



Driving

Excellence

1st Quarter 2007

Helping Clients Achieve Operational and Capital Excellence



KBC Performs Due Diligence for a Northwest European Refinery *by Geoffrey Lee*

Just as cost estimates for grass roots refining capacity have surged recently, so have valuations of existing refineries in numerous recent transactions. KBC's experience in this area is extensive, and we have a strong background in advising on both the buy and sell sides of Merger and Acquisition processes. As a technical and economic adviser, KBC not only values assets using DCF methodology, we also:

- Identify any material risks or "red flag" issues, both technical and commercial
- Pinpoint areas for profit improvement - both strategic and operational
- Recommend organisational, planning, and commercial improvements

In early 2006, KBC assisted an investment company that was considering buying a refinery in northwest Europe. The facility in question was a medium complexity refinery with lubes capability using solvent technology. Some of the key questions revolved around how its margin might develop, how the asset might best be improved, and how its markets might be sustained.

Economic Modelling

Upon receipt of the information memorandum, KBC developed an economic model 15 years forward to the EBITDA level.

Additional information was exchanged via an electronic data room. In this case, the gross margin component of the economic model was calibrated against historical margin data, so the model could be confidently used to generate gross margin forecasts. These were based on KBC's international price forecasts for crude and products, which were carefully translated into refinery gate prices. One major challenge was lube oil pricing; however, as with bulk products, supply/demand analysis provided a good foundation. Another challenge was to quantify the risk of a return to low margins, and KBC developed a special scenario to this end. A total of six major margin improvement opportunities were quantified and another four identified for further study. Cost components were individually forecast, with particular attention to maintenance costs and taking inflation into account.

Capital cost forecasts were also developed. Fundamental information was made available by the refinery, but KBC estimated the capital costs associated with most of the improvement opportunities.

Site Visit

By the time of the site visit, the first draft of the economic model was complete. The

site visit consisted of a site tour, management presentation, and a question and answer session. Such sessions are particularly valuable to enable KBC to follow-up leads from the data room information and assess how well the management are confronting various issues. Site visits, along with access to local maintenance records, are important for assessing the mechanical integrity of the plant and obtaining a more clear view of required future maintenance expenditure.

Final Report and Follow-up

Following the site visit, capital cost forecasts were updated and some of the sensitivity analyses were reworked. The final documentation included a SWOT analysis embracing all aspects of the operation and the economic model. All documents were then handed over to a financial adviser, who added tax, loan, and other financial aspects to allow NPV calculations. These items provided the basis for valuation, and the sensitivities helped formulate a negotiating strategy.

In this case, the client was an investment house or private equity group that needed advice on establishing its credibility with the

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

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

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FEATURE STORY

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seller through development of a detailed business plan. KBC worked closely with both the client and the financial adviser. Furthermore, the client needed advice on establishing an appropriate organisational structure to ensure that commercial operations interfaced smoothly and optimally with technical operations and support management processes focused on profit maximisation. KBC provided organisational charts and contributed to interviews of key personnel who might lead the new company.

Conclusion

The client and financial adviser developed a negotiating position based on the KBC analysis, which was an essential foundation for this final stage.

TEAMBUILDING FUN



KBC and Petronas Team Member Bowling Match

KBC and Petronas held a bowling teambuilding event as part of our alliance. KBC and Petronas have an effective partnership to meet future challenges in Profitability, Operational Excellence, and Reliability. We are working with them on the following activities in 2007:

- Value Improvement Program for Gas Processing Plant
- Operational Excellence Assessment for Offshore Production Platforms
- Reliability and Integrity Services for Fertiliser Complex

EVENTS

BBTC – 2nd Bottom of Barrel Tech Conference (Russia & CIS)

18-19 Apr - Moscow, Russian Federation

In this paper, Mr Simon Rogers, Chief Information Officer of KBC, describes the use of rigorous refinery-wide simulation to optimise refinery configuration in “Rigorous Refinery Configuration Design and Optimisation.” The improved refinery margins and the need to make clean fuels and minimise the impact on the environment has led to a significant increase in investment in refineries in all areas of the world. This paper will illustrate a number of case studies in which KBC has used our state-of-the-art refinery-wide simulation technology (Petro-SIM) to optimise new refinery investments.

3rd RAMS Conference

19-20 Apr – Kuala Lumpur, Malaysia

KBC’s Mike Mikulicz, Senior Staff Consultant will present “Developing Effective Asset Care Programs Utilising RISK Management Tools.”

Rigorous Refinery-wide Optimisation Seminar - Petro-SIM

20 Apr - Moscow, Russian Federation

KBC is pleased to announce our 2007 Moscow Petro-SIM Seminar entitled – “Rigorous Refinery-wide Optimisation.” This seminar outlines how rigorous simulation models can be used to supplement and improve traditional refinery planning and scheduling tools.

