Maximize crude oil production

Endress+Hauser's multiparameter Levelflex FMP55 solves emulsion interface measurement in separators

Benefits at a glance

- Maximized crude oil production
- Accurate oil from water separation
- Ensured reliability from start of operation throughout the entire lifecycle

A leading oilfield exploration company was having issues with a standard guided wave radar device that was directly installed into a separator measuring overall level and interface level. In guided wave radar devices, the microwave pulse emitted from the transmitter gets reflected at the air/oil interface (for overall level) is detected and part to pulse continues through the oil to the oil/water interface (for interface level) where a second reflection is created. However, if an emulsion (approximately > 2") exists, then the guided wave radar will not work reliably as the reflection from the interface is greatly decreased.

The challenge: Measurement reliability with an emulsion layer present

An emulsion layer - also called rag layer, is an area where two liquid products have not separated. The thicker this layer becomes, the more challenging it can be to measure the true interface.

Because guided wave radar technologies are best suited for clean interface level applications or where very little to no emulsion/rag layers are present (≤2"), a dual technology measurement device combining guided wave radar and capacitance was best suited for this application. Capacitance level measurement is based on the change in capacitance product in the vessel normally due to the change in the level. As long as one product is conductive and the other is nonconductive, a reliable interface measurement can always be obtained. Therefore, when dealing with oil/water emulsion layers, capacitance technology is the preferred technology.

Endress+Hauser
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Our solution: Levelflex FMP55

By installing Endress+Hauser's multiparameter Levelflex FMP55 into the separator – combining two measuring principles into one device (guided wave radar and capacitance), reliability was ensured from the start of the customer's operation throughout the entire lifecycle. Whether there was clean interface or there was emulsion, the FMP55 would reliably measure both the overall level and interface signal. This allowed the customer to accurately separate the oil from water, maximizing crude oil production.

Solution details:

The Endress+Hauser Levelflex FMP55 multiparameter transmitter was installed approximately 4" upstream of the weir plate in the separator. This allowed the interface level to be set for the optimum position to ensure only oil was flowing over the weir. The maximum amount of oil was captured as the amount of oil in the water was reduced. Endress+Hauser recommended that a guided wave radar transmitter be installed downstream of the weir plate to monitor the oil level in the oil collection area.

Conclusion:

The customer has a reliable interface measurement at all times even with the formation of an emulsion layer and the efficiency of the separator was increased. This allows better oil recovery without getting water into the oil.

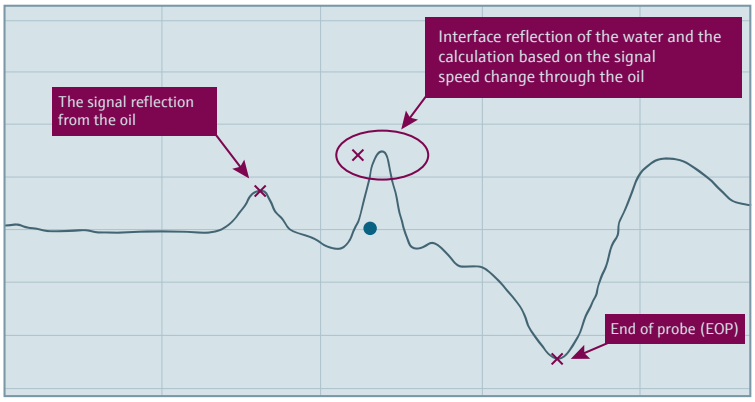

Figure 1: Signal on the FMP55 on the morning of day 1 and 2.

Figure 2: By the afternoon of day 2, the separator had an emulsion layer which resulted in a greatly reduced reflection from the water (interface). At this point, the FMP51 read no interface, but the FMP55 maintained an interface reading by automatically switching to capacitance.

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