Champions Gate, Florida

2008 NPRA Q&A and Technology Forum

Omni Orlando Resort
at ChampionsGate
Champions Gate, Florida
October 5 – 8, 2008

NPRA

Table of Contents

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Schedule of Events

Sunday	**October 5, 2008**	
2:00 pm – 8:00 pm	Registration	Rotunda
6:00 pm – 8:00 pm	Reception	Golf Course Commons
Monday	**October 6, 2008**	
7:00 am – 5:00 pm	Registration	Rotunda
8:00 am – 9:00 am	Keynote Address	National AB
9:00 am – 9:30 am	Plant Automation: Opening Keynote	National D
9:00 am – 12:30 pm	• Hydroprocessing Q&A	National AB
	• Energy Management Principles & Practices (P&P)	National C
9:30 am – 12:30 pm	Plant Automation: Plant-to-Business Interoperability	National D
10:00 am – 10:30 am	Coffee Break	Ballroom Commons
12:30 pm – 1:30 pm	Lunch	International I, II
1:30 pm – 5:00 pm	• Plant Automation: Emerging Technologies	National D
	• FCC Q&A	National AB
	• Hydroprocessing P&P	National C
3:00 pm – 3:30 pm	Refreshment Break	Ballroom Commons
Tuesday	**October 7, 2008**	
7:00 am – 5:00 pm	Registration	Rotunda
8:00 am – 8:30 am	Lifetime Service Awards	National AB
8:30 am – 5:00 pm	Cyber Security Roundtable	International III
8:30 am – 12:30 pm	• Plant Automation: Fundamentals of a Business Process	National D
	• Crude & Vacuum Distillation and Coking Q&A	National AB
	• FCC P&P	National C
10:00 am – 10:30 am	Coffee Break	Ballroom Commons
12:30 pm – 1:30 pm	Lunch	International I, II
1:30 pm – 5:00 pm	• Plant Automation: Real-Time Value Chain Management and Optimization	National D
	• Gasoline Processes Q&A	National AB
	• Crude & Vacuum Distillation and Coking P&P	National C
3:00 pm – 3:30 pm	Refreshment Break	Ballroom Commons
Wednesday	**October 8, 2008**	
7:00 am – 11:00 am	Registration	Rotunda
7:00 am – 7:30 am	Coffee & Rolls	Rotunda
7:30 am – 9:00 am	Plant Automation: The Next Generation Control Room	National D
7:30 am – 11:00 am	Gasoline Processes P&P	National C
9:00 am – 9:30 am	Coffee Break	Ballroom Commons
9:30 am – 11:00 am	Plant Automation: Concluding Keynote	National D

October 5 - 8, 2008

2008 NPRA Q&A and Technology Forum

The 2008 NPRA Q&A and Technology Forum addresses real problems and challenges that you face at your facility and will help you sort through potential solutions as you discuss them with panelists and other attendees. Today's competitive refining environment requires attention to process safety, superior technology, innovation, and excellence in operations. The shared knowledge of the refiners, petrochemical producers, catalyst and chemicals suppliers, plant automation specialists, process licensors, engineering firms, and other industry experts at the Q&A and Technology Forum keeps you moving in the right direction as you optimize your plant's operation.

The 2008 Q&A and Technology Forum program will emphasize process safety and its primary importance in plant operations and design. Each session will include questions or presentations on proven practices for improving process safety.

