2nd Quarter 2005

DRIVING Competitive Advantage

Helping Clients Improve Profits and Achieve Pacesetter Performance

KBC provides independent consulting services and implemented solutions to improve the sustainable profitability of our clients worldwide in the process industries.

Our Services Include:

- Process Improvement
- Linnhoff March© Energy Services
- Reliability, Availability and Maintenance (RAM)
- Planning Services
- PEL Market Services
- Profimatics™ Simulation Software
- Petrochemicals
- Training Services

IN THE NEXT ISSUE:
Major South American Refinery Benefits from Unit Monitoring and Implementation Work

KBC
PROFIT. ABILITY.

FEATURE STORY

Quick Response Accelerates Client's VDU Revamp Project

by Andy Roberts, Process Consultant

The quick response and on-site application of KBC's tools and methodologies allowed Kuwait National Petroleum Company (KNPC) to proceed with a VDU shutdown and revamp with confidence after doubts about the project were raised by an EPC contractor.

Client Support

KBC received a request in early February from Mina Abdullah (MAB) Refinery of KNPC to study the hydraulic performance of their "VRU" (a vacuum distillation unit). Late February produced discussion indicating an imminent shutdown and the urgent need for an on-site study. KNPC wanted confirmation that the modifications and proposed operating conditions would not compromise mechanical stability of key equipment. Client approval was received on 22nd February, and a KBC consultant was on a plane on 25th. Upon study completion, a detailed presentation was delivered to the refinery management team on 3rd March. The findings increasing the refinery's confidence in the proposed modifications, and the shutdown proceeded as planned.

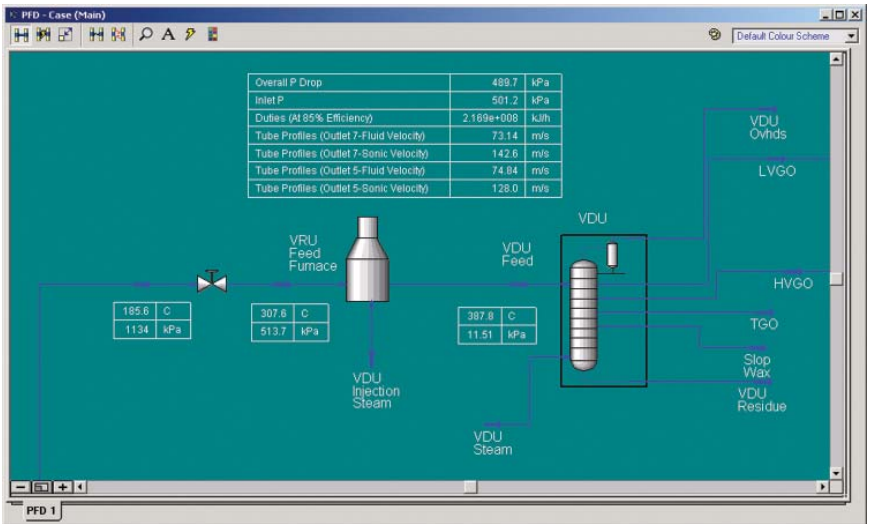
Nasser Al-Shamma, Manager of Technical Services (MAB), has acknowledged KNPC's longstanding and valued relationship with KBC, and he was pleased with KBC's input as an independent consultant on this study. KBC has been active at all three KNPC refineries since 1998.

Project Background

The MAB refinery had two identical trains of "vacuum re-run unit," each of original design capacity of 63,500 BPD operating or more than 15 years. Over time, the capacity of the plant had been enhanced through minor modifications. The planned revamp project would further increase capacity, with a provision to draw an additional cut (Trim gas oil) from the vacuum tower below the heavy vacuum gas oil draw. This concept would improve the quality of the vacuum residue that goes as feed to Coker unit and also improve the production of total conversion feedstock (feeds to Hydrocracker & FCC Units).

Concerns were raised by KNPC's EPC contractor regarding the safety of operating the furnace and transfer line after installation of the column revamp. Such concerns included the potential for system vibration (leading to damage) at the proposed higher throughputs and lower operating pressure.

