



# Crude and Vacuum Unit Revamps

The performance of Crude and Vacuum units has a large influence on the overall profitability of a refining complex. These units determine both the quantity and types of crude that can be processed and the quality of the material processed in the downstream process units. How much raw material a refinery can process, and how effectively and efficiently it can be processed to produce the desired products are key profitability parameters for an operating facility. More often than not, relatively small revamp projects of moderate capital investment and with short payback periods can be identified in Crude and Vacuum units

## EXTENSIVE CRUDE AND VACUUM EXPERTISE

In the last 25 years, KBC has completed more than 100 refinery revamp projects. Our approach combines successful, proven project experience, engineers with a strong design and operating background, and industry-leading refinery process technology to develop successful and highly profitable revamp projects.

## SUCCESSFUL AND PROVEN PROJECT EXPERIENCE

KBC conducts revamp projects with an emphasis on cost-effective revamp investment steps. This methodology is aimed at examining actual equipment operation, and then, maximising the existing equipment performance before focusing on any potential equipment modifications. Investment payback periods are typically very short, anywhere from a couple of months to a year or two. As a result, these projects are often self-financed and implemented "step-by-step" – resulting in quick earnings that can be used for financing further projects.

## STRONG DESIGN AND OPERATING BACKGROUND

Consultants involved with these revamp projects generally average 20-30 years of experience in the design, operation, and optimisation of Crude and Vacuum units. This ensures that a strong, experienced design team is assigned to each and every project.

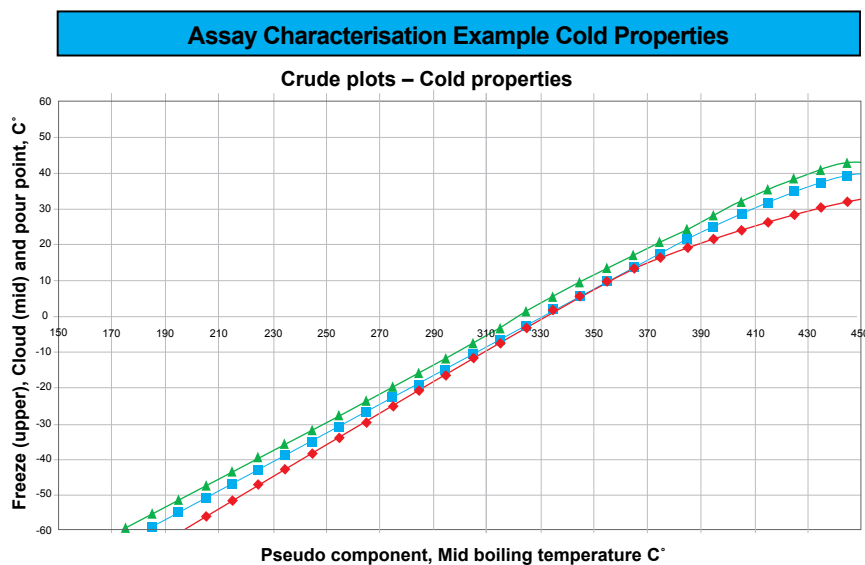
## INDUSTRY-LEADING REFINERY PROCESS TECHNOLOGY

### Simulation Technology

KBC is the only process engineering and consulting company in the industry to develop, license, and use its own proprietary refinery simulation software. KBC does not rely on oil characterisation algorithms in third-party simulator programs. Instead, feed properties are synthesized in Petro SIM™, the KBC SIM modelling software, which ensures accurate product yields and physical properties.