The Q&A and Technology Forum program has four major components:

Q&A Sessions will have panels of industry experts from refining companies and technology providers who will respond to questions and engage attendees in a discussion of today's tough issues;

Principles & Practices (P&P) Sessions which correspond to and complement the Q&A sessions, will focus on practical issues, the fundamentals of good operations, and the elimination of persistent problems. The P&P sessions will be ideal for operations superintendents, process engineers and others who can benefit from a training session that is focused on practical issues. The topics for 2008 are:

- Crude & Vacuum Distillation and Coking
- Gasoline Processes
- Fluid Catalytic Cracking (FCC)
- Hydroprocessing
- Energy Management

Plant Automation & Decision Support (PADS) sessions will provide plant automation and information technology professionals a comprehensive program on the latest developments in this rapidly evolving field. The PADS sessions are for attendees whose responsibilities overlap between process engineering, unit operations, process control, and planning. This "conference within a conference" will have its own program and will provide a comprehensive array of topics for plant automation professionals; and

Cyber Security Roundtable is tailored to the specific information technology and control system network security needs for the refining and petrochemical industries. The Roundtable will address topics considered by NPRA members to be top priorities in cyber security including: compliance, risk assessment and employee education. This one-day Roundtable will be held on Tuesday, October 7, and is open to all conference registrants.

Attendees will be able to attend any of the Q&A, Plant Automation, P&P, or Cyber Security sessions. You will have more program choices and be able to structure your own 'personal' program from the diverse elements available in the different sessions.

There will be one keynote session for all attendees on Monday and the hospitality suites will be open to every attendee.

Plant Automation & Decision Support

The Plant Automation & Decision Support Sessions are designed by operating companies for operating companies and are ideal for those individuals who are responsible for plant automation, process control, planning and scheduling, information technology, and modeling/ simulation.

Conference registrants will be able to attend any session of their choosing in the Plant Automation or Q&A programs.

There will be 5 separate sessions, and an opening and closing keynote:

- Opening Keynote
- Plant-to-Business Interoperability
- Emerging Technologies
- Fundamentals of a Business Process
- Real-Time Value Chain Management and Optimization
- The Next Generation Control Room
- Concluding Keynote

Cyber Security Roundtable

For the second year the Q&A and Technology Forum will host the NPRA Cyber Security Roundtable. Unlike other cyber security seminars, this roundtable is tailored to the specific needs of the IT and DCS personnel in the refining and petrochemical industries.

Topics include:

- Dealing with Compliance Issues
- Wireless Devices' Impact on Cyber Security
- Insider Threats

In addition to illustrating the top cyber secruity issues, this roundtable will show which tools are available today for the IT and DCS personnel in the refining and petrochemical industry.

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Monday Morning Coffee Break
Aspen Technology

Monday Afternoon Refreshment Break
Grace Davison/ART

Tuesday Morning Coffee Break
Sotecia Ideas & Technology

Tuesday Afternoon Refreshment Break
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Monday
October 6, 2008

Principles & Practices Sessions

The Principles & Practices (P&P) sessions are discussion-oriented sessions, primarily designed for the engineer whose overall operating experience is less than 20 years. The P&P sessions will complement the information exchange that occurs in the Q&A sessions. Each of the sessions will address the fundamentals of good operation and the foundational principles for the technologies that are commonly employed. These sessions will usually have short presentations followed by a time where attendees can ask further questions or present their own particular problems and benefit from the collective experience of the other attendees.
The 5 P&P sessions address:

- Crude & vacuum distillation and coking topics such as: safety; desalting; vacuum distillation; heat exchanger networks; coke drums; coker operations; expansions; and turnaround cycles.
- Gasoline topics such as: learnings from LPG accidents; troubleshooting alkylation units; detection of CCR regenerator plugging; pentanes disposition; and future gasoline regulations.
- Fluid Catalytic Cracking (FCC) topics such as: reactor start-up safety; increasing diesel production, flareless start-ups, and pacesetter best practices.
- Hydroprocessing topics such as: inert entry; shutdowns; feed effects and fouling; and compressor reliability.
- Energy Management topics such as: a corporate energy management process; a refinery energy program; crude preheat energy management; saving energy through enhanced automation; and high temperature furnace fouling.