KBC was employed to investigate using our modelling technology and present an independent viewpoint on the matter.



Continued on pg 2

Petro-SIM™ UPDATE

From detailed design to refinery-wide optimization, Petro-SIM™ has sparked wide use by clients and KBC consultants alike to optimize refinery and petrochemical operations.

Client licensing of Petro-SIM has progressed much faster than expected. Within weeks of the release of Version 2.0, three new license agreements were signed by Tamoil in Switzerland, MOL in Hungary, and OMV in Austria.

A complex refinery-wide model of an Asian refinery has also recently been completed. This model was used to optimize the refinery by identifying and quantifying profit improvement opportunities. The typical benefits achieved using KBC's unique methodology were 50 c/bbl.

KBC consultants worked with client engineers in our Houston office to recently complete a Petro-SIM model of the gasoline and aromatics portion of a large Asian refinery. This client used the completed Petro-SIM model to investigate opportunities between the refinery and the petrochemicals units.

European and US refineries have had vacuum column upgrade designs performed using Petro-SIM. KBC's proprietary synthesis and properties prediction capabilites were integrated with detailed tray-to-tray modeling, providing more accurate predictions of results and the best operation of these key refinery units.

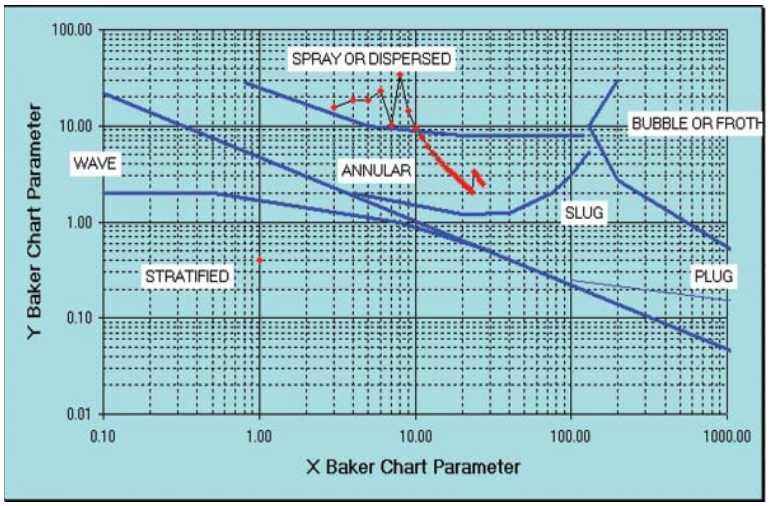
Petro-SIM

FEATURE STORY

Continued from pg 1

Methodology

KBC's proprietary furnace modelling technology is based on detailed mechanical modelling, which incorporates hydraulic and heat trans fer technology and our extensive knowledge of critical furnace operations (particularly in VDU, Coker and Visbreaker applications) in the interpretation of the model results.



This furnace model technology was used with Petro-SIM™, KBC's refinery-wide simulation tool, which allows thermal and hydraulic calculations of the furnace and transfer line (between furnace and column) into the column.

The use of KBC's furnace modelling technology within Petro-SIM is unique. It allows operating changes and their impact on key furnace parameters (e.g. pressure drop; fluid velocity; sonic velocity; tube side bulk and film temperatures; furnace tube metal temperatures; onset and degree of vaporization, Baker flow regimes and approach to coking curves) once the detailed mechanical model is built.

On completion and calibration of the furnace model, a user-friendly graphical interface allows interactive use of the model making step out studies straightforward.

For this study, the key areas examined were tube side velocities and flow regimes to ensure that no mechanical or process criteria were likely to be invalidated. Multiphase flow may change between different flow regimes. Flow regime maps, showing the stability region of the various flow patterns as function of liquid and gas velocity, have been developed based on experimental data. The plot shown above illustrates the flow regime analysis that is undertaken to ensure that the potentially dangerous slug and plug flow regimes are not entered through the system.

NEWS & EVENTS

EVENTS

ERTC - Management Conference
June 13-15, Westin Excelsior Hotel
Venice, Italy
KBC's own Gerard Van Drempt will present "Combining Expert Knowledge and Change Management for Effective Asset Management Improvements.