Haverly’s Magen User Group Intl (MUGI)

22-25 Apr – Athens, Greece

Simon Rogers, KBC’s Chief Information Officer, will present on the significant opportunity to improve the accuracy of refinery LP models using state of the art process simulation. This paper describes how Petro-SIM can be used to generate LP vectors and improve model accuracy for all refinery units

AICHe Spring National Meeting

23-25 Apr – Houston, Texas, USA

Zoran Milsosovic will present a paper entitled “Energy Efficiency Improvement and Cost Reduction in Olefins Plants” at the AICHe Ethylene Producers section of the conference. KBC will also participate in the exhibit. Please visit us at booth #117.

Refinery Operations Asia

25-27 Apr – Singapore

KBC’s David Turner, EVP Business Development - ASIA will present “Refinery Operational Excellence (OpX).”

The Refinery of the Future Seminar

30 Apr-1 May – London, England

This KBC seminar provides you with an understanding of our global economic forecast for oil refining through the year 2025. In addition, we present a model of the Refinery of the Future, including its refining technology, automation and controls, organisational structure, manpower requirements,

and human elements. We conclude with a discussion on how to develop and deploy a corporate strategy to achieve this vision. For more information, visit www.refineryofthefuture.net

ERTC – Asset Maximisation Conference

21-23 May – Rome, Italy

Reliability Session - KBC’s Dave Morgan, VP – Reliability, Availability, & Maintenance, will present “Optimising Turnaround Execution through Effective Risk Analysis of the Work Scope and Integrated Plan Development.” This paper examines effective workscope review methodologies and utilisation of tools based on risk management.

Computing Session - Mr Simon Rogers, Chief Information Officer of KBC, will present “Rigorous Refinery Configuration Design and Optimisation.”

BBTC – 1st Asian Bottom of the Barrel Technology Conference & Exhibit -

22-23 May – Kuala Lumpur, Malaysia

Mr Paul Kennedy, KBC’s EVP Operations – ASIA, will present “Reconfiguring Asian Refineries to Meet Market Realities.”

NPRA – Reliability and Maintenance Conference & Exhibition

22-25 May – Houston, Texas, USA

KBC supports the conference as a sponsor and exhibitor. Please visit us at booth #231 in the George R Brown Convention Center.

5th Asia Petrochemicals & Gas Technology Conference & Exhibit

24-25 May – Kuala Lumpur, Malaysia

KBC’s Steven Kantorowicz, VP Petrochemicals – ASIA, will present “A Rigorous Approach to Refinery and Petrochemical Integration.”

Reliability Congress 2007

29-30 May – Singapore

Michael Voigt, KBC’s Senior RAM Consultant, will present “Ensuring Asset Care Using Risk Management.”

Asia Olefins & Polyolefins Markets Conference

11-12 Jun – Singapore

Steven Kantorowicz, KBC’s VP Petrochemicals – ASIA, will speak.

KBC Seminar - Achieving Operational and Capital Excellence

11 Jun – Vienna, Austria

In association with the Refining Management Forum, KBC is pleased to announce this year’s pre-conference seminar. The agenda will include proven methodologies and strategies to address the impact of the changing characteristics of available crude feedstock and product demand, the availability of engineering staff and changing process operator profile, the need for effective planning and execution of major capital investment projects whilst ensuring the safe, reliable, and profitable production from existing assets. To register, visit www.kbcat.com/seminars/viennaintro.asp.

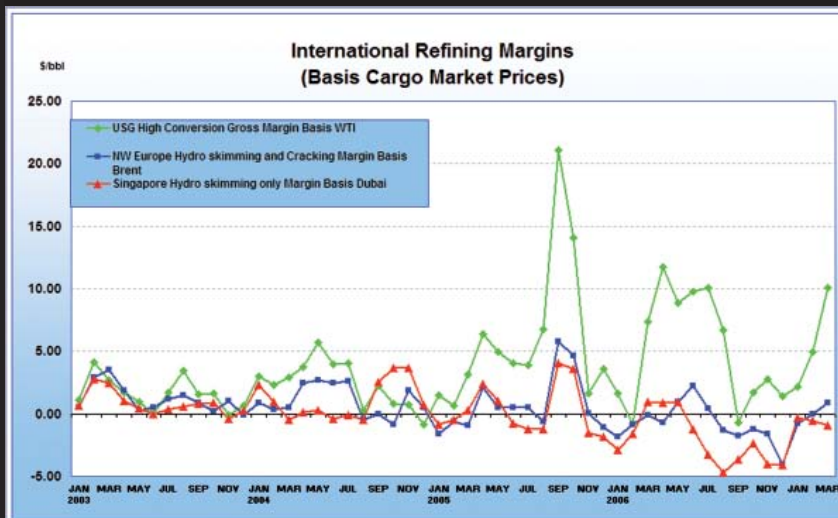
REFINING MARGINS

by Emma Storey

High conversion refining margins increased significantly in the US Gulf due to both strength in product prices and specific weakness in the WTI quote, which contributed to the massive upswing to \$10/bbl seen in February and March. Weekly draws in product inventories as a result of a heavy and lengthy refinery maintenance period giving strength to product prices. However, numerous unplanned refinery outages and reduced gasoline imports from Europe rallied gasoline prices and pushed margins higher.