Questions & Answers

Industry experts from refining companies and other technology specialists will respond to the selected questions and then engage the attendees in a discussion of the relevant issues. The questions for the Q&A panel are organized into four Operations & Technology sessions:

- Crude & vacuum distillation and coking (safety; maximizing distillate yield; vacuum tower wash bed coking; coker vapor emissions and drum life; and utility systems);
- Fluid catalytic cracking (FCC) (safety; catalyst selection; yield predictions; KPIs; hydrogen blistering; and main air blower capacity);
- Gasoline processes (safety, corrosion in alkylation units, benzene conversion in isomerization units, aromatics recovery, iron contamination in reformers, and optimization);
- Hydroprocessing (process safety, emergency depressurization, ultra-low sulfur kerosene, catalyst regeneration/ reactivation, ULSD, hydrocracking)

In the course of responding, the panelists will address:

- Safety and Environmental Performance – Protecting our co-workers, neighbors, and facilities is our first priority.
- Operations – Common (and uncommon) operational problems and how to solve them.
- Technology – Identifying the best technology and applying it appropriately to improve the bottom line.

Keynote Address

8:00 am – 9:00 am
National AB

Blake Eskew
Vice President, Purvin & Gertz, Inc.

Hydroprocessing Q&A

9:00 am – 12:30 pm
National AB

Panelists
Max Lawrence, Shell Global Solutions
Charles Olsen, Advanced Refining Technologies
George Papoutsis, CITGO Petroleum
Dave Rapavi, HOVENSA
Steven Souers, Chevron
Edwin Yuh, UOP

See page 19 for questions.

Plant Automation & Decision Support: Plant-to-Business Interoperability

9:00 am – 12:30 pm
National D

Presider
Steve Williams, Aspen Technology

Keynote

"RAVE – Working Smarter in a 3D Virtual World"
Costantino Lanza, INOVx Solutions
Kevyn Renner, Chevron Global Manufacturing

Bottom to Top Real-Time Accounting and Performance Measures
Martin Turk, Hydrocarbon Solutions, and *Peter Martin*, Invensys Process Systems

Refiners have been searching for value that can be generated by integrating plant-wide enterprise systems with minimal success. Perhaps the problem is the abnormal focus on integration rather than on solving new and unique value-generating business problems. Many executives have expressed considerable concern over the lack of financial visibility into production assets. A new value-generating approach to measuring both operational and financial business performance in real time that starts with the plant and moves up through the enterprise has proven to provide greater visibility to executives. But more than this it has also proven to be able to empower frontline through management personnel to be able to drive significant performance improvements. This paper will present the basics of this bottom up approach and provide examples of how it has led to significant performance increases in operating plants.

A Network and Linear Programming Based Approach for Analyzing the Refinery Tank Adequacy System
Sumeet Desai and *Dong Dong*, M3 Technology

This presentation will attempt to analyze whether the existing refinery tanks are adequate to handle the unstable crude supply and demand fluctuations. M3 used a network based approach to model to complex and dynamic refinery processes and found that the model shows useful insights on the crude buying policy, net profit impact, and average tank utilization.

MOM/DSS with SOA Flavor
Hamdy Noureldien, Saudi Aramco

In this presentation, Saudi Aramco will give an overview of their approach towards SOA that capitalized on the published ISA 95 standard to define the MOM business model (Maintenance, Regulatory Compliance, Inventory, Operation, Production and Quality). SOA was used to identify reusable oil & gas services and to build the required SOA reference architecture and infrastructure to accommodate and facilitate these services. This presentation details the steps that Saudi Aramco took to start the SOA initiative, from evaluation to piloting different SOA technologies.

