

Monday March 10, 2008 Afternoon Sessions

Gasoline

- **AM-08-82 It Is Not Your Grandfather's Gasoline**
It is not your grandfather's gasoline gives the refining industry credit for reducing automotive emissions by 99%. It summarizes and estimates the costs of the fuel changes that have made today's cleaner air possible.
- **AM-08-10 Options for Reducing Benzene in the Refinery Gasoline Pool**
In this paper various strategies will be identified to remove benzene from the refinery gasoline pool for various refinery configurations and crude types. Typical design guidelines for naphtha pre-fractionation and sensitivities of number of trays; reflux ratio versus levels of benzene; and benzene precursors in the fractionator products will also be presented.
- **AM-08-12 Utility and Infrastructure Requirements for Gasoline Benzene Reduction Processes**
- **AM-08-11 Benzene Management in a MSAT II Environment**
- **AM-08-15 Benzene Recovery**
Recovery and purification of greater volumes of higher valued petrochemical products is a way for refiners to improve their bottom line. This presentation will address the optimal disposition of benzene and review certain refiners' decisions to add new benzene production capacity and increase existing units' production through innovative revamp designs.
- **AM-08-14 Benzene Reduction at Lowest Capital Cost**
Some refiners will choose benzene saturation to meet the upcoming MSAT II regulations. CDTECH's Benzene CDHydro process offers significant capital cost reductions compared to conventional fixed bed technologies.

FCC Technology

- **AM-08-53 Maximizing Flexibility for FCC's Designed to Maximize Propylene**
- **AM-08-51 The Effect of Hydrocarbon Partial Pressure on Propylene Production in the FCC**
- **AM-08-54 MILOS – Shell's Ultimate Flexible FCC Technology in Delivering Diesel/Propylene**
Shell Global Solutions has developed a new process option that produces more diesel with improved quality and more propylene from a revamped FCC unit. This process option has a wide flexibility with respect to products, ranging from the normal product slate to maximized propylene or diesel, all achieved through normal "on-the-run" operational measures.
- **AM-08-52 Pilot Plant Catalyst Evaluation**
The application of best-fit catalyst technology to commercial fluid catalytic cracking Units (FCCU's) delivers additional yield value to the refinery and most importantly, provides additional high-value products such as gasoline and/or diesel for our customers and communities. An example of how continuous improvements in catalyst evaluation techniques were commercially applied to one BP European FCCU unit to deliver year-on-year value delivery, and product yield improvements are described.
- **AM-08-50 FCC Catalyst Optimization – A Dynamic Approach for Today's Changing Feedstocks & Refinery Economics**
The key to maximizing FCC unit profitability is to keep it optimized at all times. Most refiners pay a lot of attention to optimizing operating conditions, but keep the most important variable – the catalyst - constant for months at a time. This paper gives specific recommendations for dynamically optimizing FCC catalyst formulation on a week-by-week basis for maximum FCC profitability.

- **AM-08-18 FCC Regenerator Design to Minimize Catalyst Deactivation and Emissions**

Process Safety

- **AM-08-24 Delivering Process Safety Performance Indicators**
This presentation will describe a strategy for the development of a comprehensive management information system for process safety performance indicators.
- **AM-08-22 U.S. Chemical Safety Board: Lessons Learned from Recent Investigations**
- **AM-08-23 Effective Design of Overview Displays to Support Operator Situation Awareness**
- **AM-08-96 Understanding and Implementing API RP753**
This presentation addresses the practical details of API RP753, and the responsibility incurred in the planning and execution of a safe and efficient turnaround. Major concerns such as blast ratings, duration and structure response and their relationship to each other will be analyzed.
- **AM-08-25 Reliability and Availability: Lifecycle Lessons from Functional Safety**

Hydroprocessing:

