



Delayed Coker Unit

Ultrasonic flow meters provide a safer and more reliable flow measurement on heavy residue furnace feed lines.

Summary

As for every critical safety measurement on the furnace feed lines in Delayed Cokers, operators must have a highly reliable, reproducible/repeatable and safe flow measurement. It's quite common to have one transmitter connected to the Digital Control System, and 2 or 3 connected to the Emergency Shut Down System with a voting logic providing a redundancy like 1 out of 2 or 2 out of 3 down, from where an action is taken from the ESD. That is typically done at low flow since too low flow may lead to insufficient feed into the furnace leading to high risks of blast.

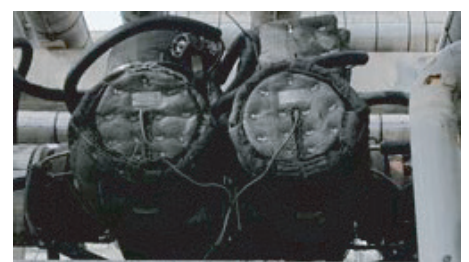


Challenge

A Refinery in Texas used Wedge Flowmeters for this purpose. This customer faced serious issues with these flowmeters, frequent unit trip caused by unreliable/not repeatable measurement due to a significant deviation on readings between the DP cells connected to the Wedge flowmeter. These readings deviations were derived from coke build up on the DP seals. To mitigate this issue, this facility had to purge these seals as frequent as 5 times a week, which lead to high maintenance cost, significant downtime, less finished product yield, and a huge safety concern. Indeed, when performing the impulse line purge operation on the DP cells there is a high risk of high temperature distillate leakage at the connected manifold, that when in contact with the atmosphere can ignite creating significant risks to personnel and assets.

Benefits:

- No pressure drop, no risk of clogging
- No drift over time, no need to re-calibrate
- Transducer replacement under process conditions with no risk of product leakage, reduced safety hazards
- Triple redundancy to increase the operation level of safety
- Improve furnace feed reliability leading less downtime and product yield increase
- Reduce maintenance cost and exposure time in the unit



Solution

The recommended solution for this application was the Panametrics ultrasonic flowmeter Panaflow HT which is SIL certified and specifically designed for extreme high/low temperature liquid flow applications. However, customer wanted us to match the face to face dimension of existing wedge meters and provide a triple redundancy ultrasonic flow measurement system which represented an additional challenge.

The existing face to face dimension was shorter than the standard length of our Panaflow HT redundant system. To address this challenge, we designed custom flowmeters to accommodate three acoustical paths with three pairs of BWT transducers and three independent XMT868i electronics which operate with a 2 out of 3 safety system control logic. Because of the of the measurement criticality, our customer decided to first try one meter out of the 8 furnace feed lines. After few months of reliable, accurate and safe operations, they decided to fit all feed lines with the same meters and they are now in operations for more than 2 years.

Since then, they have also replaced other heavy residue flow measurement points using Panametrics ultrasonic meters successfully.



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