Refining Operation Information System
Zane Barham, *Suresh Vaidyanathan* and *Denise Gilbert*, ConocoPhillips

In 2006, ConocoPhillips set a strategy to roll-out a Refinery Operations Information System (OIS) across its worldwide refining assets. It is currently 50% through that roll-out process. A key objective of this roll-out has been to maximize the value delivered from its various information system assets including process historians, electronic logbooks, operating targets, alarm management systems, lab systems, operator document systems, plant maintenance, and safety tracking systems. ConocoPhillips selected Aspen Technology's Role-Based Visualization technology to provide an open web-based visualization platform to develop and deliver a solution. This presentation will highlight the advantages of this type of system with some examples, and provide some insight into experiences from the roll-out including training needs, maintenance requirements, etc.

Energy Management Principles & Practices

9:00 am – 12:30 pm
National C

Presiders
Dan Kennedy, Pasadena Refining
Larry Kremer, Baker Petrolite

Corporate Energy Management Process
Fernando Oliveira, Petrobras

Refiners have to improve product qualities while processing more heavy and high acid crude oils and coping with natural gas supply issues, more stringent environmental regulations, and intense concern regarding future climate change regulations. PETROBRAS will present their current Energy Management Process, its main objectives, its difficulties, and the big challenges to improve their refineries' Energy Intensity Indices (EII), while competing for capital with necessary investments in E&P to develop production from new oil fields.

Refinery Energy Program
Lee Wells, LyondellBasell

This session will detail how the LyondellBasell Houston Refinery put together its energy team and then began generating ideas for improving energy performance. The discussion will include the selection of KPIs, their benchmarking strategy, the steps taken to address the basics of steam traps, insulation, air/nitrogen leaks, steam header balancing, and future steps of energy assessment and strategy development.

Three Types of Industry Energy Programs
Gregg McAteer and *Brad Mason*, Nalco Energy Services
TBD, Emerson Process Management
TBD, Baker Petrolite

- *Crude Preheat Energy Management* – The results from preheat monitoring in a North American refinery since 2004 will be discussed.
- *How to Save Energy Through Enhanced Automation* – Case studies of the ways that automation, advanced automation and asset management can save energy in process plants.
- *Refinery Heater Fouling Control Minimizes Excess Energy Consumption* – One way to minimize energy consumption (and emissions) is by controlling furnace fouling and coking.

Summary and Conclusions – What Can You Do Today to Manage Energy Costs?
Bruce Wright, Baker Petrolite

Plant Automation & Decision Support: Emerging Technologies

1:30 pm – 5:00 pm
National D

Presider
Kevyn Renner, Chevron Global Manufacturing

In-line Laboratory and Real Time Quality Management
Marc Valleur, Technip France

The presentation shall focus on practical applications of Near Infrared spectroscopy to enable efficient decision support systems, such as crude TBP for swings transients minimization, blending indices for in-line certification of gasoline and middle distillates, and quality management of very heavy streams. Recent projects shall be taken as examples to illustrate the concept of an in-line laboratory.

Development and Operation of Next Generation Automation System for Standardized, Efficient Operations
Fred Woolfrey, Yokogawa Corporation of America

Plant control systems require intervention by resourceful operators when plant conditions change dramatically. Operator expertise is lost as older operators retire, making it difficult to maintain the same operation levels. Non-automated equipment requires coordinated operations with field operators, but the operational expertise of field operators is also declining due to retirement. Development of a hybrid automation system combining operational know-how of board operators with control systems will help avoid potential losses as these experienced personnel retire.

Continued on next page.

Monday
October 6, 2008

Plant Automation & Decision Support: Emerging Technologies

1:30 pm – 5:00 pm
National D

Extending Process Automation Through Wireless Technologies
Craig McClure, Honeywell

Innovative refineries are taking advantage of wireless technology to enable both sensing and Wi-Fi applications throughout their plant. Plant-wide wireless coverage enhances applications currently in use and provides an infrastructure for growth to meet demands of tomorrow's refineries. Hear case studies and examples from several key refining companies.

Advanced Diagnostics: Four Steps to Better Decision Making
Bill Zhou and *Andrew Klosinski*, Emerson Process Management

Virtually all dynamic processes have distinctive noise profiles. Applying best practices with new diagnostic capabilities found in HART Pressure Transmitters allows users to receive actionable information for better decision making in the plant.