- **AM-08-28: Improving the Operation of Desulfurization Units Using Advanced Process Control Technology**
Advanced process control (APC) technology has been used to help refiners offset higher costs associated with the production of low sulfur fuel. Best practices for implementation on gasoline and diesel hydrodesulfurization units will be discussed, looking at several recent applications.
- **AM-08-30 Increased FCC Pre-treatment Capability – How Best to Utilize in a Clean Fuel Facility**
Through a series of low cost improvements, Houston Refining, LP, a Lyondell Basell Company has realized significant improvements throughout the clean fuels system. These improvements were achieved in cooperation with Criterion Catalyst & Technologies and include gains obtained in FCC pre-treat performance via a combination of diagnostic operational review and catalyst product development.
- **AM-08-27 Fixed Bed Reactor Optimization Through Novel Bed Support Design**
- **AM-08-29 Combining New and Old Technologies: Inlet Diffuser and Random Packing Dramatically Improve Reactor Performance**
- **AM-08-26 IsoTherming Hydroprocessing Technology**
- **AM-08-95 Optimal Pressure for Hydrocracking: Case Study for Assessing Trade-Offs**

Syncrude Challenges

- **AM-08-35: Canadian Synthetic Crude Oil: Markets in Transition**
Canadian synthetic crude oil (SCO) production is projected to expand substantially over the next decade which may result in wider price discounts for SCO as it moves further away from Alberta to clear the market. This presentation will put current developments into context, through consideration of crude valuation principles, key SCO qualities, and downstream refinery limitations for processing SCO.
- **AM-08-34 Processing Oil Sands-derived Crudes in Conventional Refineries**
The presentation discusses the potential US market for the Alberta oil sands-derived crude and the benefits and issues in processing such crude in the existing refineries. It highlights the complexities of US PADD II refineries and discusses the supply, quality and processing issues in these refineries. The presentation also discusses a recent refinery conversion by SUNCOR for processing sour crude.

- **AM-08-31 New Oil Sands Upgrading Technologies Winnowing Promises**
This paper will provide an overview of the Hydrocarbon Upgrading Demonstration Program sponsored by the Alberta government aimed at identifying and demonstrating new technologies to upgrade Canadian oil sands.
- **AM-08-32 Upgrading Bitumens from Western Canada**
- **AM-08-33 LC-FINING Options for Heavy Oil Upgrading**
- **AM-08-36 Strategies for Desalting Heavy Western Canadian Feedstocks**
This paper describes how refiners purchasing these feedstocks are addressing processing challenges in refinery crude unit desalters and improving their flexibility in selection of crudes they can process. These strategies include the development of feedstock blending protocols, the use of innovative chemical treatment programs, and optimization of desalter operations to allow successful handling of these crudes.

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Developing Carbon Dioxide Strategies

- **AM-08-40 Economics, CO2 Balance and Energy Efficiency of Biofuels Production**
This paper compares the economics, CO2 emission reductions and energy efficiency of various biofuels processes as well as the investment required to meet the 2007 renewable fuel standards. It also quantifies land constraints for biofuels production.
- **AM-08-39 Carbon Dioxide and Refining – Trends and Challenges**
- **AM-08-38 GHG Emissions Performance Measurement and Management – The Missing Ruler**
Today's refining executives and managers need high-quality management tools to address a broad range of GHG-related performance issues. Solomon's new Carbon Emissions Index -- CEI™ now provides the industry with the capability of assessing GHG emissions efficiency and managing GHG performance.
- **AM-08-37 Carbon and Energy Management : Innovative Approaches for a Responsible Energy Future**
Referring to Shell's broad and growing experience base in sustainable energy, the speaker will illustrate how the organization is responding to the environmental and legislative challenges of climate change. The carbon and energy management (CEM) program developed by Shell Global Solutions to provide a framework for assessing a business's current energy and carbon position with a view to saving energy, reducing costs and controlling emissions will be described. In addition, Shell's portfolio of successful projects for managing carbon dioxide intensity and reducing net emissions, and how Shell Global Solutions' CEM consultancy is benefiting other companies facing similar challenges will be highlighted.
- **AM-08-41 Monitoring and Reducing a Refinery's Carbon Footprint**
A renewed emphasis on greenhouse gases emissions reduction and current record-high energy prices makes monitoring, predicting and cost-effectively reducing CO2 emissions one of the biggest challenges facing refiners. The experience of a South California refinery, subject to some of the strictest standards in the world, following the energy conservation route to reduce CO2 emissions is discussed.