On a hydroskimming and cracking basis, European refinery margins moved above marginal cost break-even. There was support from products across the barrel, with unusual strength in residual fuel oil in January, heating oil strength in February, and support for gasoline prices in March. Heavy refinery maintenance, abundant arbitrage opportunities, and the renewed strength of US prices played strongly into gasoline and naphtha.

Margins in Singapore improved sharply in January largely caused by extreme strength in the residual fuel oil market, support from a tightening regional naphtha market, and lower Dubai crude oil prices. This strength has continued; on a simple hydroskimming basis, margins remain at around marginal cost break-even margins (not shown here) actually improved marginally as gasoline, naphtha, and kero prices improved.



FEATURED PROJECTS

Revamp Feasibility Study

OMV/Petrom's Petrobrazi Refinery, Romania

In 2006, KBC carried out a feasibility study to expand the crude and vacuum unit from 4 to 6 million tonnes per annum. The feed is a complex mixture of low sulphur, naphthenic domestic crudes, and incremental crude, which would be imported. Other project objectives were: to improve energy performance, increase distillate yield and minimise naphtha, and increase VGO recovery for new conversion units. Many cases were quickly studied in a cost effective manner with the project partners.

KBC used SuperTarget™, KBC's energy pinch tool, to optimise the heat recovery systems. The target throughput was achieved without building new furnaces by increasing the preheat temperature by 20°C; a significant reduction in specific energy use also resulted.

Petro-SIM™, KBC's plant-wide simulation software, was used to develop heat and material balances for the base, short-term optimisation, and potential revamp cases. In addition, a furnace model was included for the vacuum unit to confirm run length using KBC's Deep Cut experience.

A new diesel recovery section was added to the top of the vacuum tower. For crude tower capacity, we considered the replacement of pumparound trays with structured packing. However, the preferred proposal

was to add a third lower pumparound to recover high level heat and unload all trays above this section.

Fouling Monitoring Application Implementation

Irving Oil, Canada

This refinery had a desire to monitor the performance of the preheat network on one of its crude units. As a strategic partner, KBC provides technical services to Irving, and KBC's Fouling Monitoring Application was implemented as part of a suite of process and energy monitoring tools.

This application downloads all of the relevant process and lab data, reconciles the heat and material balances, and uses the built-in preheat network simulation to provide information about the state of fouling in each exchanger. The program keeps track of normal fouling as well as fouling events. The calculations provide information about the value to the refinery of taking exchangers off-line and cleaning them.

With a range of crudes processed, including those with high TAN content, the application examines the process data around each exchanger, trends the fouling, demonstrates the effectiveness of exchanger cleaning, and places a value on proposed and completed cleaning efforts.

When an unusual fouling event occurred following startup from an unscheduled shutdown, the application almost instantly

sensed the event. It also pinpointed when and where the fouling occurred, which enabled targeted cleaning and an investigation of procedures at the time of the fouling. The refinery planned for opportunity cleaning of the three identified exchangers (6 shells) during a refinery slow down 12 weeks after the event. The program also indicated that cleaning the exchangers recovered 20-25°F of coil inlet, which equates to ~25MMBtu/h of furnace firing. At \$10/MMBtu, this equates to ~\$2MM/y of energy costs and an even greater value based on either reduced crude processing capability or reduced recovery on the atmospheric tower.

IN THE COMMUNITY...



KBC proudly sponsored the University of Surrey's Chemical Engineering Team at the recent Frank Morton Sports Day in Manchester. Above is a photo of the dodgeball team.

UPCOMING HUMAN PERFORMANCE IMPROVEMENT SEMINARS

Join us for one of the upcoming public seminars listed below to learn how your company can begin to achieve Operational Excellence.

Training Skills for Process Plant Trainers

• 15-17 Aug – Houston, Texas, USA

Achieving and Sustaining Operational Excellence (OpX)

• 1-3 Aug – Kuala Lumpur, Malaysia
• 19-21 Sept – Denver, Colorado, USA
• 24-26 Oct – Madrid, Spain

Improving and Sustaining Process Plant Operator Performance

• 17-19 Oct – Houston, Texas, USA

Supervising for Operational Effectiveness

• 7-9 Nov – San Antonio, Texas, USA



To register, visit us online at: http://www.ttsperformancesystems.com/Seminars_toc.php.

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DRIVING EXCELLENCE

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