DCS Migration Panel
TBD

FCC Q&A

1:30 pm – 5:00 pm
National AB

Panelists
Kevin Burton, HOVENSA
Scott Flathouse, ConocoPhillips
Edward MacNeel, Aspen Technology
Jeffery Oberlin, Albemarle Catalysts
Rama Rao, Lummus Technology
Bryan Stephens, Western Refining

See page 21 for questions.

Hydroprocessing Principles & Practices

1:30 pm – 5:00 pm
National C

Presiders
David Brossard, *Chevron*
Steve Mayo, Albemarle Catalysts

Safety Topic – Inert Entry
Gary Everett and *Dave Wilkins*, LyondellBasell

Safe and Effective Shutdowns
Chris O'Connor, Chevron

Thorough planning and strict adherence to safe work practices are key to safe and cost-effective shutdowns.

Feed Effects and Fouling
Steve Mayo, Albemarle Catalysts

Maximum return on investment for hydroprocessing catalyst expenditures necessitates that catalyst activity be the main factor limiting cycle length. It is not uncommon, however, to find cases where pressure drop buildup and/or catalyst fouling limit cycle length. These problems can, in many cases, be traced to characteristics and components of the feedstock. Proper hydrotreater operation, feedstock preparation and catalyst selection are key to minimizing these effects and maximizing hydrotreater performance and cycle length. This presentation will review common feedstock effects on hydrotreater performance. Cycle limiting effects from feedstock on pressure drop and catalyst deactivation by poisoning and fouling will be examined.

Compressor Reliability
TBD, Shell Global Solutions

Tuesday
October 7, 2008

2008 NPRA Q&A Peter G. Andrews Lifetime Service Awards

8:00 am – 8:30 am
National AB

The Peter G. Andrews Lifetime Service Award honors members who have made long lasting contributions to the value and vitality of the NPRA Q&A Meeting. Recipients of this award have served as Q&A Panelists, screening committee members, and, most importantly, active participants in the dialogue that is fundamental to the meeting. During their careers, the recipients have demonstrated a willingness to pass on their knowledge and expertise to future generations in this forum, have made significant contributions to the meeting's quality, and have emphasized the importance of sharing knowledge in making continuous improvements.

Lawrence Lew
Chevron

Glenn Liolios
DuPont™ STRATCO®

Elizabeth Mettee
Grace Davison

Cyber Security Roundtable

8:30 am – 5:00 pm
International III

Lessons Learned from NERC Compliance Initiatives
Andrea Gay, CA, Inc.
Michael Sanchez, Sirius Solutions

The growth in regulatory oversight is affecting all industries, especially Petrochemical and Refining. CFATS from the Department of Homeland Security is one of the latest regulatory mandates and is already having its impact on companies' compliance activities. Can the Petrochemical and Refinery industry learn from the experience of other industries in an effort to minimize the efforts required to comply? Can lessons learned from the Electric Industry and NERC's Cyber Security Regulations be of use? The answer is a resounding, "Yes!" There's nothing like a little experience, whether it's yours or someone else's, to help ease the compliance effort.

Using Historians to Aggregate and Correlate Security Events and Detect Cyber Attacks
Dale Peterson, Digital Bond, Inc.

Control system historians aggregate process data and some can correlate these data to assist with maintenance and key performance indicators. This workshop will show how these same aggregation and correlation capabilities in historians can be used to detect cyber attacks on control systems.

Combining Biometric Multi-Factor Authentication with Certificates for Secure User Log On
John Petze, Privaris, Inc.

One of the weaknesses present in many IT environments is the use of passwords for user authentication. Passwords have been shown to be easily compromised, insecure and costly to manage.