Crude Evaluation and Distillation

- **AM-08-42 Improve Crude Selection by Better Understanding Crude Oil Quality**
Optimal crude selection and processing decisions require the refiner to understand the changing quality of crude oil. By employing statistical techniques and models for predicting crude oil qualities, and generating comprehensive assays based on limited current quality data, refiners can improve refining margins.
- **AM-08-68 Managing High Acid Crudes**
- **AM-08-85 Rerun and Off-Spec Product Recovery: New Opportunities with Industry Wide Benefits**
Recent EPA clarifications give refinery managers new opportunities to boost productivity and lower environmental risk by selling off-spec oil to an outside reclaimer. This paper describes the risks associated with rerun processing and highlights an innovative transaction opportunity that, by removing off-spec oil from the refinery stream, allows refineries to reduce energy consumption and maintenance costs, increase time between turnarounds, extend the life of catalysts and reduce waste production.
- **AM-08-44 Diesel Recovery in Crude Unit Revamps**
An overview of case histories of diesel recovery options for crude units is presented including a range of options from minor modifications to major unit revamps.
- **AM-08-43 Cheyenne Yield Improvement Project – Recovering Maximum Diesel from Crude Oil Fractionation Process at Frontier Oil’s Cheyenne Refinery**
Faced with the need to squeeze every drop of gasoline and diesel out of the Cheyenne Refinery, a project was implemented to recover diesel from the AGO and LVGO cuts. An innovative flow scheme was developed that minimized capital and utility requirements, as well as providing significant diesel recovery. The project payout was less than three months.

Operations

- **AM-08-87 The Journey to Operational Excellence**
- **AM-08-49 Managing Marine Logistics: What You Don’t Know CAN Hurt You**
Major refineries along the Sabine-Neches waterway were seeking to reduce demurrage costs and improve efficiency of vessel movements along the waterway. To accomplish this goal, they deployed a web-based system, PortVision, which has not only reduced demurrage costs for terminal operators, but also changed the culture of how business is done on the waterway -- by bringing complete visibility and transparency of vessel movements to all stakeholders.
- **AM-08-46 Tank Farm and Terminal Automation: Developing a Business Case**
- **AM-08-86 The Dawn of a New Age in Gasoline Blend Scheduling**
Achieving optimal blend scheduling is extremely difficult for today's gasoline producers. This paper will introduce a powerful new modeling system designed specifically with these producers in mind, discuss its many features, and share examples of its use.
- **AM-08-48 Stoichiometric Combustion Control**
Controlling refinery process heaters at stoichiometric combustion will produce an efficiency improvement of 1 to 5%, which results in CO2 reduction. This paper will discuss the technical challenges of stoichiometric combustion and how to operate safely in this regime.

FCC Technology

- **AM-08-19 FCC Revamp**

- **AM-08-17 Tesoro FCC Regenerator Upgrade Project, Salt Lake City**
Tesoro Petroleum Salt City Refinery upgraded the performance of their FCCU catalyst regeneration. The mechanical changes improved air/catalyst mixing, reduced catalyst losses, lowered flue gas emissions and, more importantly, improved the bottom line.
- **AM-08-16 A New Technology for Reducing NOx Emissions from FCC Regenerators**
This paper will focus on how refineries can leverage the low NOx FCC regeneration technology for reducing NOx emissions below 25 ppm. A case study of a recent successful revamp in a large FCC unit will be presented.
- **AM-08-21 Capturing Value Through Optimization of FCC Catalyst Technology for Processing Opportunity Feedstocks Derived from Canadian Oil Sands**
- **AM-08-20 Impact of Bitumen Derived Feeds on the FCC**

Profit Improvement

- **AM-08-45 Gasification Technology: Generating Profit from the Bottom of the Barrel**
The Shell Group (Shell) has over fifty years of commercial gasification experience and more than 150 Shell gasification units have been licensed worldwide. With applications for both solids (Shell Coal Gasification Process) and liquids (Shell Gasification Process) conversion, Shell's technology case studies will be used to illustrate how the business drivers, highlighted at the outset, are placing pressures on refiners today and how Shell's solid's and liquid's gasification heritage, has enabled these challenges to be met profitably.
- **AM-08-58 Maximizing Value for Refinery "Orphan" Products**
This paper will discuss increasing business value by re-engineering the marketing of your refinery's "orphan" products.
- **AM-08-92 A Bold Move in Hydrocracking Catalyst Selection Resulted in a Record Run Length and Significant Boost in Hydrocracker Margins**
- **AM-08-88 A New Process Approach to Hydrotreating Coker Naptha**
This paper presents a new process approach to address the optimization of coker naphtha hydrotreating technology. We will give examples of industrial experience along with pilot plant data.
- **AM-08-93 Results of Antifoulant in Delayed Coker Furnace**