IPTC - International Petrochemicals Technology Conference
June 23-24, The Hilton
Athens, Greece
John Philpot, KBC's Petrochemical Practice Leader, will present "Profit Improvement in Olefin Complexes."

Floating Production Summit
June 28-29, Mandarin Oriental
Kuala Lumpur, Malaysia
Join offshore industry professionals to learn strategies to integrate design, safety and resource management to maximize production on floating facilities. KBC will be present with a tabletop exhibit.

NPRA - Clean Fuels Challenge
Aug 9-10, The Westin Galleria Hotel
Houston, Texas, USA
KBC will attend with a tabletop exhibit.

3rd Hydrocarbon Asia Bottomline Improvement Conference
Aug 15-16, Shangri-La
Kuala Lumpur, Malaysia
This conference focuses on maximizing

Summary

The on-site modelling and analysis of the vacuum column resulted in the following conclusions:

1. The vacuum unit feed furnace was safe to operate at the proposed revamp conditions.
2. Velocities calculated for all conditions examined indicate that the linear velocities are well within the design criteria of 80% max of sonic velocity for all the furnace tubing and transfer line piping from the furnace outlet into the column itself.
3. Flow regimes were also examined for the proposed revamp conditions and variations in feed quality, throughput (maximum turndown), improved vacuum, and increased furnace outlet temperature. In all cases the flow regime does not enter the slug/plug flow regime.

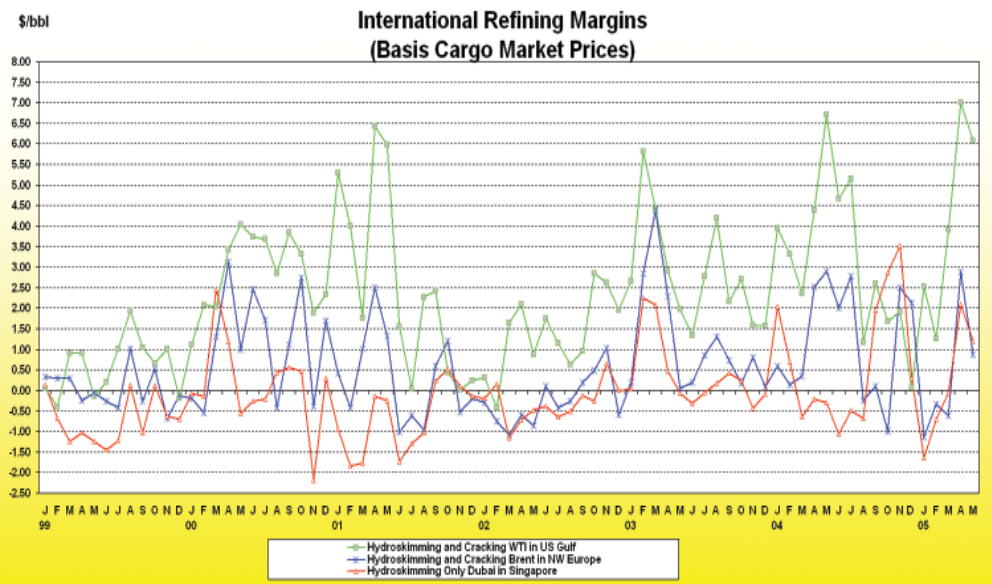
The KNPC MAB refinery proceeded with the work in confidence, and the revamped unit started-up with no furnace or transfer header vibrations.

PEL MARKET SERVICES

Refining Margins

by Olan O'Sullivan

Refining Margins have been extremely buoyant over the past couple of months, particularly in the US, which averaged around $7/bbl in April. Moreover, in both NW Europe and Singapore margins were considerably improved from the first quarter, moving from below breakeven to show positive returns throughout April and May-to date. April is traditionally the month when the market begins to firmly focus on the US driving season, and despite comfortable stocks, prices have remained vulnerable to upward price movements. A number of unplanned refinery shutdowns in the US ensured that prices remained well supported. The continued strength of the distillate market combined with seasonal gasoline support and a slightly stronger fuel oil market, particularly in the USG and Singapore, ensured margins remained healthy, despite prolonged periods of high crude prices. Conversely in May margins have not reached the highs seen in April; continued bearish US gasoline inventory data and some seasonal weakening in distillate markets have accounted for the slightly lower returns, in spite of lower crude oil prices. Even so they have remained well above breakeven levels.



margins and improving capacity and reliability to meet the growing demand of higher quality transportation fuels. KBC will present a paper.

