Honeywell

Case Study

Profit® Suite Applications Maximize Profitability for Petrotel-Lukoil Refinery in Romania

"APC gives valuable online quality information, which helps us adjust downstream unit operations."

- Costin Dumitrache, Optimization Projects Leader, Petrotel-Lukoil Refinery, Ploiesti, Romania

Background

Petrotel-Lukoil Refinery, established in 1904, is the oldest Romanian oil refineries and the oldest in Eastern Europe. Located in Ploieşti, its main activity is the processing of Romanian and Russian oil. A separate unit specializes in lubeoil blending and another unit specializes in energy production.

The Petrotel-Lukoil plant can process 48,600 barrels of crude oil a day

The refinery had some key objectives to meet for the Crude Heater and Atmospheric Column which included:

- Maximizing the Distillation Complex profitability
- Maintaining the quality within required specifications and reducing "quality giveaway"
- Having the flexibility to change operating mode depending on market conditions
- Satisfying the process safety operation limits.

Additionally the Residue Heater and Vacuum Column had to be tuned for:

- Optimizing/minimizing the heater outlet temperature depending on process conditions
- Protecting the heater constraints
- Maximizing the Distillate Vacuum Gas Oil (VGO) product yield within the required VGO quality specifications
- Maximizing the Vacuum Diesel Yield depending on the Diesel MIX quality
- Minimizing the Vacuum Residue product yield
- Maintaining the temperature profile of Vacuum Column during normal operation and during crude switches.

Benefits

Honeywell's Process Optimization products provide a unique layered approach to advanced control and optimization. This model allows new technologies to be easily added at any time to a common platform that meets optimization objectives without compromising on future opportunities to improve business performance. Profit® Suite and Control Performance Monitor integrate performance monitoring and diagnostic capabilities for accessing, presenting and analyzing performance data associated with control and optimization applications.

Process Optimization products help users:

- Optimize process performance and efficiency
- Protect plant uptime and safety by reducing losses caused by control performance
- Improve profitability by increasing production and decreasing costs
- Increase yields and enhance product quality.

Challenge

Before commencing the Advanced Process Control (APC) project, plant operations had to be stabilized, including loop and cascade tuning. The plan included step-test moves in accordance with crude changes and laboratory samplings for quality models. Sudden changes in the crude water content as well as crude composition creates disturbances. Customized logic toolkits were implemented and linked to the APC to minimize such effects.

Additionally, the project team needed to ensure high operator acceptance of the "new" system, using extended training and additional information displayed at the DCS level.

Solution

The site implemented Profit® Controller on the Crude Pre-Heating Heater, Atmospheric Distillation Column, Atmospheric Residue Heater, and Vacuum Distillation Column.

Multi-unit optimization, using Profit® Optimizer, was implemented on the controllers outlined above. Using Profit® SensorPro, sixteen quality variables were inferred online and controlled in real time.

The APC software executes on a separate server and safely communicates with the third-party DCS, a Delta V system. A dedicated software interface was required.

The APC calculates optimum setpoints for DCS base loop manipulated variables to satisfy unit profitability requirements.

Results

The following APC improvements can be related to quantifiable profit:

- Crude fractionation improvement – reduction of vacuum residue yield translates to more VGO yield
- Reduction in in fuel gas consumption
- Reduction in steam consumption.

Additional benefits include:

- PID loop tuning improvements – all key loops operated in auto mode after the APC project. The Honeywell Tai Ji PID Loop Automatic Tuning application was acquired and used during the project.
- Operation with designed loops in cascade, as per process design requirements - new cascade loops were implemented.
- Improvement in process operation of atmospheric/vacuum columns with fewer disturbances and less DCS operator intervention.
- Flexibility in operating downstream units – APC gives valuable online quality information, which is used to adjust downstream unit operation.
- More stable operation with respect to crude changes and better handling of disturbances.
- Field instrumentation proposed and installed as part of the APC project.

About Honeywell's Process Optimization Products

Honeywell's Process Optimization products, including Profit® Suite and Control Performance Monitor, address all aspects of advanced process control (APC) and optimization from improving regulatory loop control to optimizing the entire process. The products help improve profitability by increasing throughput, reducing costs, enhancing yields and improving product quality.

For More Information
Learn more about Honeywell's products and services, visit our website www.honeywellprocess.com/software or contact your Honeywell account manager.

Honeywell Process Solutions
Honeywell
1250 West Sam Houston Parkway South
Houston, TX 77042

Honeywell House, Arlington Business Park,
Bracknell, Berkshire, England RG12 1EB UK

Shanghai City Centre, 100 Junyi Road
Shanghai, China 20051

www.honeywellprocess.com

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