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Management

- **AM-08-59 Gasoline or Diesel**
As new projects are evaluated with a forward view: which makes more sense, gasoline or diesel? This paper focuses on a US scenario to provide some insight as to the issues to be considered in the decision process.
- **AM-08-56 The Potential Contribution of Coal-to-Liquids Technology to the US and Global Energy Pool**
In this paper, key coal-to-liquids (CTL) technologies and recent commercial activity are discussed. The prospects for significant commercial implementation of these technologies and their potential impact on the US and global transportation fuel and niche markets are reviewed.
- **AM-08-89 Capital Projects Survey**

- **AM-08-57 A Fresh Look at Project Evaluation & Execution**
This paper takes a fresh look at evaluating and executing refinery projects given today's much different economic environment. The applicability of "standard" industry approaches developed and honed during the past twenty years is specifically addressed and several case studies are cited to support the belief that alternative approaches may deserve greater attention now that the North American refining industry has fundamentally changed.
- **AM-08-55 Value Engineering in an Escalating Business Environment**

Energy Economics

- **AM-08-62 Economics of Refinery Energy Saving Projects in a Changing Market**
The continued volatility in energy prices makes financial analysis of potential investments to save energy even more uncertain than in the past. In this paper, appropriate techniques to evaluate such investments are presented along with case studies illustrating the approach.
- **AM-08-61 Rapid Excel Modeling for the Optimization of Refinery Energy Systems**
A detailed refinery total energy model can be a valuable tactical or strategic decision-support tool for predicting and quantifying the impact of changes. This paper describes a structured framework and methods for rapid Excel modeling of a refinery energy system.
- **AM-08-60 Sustaining Refinery Energy Improvement Using Solomon's NCM3 Methodology**
- **AM-08-63 Energy Management System**
- **AM-08-94 Exponential Gains Through Incremental Change**

Reliability

- **AM-08-64 How Marathon Petroleum's Reliability Initiative Changed MPC**
Over the last decade, Marathon Petroleum Company (MPC) has spent considerable time, effort, and money instilling a reliability culture across the organization, which required an internal culture change, tools/technology, and work process changes and resulted in significant financial success. This paper will detail the technical, organizational, and cultural obstacles encountered and how they were overcome.
- **AM-08-67 Gray Matter(s) in Human Reliability**
Gray Matter(s) in Reliability looks at many incidents in not only the petrochemical industry, but many other industries where people operate in the gray zone. The gray zone leads to accidents, reliability failures, and added cost. Case studies and solutions on how to avoid the gray zone are also provided.
- **AM-08-47 Enhancing Plant Asset Management in Process Industries with Wireless Retrofits**
Many think that adopting wireless means replacing existing instrumentation with new devices, new networks, and new software; however a simpler, less costly, and lower risk approach is to retrofit existing wired instrumentation with wireless adapters. This presentation will provide an update of the wireless standards landscape, describe a wireless instrument adapter, and outline how plant asset management systems, including condition-based maintenance, can use information from retrofitted wireless instruments to reduce plant-wide maintenance costs and increase plant availability.
- **AM-08-66 Risk-Informed Inspection: Developing Plans to Load into Asset Management Systems**
- **AM-08-65 Inspection and Monitoring of Coke Drum for Life Extension and Safety**
For coke drum fatigue life extension and safety, a routine inspection and monitoring program is suggested, as a first step. This program is simple and can be executed by refinery operator and inspectors.