In order to enhance security and respond to increased regulatory pressure, many organizations are looking to multi-factor authentication approaches to confirm the identity of the user. These approaches can help increase security of user logon, but often come with significant impact on IT resources and workload which limits their areas of applicability. This presentation will look at some of the most common modes of multi-factor authentication for IT applications and their impact on IT infrastructure.

DHS – Homeland Infrastructure Threat and Risk Analysis Center (HITRAC) Cyber Security Update
Kristin E. Esbeck, Department of Homeland Security-HITRAC

Addressing Risk in Process Environments
Ryan Wakeham, NetSPI

This presentation will discuss methods for assessing and mitigating risk in process environments.

The Increasing Emergence of Wireless Devices and Cyber Security issues Arising in the Refining and Petrochemical Industry
Garrett Schmidt, Phoenix Contact

The design and implementation of a wireless system in an industrial application has some very important criterion, especially regarding reliability and security. These topics will be addressed in an objective format, focusing on the different wireless technologies that are available and suitable for industrial environments.

Insider Threats – The Greatest Challenge
Winston Krone and *Pat Markham*, SafirRosetti

Attention to the Cyber Security Threat facing members of the NPRA has previously focused on protecting computer networks from external threats which might disrupt business operations or harm physical assets.

However, SafirRosetti/Global Operations has seen a need to reassess insider threats as the increasingly important vulnerability in Cyber Security Threats. While physical damage/business disruption caused by malicious activity or accidents/weather has been quantified and studied in terms of insurance risks and disaster recovery, the potential liability caused by the loss or misuse of confidential data is not fully appreciated.

Rapid Response to Cyber Security Threats
Tim Helming, Watchguard Technologies, Inc.

Plant Automation & Decision Support: Fundamentals of a Business Process

8:30 am – 12:30 pm
National D

Presider
Rich Bowman, TOTAL Petrochemicals USA

Managing Hydrocarbon Losses: What You Don't Know Really Affects the Bottom Line!
Patrick Truesdale, Emerson Process Management

Production accounting for a refinery or petrochemical plant is a complex mixture of business processes: Stock, custody, yield and utility plus even environmental (GHG) accounting. In today's economic environment, poor measurements, practices and control can result in significant financial as well as legal (i.e. environmental, Sarbanes-Oxley, Customs and Excise) impacts.

Daily Production Accounting at Frontier's Cheyenne Refinery
Tina Geyer, Frontier Refining Inc.
Marcela Brina, Soteica LLC

This presentation will describe Frontier Cheyenne's yield accountant experience using the S-TMS Production Accounting System on a daily basis since 2003. The presentation will describe many aspects of the daily operation of the system in the refinery, what errors are typically found and how S-TMS helps to find them. It will also describe how the model is maintained and how the model is adapted to plant changes. In addition, it will touch on the implementation stage of the tool at the site.

Model Based Performance Monitoring
John Righi, ExxonMobil Research & Engineering Co.

Model Based Performance Monitoring enables engineers to monitor and improve the performance of their process unit area. Using the many capabilities of today's commercial simulation/monitoring technology to deliver these monitoring applications is a way of effectively developing and deploying to engineers world-wide.

Your Process Using Normal Operation Data
Hank Brittain, Top Control Inc.

Eliminate the guesswork in control tuning and process optimization by analyzing and tuning control performance in closed-loop conditions without breaking open loops. This paper will demonstrate that with the right tools, it is possible to optimize your process without disturbing production and without need for operators to change mode, change set point, or bump the controller output.

Squeezing the Sulfur out of the Diesel
Clint Dolby, LyondellBasell Industries
Khanh Nguyen, PCN Global Solutions

As the LyondellBasell Refinery in Houston retrofitted two hydrotreaters for ultra low sulfur diesel (ULSD) in 2006 it was recognized that manually controlling sulfur at the new spec (8 ppm) would be challenging. This paper will detail the project, its execution, the application, and the lessons learned. The controller still performs well although a couple of model changes have been required due to changes in catalysts.