Asia Pacific Refining Conference
Sept 13-14,Sheraton Grande Suhumvit
Bankok, Thailand
Zoran Milosivec, Senior Staff Consultant with KBC, will present a paper entitled "Use of Energy Metrics to Sustain Refinery Energy and Environmental Performance."

13th Annual Asia Petrochemicals Summit
Sept 15-16,
Bankok, Thailand
John Philpot, KBC's Petrochemical Practice Leader, will present "Profit Improvement in Olefin Complexes."

Pictured (left-right): *JS Kim (AID Corp.; Manager), John Philpot (KBC; Leader, Petrochemicals), IS Cho (STC; VP, Technology),David Turner (KBC; VP, Business Devel., Asia), and JH Lee (STC; GM, Technology & Business Devel.)*

KBC VISITS SAMSUNG TOTAL

On May 16, KBC's John Philpot and David Turner visited Samsung Total Petrochemicals Co. (STC) in Daesan, Korea to discuss further petrochemical profit improvement opportunities. KBC completed a refinery/petrochemical integration study for STC and a nearby refinery, and they have just begun a Strategic Energy Review at the same site. STC produces over 2.5 Million tons per year of petrochemical derivatives from 13 plants at the Daesan complex.

RECENTLY COMPLETED PROJECTS

Due Diligence

Southeast Asia

A client contacted KBC with an urgent need to carry out pre-acquisition due diligence on all aspects of an on-going refinery and petrochemical business complex. Our team made an initial visit to the plant site to collect information and begin assessing the competitive positioning of the business as well as its physical and technical state. Using our long-term pricing outlook, we determined the cash flow-based value of the assets in their current condition.

We provided expert opinions about virtually immediate profit improvement potential that was available with little or no capital requirement. Such profit improvement potential was attainable through different operating modes and raw material supply schemes. The client also requested advice on investment options, which would improve processing flexibility and enhance the long-term value of the assets. For an array of cases, we developed sensitivity analyses to provide insight into the risk elements of the acquisition and the changes in asset values or ROI rates that might result from differing key factors.

The work we delivered showed our client the range of values that could be applied to both the plant and the business. This report was employed to present the opportunity to the financial community, and a bidding and acquisition strategy was developed. KBC delivered preliminary advice on short-term changes to be implemented as soon as possible following assumption of ownership and an overview of subsequent tactical and strategic shifts to improve the performance of the enterprise under new owners.

Profit Improvement Program

Europe

KBC performed a comprehensive two-phase Profit Improvement Program for the petrochemical complex of TVK, part of the MOL Group, in Hungary. TVK had a strategic objective to improve its competitive position in all aspects of its operations, and initiated a joint program with KBC in June 2004 to help achieve this. An improvement of at least €8 Million/year was targeted.

Phase 1 encompassed a 2-month benchmarking and opportunity identification study, using KBC's models and methodologies. This phase looked at the areas of Process, Planning, Energy, and Asset Management to identify the scale and nature of potential benefits if best practices were adopted. The main purpose of Phase 1 involved building the business case for additional work and prioritizing where this effort should be spent in Phase 2. In fact, since such attractive prospects were identified in each area, Phase 2 was initiated as a 6-month program to fully define, agree and start implementation of quick-win opportunities across all areas.

We have completed Phase 2, with agreed benefits of over €10 Million/year, and considerable additional potential is being explored. The bulk of the benefits required zero capital investment, and the remainder of the benefits had payouts of under 18 months.

Implemented quick wins have already more than paid for the project and motivated the team to continue the efforts.

KBC DRIVING Competitive Advantage

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