### Crude Assay Technology

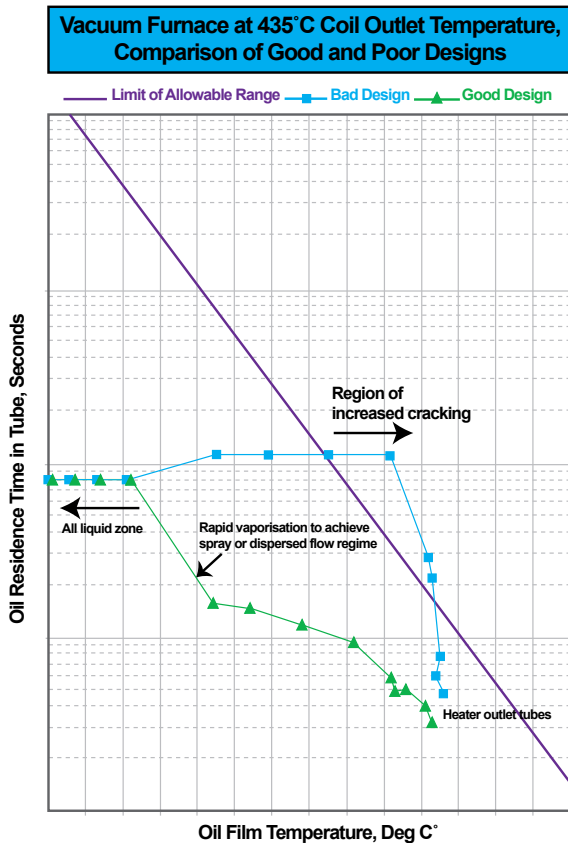
Our unique synthesis technology, which takes the raw data in wide and overlapping cuts and transforms it into narrow cuts enhances crude assay information. This narrow cut definition provides the required level of detail for rigorous process analysis within a process simulator. The data is also checked for integrity and consistency, and proprietary correlations extend data over the appropriate ranges, resulting in a realistic distribution of properties. Over 60 refinery properties are synthesised including distillations, densities, molecular weights, viscosities, cold properties, sulphur, and nitrogen. Also included are detailed distributions for metals, concarbon, and asphaltenes for heavy-ends processing and deep-cut technology.



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## Heater Design Technology

Oil residence time and temperature are key parameters that determine the extent of cracking in crude and vacuum heaters. Using VIS-SIM™, one of the proprietary KBC SIM models, the tube diameter and number of passes, the quantity and injection point of acceleration steam, and the transfer line layout are optimised to ensure the heater design is safely outside of the cracking region.



™ Petro-SIM, SuperTarget, and VIS-SIM are trademarks of KBC Advanced Technologies plc, and they are registered in various territories.

## Heat Availability (“Pinch”) Technology

In Crude and Vacuum units, feed is pre-heated using product and pumparound heat to reduce the fuel required in the charge heaters. Our pinch analysis, using the KBC Energy Services SuperTarget™ program, effectively defines the optimum balance between the heat transfer equipment capital cost and energy cost. In addition to identifying the minimum energy consumption, this analysis also optimises the energy efficiency of the processes and utilities together.

## THE BENEFITS

With our state-of-the-art technology, KBC revamp process designs achieve an optimum balance between product yields, capital investment, and operating costs. Other factors such as turnaround frequency, process flexibility, reliability and environmental aspects are also incorporated into this overall balance. Extensive experience along with the knowledge gained from numerous engineering studies and designs has been translated into design guidelines that strike this optimal level.

These practices have been continuously refined over almost three decades based on the feedback from the numerous assignments undertaken by KBC in the areas of troubleshooting, yield improvement evaluations, revamp/grass roots design projects, and reliability and maintenance consulting. Current, strict quality control procedures ensure a high quality product by utilising experienced personnel in the areas of plant operations and project design and highly automated calculation procedures, which have been thoroughly checked, the results of which are also automatically interfaced with the design specification sheets. These practices along with our industry-leading process technology result in successful and cost-effective revamp projects for our clients.

*KBC offers a comprehensive range of consulting, implementation, and training solutions to provide sustainable competitive advantage to our process industry clients worldwide.*



**DRIVING EXCELLENCE**

### OUR SERVICES INCLUDE:

#### CapX – Capital Excellence

- Market Analysis & Forecasting
- Business Strategy Review
- Merger, Acquisition, & Integration Studies
- Feasibility Studies
- Capital Project Support

#### OpX – Operational Excellence

- Operational Planning
- Process Optimisation
- Energy
- HSE
- Reliability, Availability, & Maintenance
- Human Performance Improvement
- Software Solutions

For more information, please visit [www.kbcat.com](http://www.kbcat.com),  
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