calculated level to correspond with the actual level whenever PEP is activated.

To gain confidence in the 5300 GWR and its PEP function, the advanced software capabilities provided by the Rosemount Radar Master Software tool allowed the engineers to view and study the echo profile. This allowed them to see the impact of turbulence on the surface and to view the PEP function activation while watching the steady output from the transmitter. This helped the plant engineers to gain confidence with the product.

The Rosemount 5300 was installed in October 2010 and has been working very well on this vacuum tower bottom measurement. It is providing reliable level readings and has not required any maintenance or downtime of the tower. In two months after installation, downtime was reduced by 200%. This bottom level measurement is a crucial parameter to maintain for product quality. The reliable level reading has resulted in improved operations of the tower and better quality of the product.

RESOURCES

Emerson Process Management Refining Industry

http://www.emersonprocess.com/solutions/refining/

Rosemount 5300 Series

http://www2.emersonprocess.com/en-US/brands/rosemount/Level/Guided-Wave-Radar/5300-Series/Pages/index.aspx

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