

PROCESSOR® PERFORMANCE DEMONSTRATION ON A PALTFORMER - CASE STUDY

Pentair engaged to assist a 155,000 bpd Midwest refiner, who was experiencing fouling challenges associated with two vertical style heat exchangers on their Platformer (i.e. Platinum Reformer) Unit.

The fouling had been occurring every 3-5 years and as a result was very costly to them from a process efficiency and maintenance standpoint.

The process of “cleaning” the heat exchangers requires that they be partially disassembled, lifted by crane out of their support cradles and moved to an open area, where the work must be done from underneath.

During this process the Platformer production is interrupted the entire time (up to 20 days). The last time these exchangers were cleaned was in March and one of their lead operators estimated that the event cost the refinery approximately \$1M. By Summer of the following year the heat exchangers’ duty trend was already indicating the drop-off of efficiency and the refinery decided to devote high priority attention to the matter.



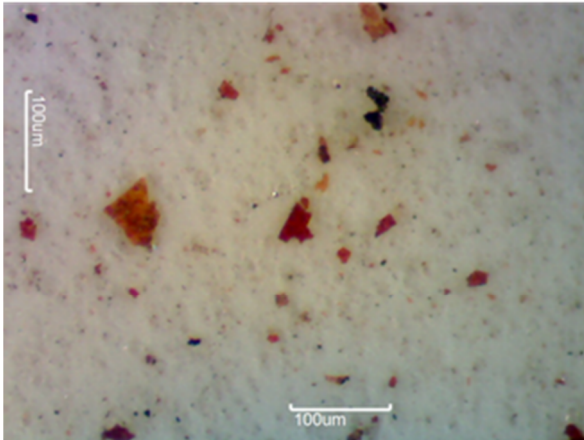
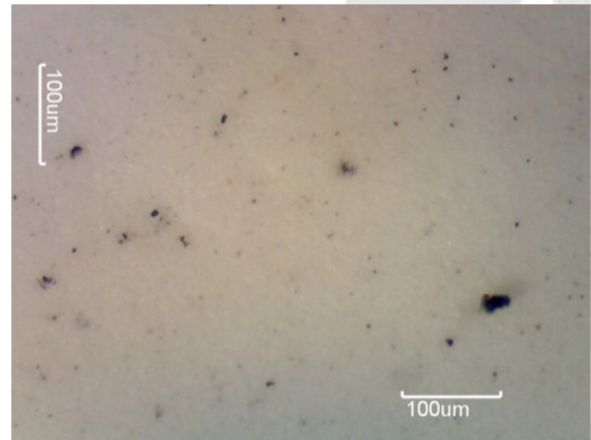
As a measure to assist with identifying a potential source of heat exchanger fouling, Pentair deployed a ProcessOr® (particle separator) performance demonstration skid equipped with a single 10 micron rated element.

After tying-in to a 4 gpm slip-stream it separated solids from 170 degree F sweet Naphtha at 240 psig (.75 specific gravity). The 10 micron rating was chosen based on preliminary sample evaluation by our S.T.A.R. Labs in the months preceding the study. After 2 months of very little dP (differential pressure) increase, the 10 micron element was replaced with a 1 micron one.

While Pentair personnel were on site to deploy the ProcessOr®, they proceeded to collect particulate samples via a .45 micron membrane for the purpose of gravimetric testing at the S.T.A.R. Laboratory. In addition to these samples collected, the refiner shipped bottled samples collected on various dates along with two “spent” ProcessOr® skid filter elements for additional analyses (including EDS).

Based on our findings, the first two months indicated an almost negligible amount of particulate (i.e. approximately .5 mg/L) (see photo 3) in the stream feeding the heat exchangers. But, after the refiner changed its feed source, the amount of particulate increased nearly 10 times (i.e. 4.8 mg/L) (see photo 4) and this caught the attention of the refiner, who is now paying attention to the need for a full-flow solid-liquid separator for this stream. They are now deploying a 36” O.D. ProcessOr® skid to validate performance and measure the impact on the duty trend and the decision could be confirmed early this quarter.

See images on the following page

August 6th Inlet (@ 1100) 1.3 mg/LJune 5th Inlet Sample (@ 1000) 0.5 mg/L

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