



North American Refinery Saved Over USD 2 Million/Year

Petro-SIM and HX Monitor integrated digital twin improves profit margins

Key Benefits

- Saved USD 2 million/year
- Improved profit margins
- Achieved best practice fouling monitoring

Background

- North American refinery
- Unscheduled shutdown
- Fouling in several exchanges

KBC Solution and Results

- Petro-SIM and HX Monitor integrated digital twin
- Developed an optimized cleaning schedule

Client Challenge

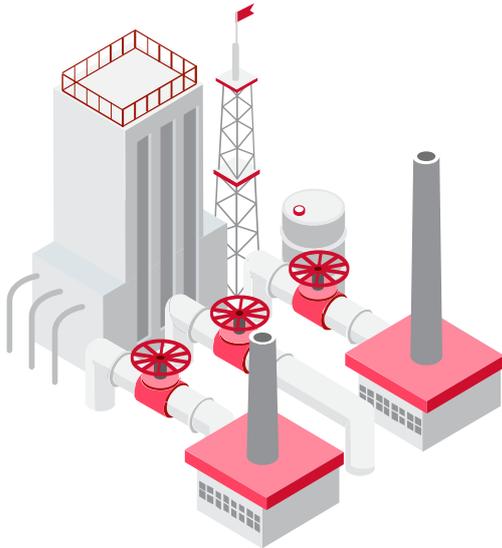
After a typical start-up, an unscheduled shutdown led to significant fouling in several exchangers for a North American 300 kbpd refinery.

In a typical refinery, online cleaning costs and increased energy usage associated with fouling can result in incremental expenses over \$1 million per year. The operator, wanting to mitigate this type of costs for their refinery, reached out to KBC to analyze the situation and deliver a solution.

The Solution

Using Petro-SIM and HX Monitor simulation software, KBC created an integrated digital twin of the entire heat exchanger network. Once they connected the model to the plant historian and calibrated it, they were ready to start gathering data to analyze the situation.

The integrated Petro-SIM and HX Monitor digital twin ran automatically on a regular basis. It monitored the amount of fouling over time for each exchanger and the whole network. The data the model collected enabled KBC consultants to put together the time frame of when the incident occurred and the exchangers that fouled. They also determined the extent of fouling and the value to the refinery of cleaning the fouled exchangers.



The heat exchanger monitoring helped the operator to develop a cleaning schedule to mitigate additional fouling costs. The digital twin helped them identify which exchangers to clean.

The operator was able to perform “what-if” analysis with the Petro-SIM and HX Monitor digital twin. They prioritized the exchangers to clean in a turnaround. Following a brief shutdown during which they limited the cleaning to the selected exchangers, one crude

unit increased throughput and transfer temperatures went back to normal conditions.

Now that they have a consistently up to date model which they regularly monitor, the operator is able to quickly assess their situation. During a process slow-down, the refinery planned an opportunity for cleaning of three fouled exchangers.

Results

The operator had immediate results after KBC installed the Petro-SIM and HX Monitor integrated digital twin. The digital twin provided workflow integration and employee collaboration at all levels and functions in the plant.

The refinery improved their profit margins. The estimated savings in energy cost alone was USD 2 million/year and throughput offered much greater savings.

The refinery now has the tools to plan an effective cleaning schedule to mitigate online cleaning costs and energy usage associated with fouling. The operator achieved best practice in fouling monitoring.



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