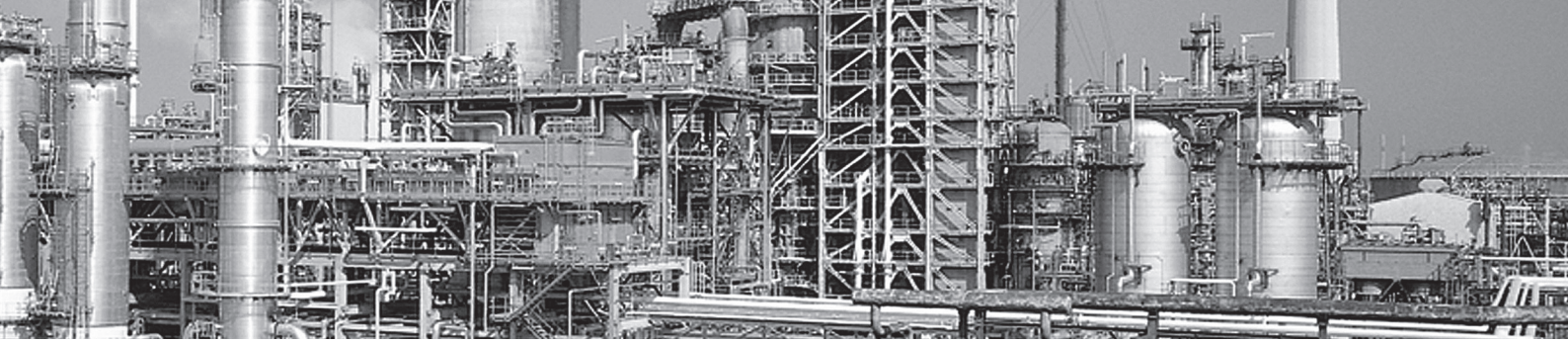


CRUDE DISTILLATION UNITS

MORE THAN MEETS THE EYE

Crude distillation units are applied on all plants in the Oil refining industry. Often they are not meeting their full potential. Improving the performance and reliability of the crude distillation units can impact the product quality, operation and performance of the remaining facilities significantly.

One of the reasons of the sub-optimal performance is the fact that designing and operating distillation units properly requires an extensive set of specific skills. In case of crude distillation units skills related to crude oil desalting, furnaces, process water integration, heat exchanger fouling abatement, and vacuum systems are required.

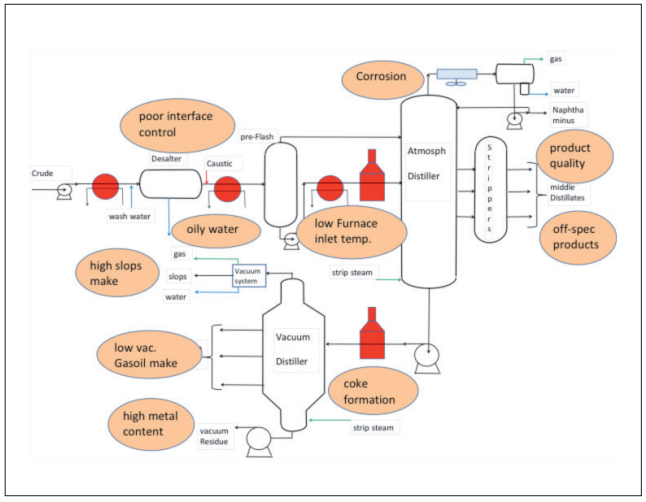
TECHNOLOGICAL CHALLENGES

Typical issues in a Crude Distillation Unit (CDU) - depicted below - are:

- Product quality give-away / off-spec
- Desalter performance / pH control
- Heat exchanger fouling
- Low vac. Gasoil (VGO) & high slops make
- Coke formation

Managing these issues requires in-depth design and operational know-how.

For example, improved Desalter operation can reduce the overhead corrosion rates, increase the catalyst life time. Close monitoring & one-line cleaning of the pre-heat train can increase the crude intake, the VGO recovery efficiency, the vacuum furnace run length, decrease the slops make, There are edge equipment upgrades in the CDU that have a short payback time of a couple of months.



EPS OPERATIONAL APPROACH

EPS approach is to provide the refinery with an independent operational performance assessment of the crude distillation unit. The review is normally carried out during a site visit of one week together with an onsite distillation technology and operating expert.

The focus will be on all aspects that have the potential to reduce the operational availability of the unit, and on the identification of opportunities for performance improvement.

The review will typically consist of the following elements:

- Data gathering
- Assessment of main unit parameters (e.g. product quality, availability, energy consumption)
- Performance comparison to best in class and gap closure plan
- Opportunity identification and implementation roadmap
- Challenge session with the client
- Presentation and final reporting

INDICATIVE BENEFITS

Various (typical) benefits of the improvements that have been established are:

- A 5 wt% increase of the Kero yield (at the expense of Naphtha and light Gasoil)
- Improved heat exchanger monitoring and on-line cleaning of pre-heat exchangers increased the crude intake by 5-10%.
- Optimised conditions in the columns and vacuum system improved the VGO- and slops make by 10%, and increased the run length vacuum furnace by 1 year

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