Workforce

- **AM-08-72 Where Have All the Workers Gone?**
- **AM-08-69 Managing the Challenges of Complex Operations and Work Force Changes. Are You Ready?**
- **AM-08-70 The Challenges and Rewards of Hiring Hourly Employees**
- **AM-08-71 Enhancing Operator Effectiveness with Tools, Training and Processes**
Maximizing operator effectiveness requires the right combination of tools, work processes and training. This paper examines the role of each of these and shows how some refiners are utilizing operator training simulators to great advantage.
- **AM-08-90 Evolving Best Practices Through Simulation based Training**
Simulators are widely recognized as essential to process control training as they facilitate the propagation of a company's standard operating procedures (SOPs). This paper explores the use of process control simulators by Chevron Products Company to validate and/or challenge existing corporate SOPs and to help achieve improvements in overall production performance.

Hydrogen & Refinery Off-gas Systems

- **AM-08-74 Hydrogen Costs and Issues – Gasification vs. SMR**
Future natural gas price and availability uncertainties combined with increasing “on purpose” hydrogen demands require analysis of the alternative to traditional steam methane reforming (SMR) hydrogen via gasification of pitch or coke. This presentation addresses the key technical and economic issues for this comparison such as economy-of-scale, reliability, sparing, and the much higher capital cost of gasification vs. the cost of natural gas.
- **AM-08-73 Commercialization of New Low-cost Hydrogen Recovery Process: Rapid-Cycle Pressure-Swing Adsorption**
Hydrogen recovery from fuel gas and hydrogen containing off-gas streams in refinery and chemical processes offers many potential benefits, including process uplift, reduced H₂ costs, avoids H₂ plant expansion, and CO₂ emissions reductions. This presentation is about Rapid-Cycle Pressure Swing Adsorption (RCPSA) technology which offers a more-compact, less-expensive and more-energy-efficient solution for H₂ recovery compared to conventional PSA technology. The first large-scale commercial product – the “QuestAir H-6200” – was successfully started up to demonstrate the technology in an ExxonMobil Refinery in 2007.
- **AM-08-76 Economic LPG Recovery from Stranded Low Pressure Gas**
A new process technology (PRO-MAX) overcomes the challenges of processing rich, low pressure gas streams. Total required horsepower is reduced significantly while efficiently recovering virtually 100% of the propane, propylene and heavier hydrocarbons.
- **AM-08-75 Refinery Off-gas (ROG) Treatment and Recovery – Challenges of Designing ROG Units**
Valuable products including hydrogen, olefins, natural gas liquids (NGL) and higher BTU fuel gas can be recovered from the off-gas of a refinery in a ROG plant. Methods for removal of the individual contaminants in the gas and the various configurations of the ROG plant are discussed in the paper.
- **AM-08-91 Problem-free Sulfur Plant Startups with Pre-activated Tail Gas Catalysts**

Renewable Fuels

- **AM-08-77 Ethanol – Absorbing the Deluge**
The recent energy bill signed into law significantly increases the volume of ethanol that must be blended into gasoline to more than double the current level by 2012. During 2007, as ethanol

production capacity surged, the increase in ethanol blending was driven by attractive economics, with gasoline marketers largely determining the pace at which ethanol penetrated conventional gasoline markets. With federal legislation mandating aggressive new targets for ethanol, the refiners' decisions will be governed by regulatory compliance rather than economics. "Ethanol – Absorbing the Deluge" examines supply and demand, logistical issues, and the decisions that will be required to meet the new ethanol mandate.

- **AM-08-78 How Will Biofuels Challenge Petroleum Refining**

Significant technological advances are being made that may lead to the production of transportation fuels from a wide range of conventional and emerging biological feedstocks. This discussion of biofuels technology development relative to petroleum processing will examine opportunities to integrate refinery operations with bio-refineries, as well as challenges to adapt to modified fuel supply/demand and quality scenarios.

- **AM-08-80 Biofuels: New Opportunities for Co-Processing Renewable Feeds in Refinery Process Equipment**

- **AM-08-81 Converting Pyrolysis Oils to Renewable Transport Fuels: Processing Challenges & Opportunities**

- **AM-08-79 Renewable Raw Materials for Fuels and Petrochemicals Production**

This paper shows how FCC technology can be modified to process many different renewable raw materials, including ethanol, vegetable oils or agricultural ligno-cellulosic wastes, such as sugar cane straw. Tests carried out in an FCC pilot riser show the potential of these alternative materials.