On-line Optimization of an Aromatics Plant in a Petrochemicals Complex
Lee Turpin, Turpin Consulting
Nan Ye, Applied Manufacturing Technologies
Woo Jo Lee, Samsung Total Petrochemicals

This presentation will describe the methodology used to create the business plan, define the optimization problem, and implement an on-line optimization solution. The presentation will include discussions of the economic risks and opportunities in a chemical complex purchasing feed stocks on the open market as opposed to a plant integrated with a refining complex.

FCC Principles & Practices

8:30 am – 12:30 pm
National C

Presiders
Rik Miller, ConocoPhillips
Sherard McIntosh, KBR

Safety Topic: Preventing Reactor Vapor Line Light-off During Startup
Bill Wilson, BP

Coke deposits in the FCC reactor and reactor overhead vapor line can ignite as the unit is heated prior to start-up. This can lead to unsafe conditions, aborting the start-up, and potential equipment damage. This brief session will discuss preventive, early detection and corrective measures to address this risk.

How Can We Increase Diesel Production from the FCC?
Joe McLean, BASF Catalysts
Harvey McQuiston, Shaw Stone & Webster
George Curtin, Sunoco

Current product economics which favor production of diesel over gasoline have led refiners to maximize middle distillate (LCO) production from the FCC to help boost the overall refinery diesel output. This workshop will cover feedstock, operating conditions, and catalyst effects on FCC operations in refineries wishing to maximize diesel production. FCC design options for increasing middle distillate yield and impacts on other refinery unit operations will be discussed. The presentation will include operating results from several refineries and industry benchmarking data showing ranges of results which are currently being achieved.

Achieving Flareless FCC Startups
David Brosten, Shell Global Solutions
Neal Cammy, UOP

FCC units have traditionally required some amount of flaring during startup. Due to community impact, environmental regulations, reduction in lost product and a variety of other reasons, achieving a "flareless" startup is becoming required for most refiners. This P&P session will define what a "flareless" startup really means, and how to implement it on both new and existing units. Startup procedures for the FCC catalyst, fractionation and gas concentration sections will be briefly reviewed to highlight those areas that affect flaring during startup. Both "best practice" and realistic compromises will be discussed.

FCC Trends and Best Practices from the 2006 Solomon Fuels Study
Kevin Proops, Solomon Associates

Solomon Associates conducts its Fuels Refinery Performance Analysis every 2 years, most recently in 2006. This presentation will review trends and "Best Practices" related to the FCC. Topics to be covered include yield benchmarking, catalyst makeup, maintenance cost trends, unit availability, and turnaround cost, interval and duration trends.

Crude & Vacuum Distillation and Coking Q&A

8:30 am – 12:30 pm
National AB

Panelists
Dennis Haynes, Nalco Energy Services
Eric Hutchins, Process Consulting Services
Mitchell Moloney, ExxonMobil Research & Engineering
Charles Ross, Frontier Refining
Todd Sandifer, Marathon Petroleum
Prithviraj Sur, Indian Oil

See page 22 for questions.

Crude & Vacuum Distillation and Coking Principles & Practices

1:30 pm – 5:00 pm
National C

Presider
Kevin Sitton, ConocoPhillips
Craig Winslow, GE

Coker Utilization
Matthew Biery, ConocoPhillips

The trend of running increasingly heavier crudes, and more unconventional feeds such as oil sand bitumen, requires increasingly higher utilization of the Delayed Coker. This discussion will examine coker utilization with respect to maximum daily capacity of equipment and reliability of operation. Maximum capacity of the coker unit will be related to the capacity limit of several major pieces of coker equipment. Overall performance and reliability of the coker unit will be examined, including slow-downs or downtime imposed on the coker unit by other refinery processes and by the coker unit equipment.

Crude, Vacuum and Delayed Coker Units – Trends and Best Practices
Kevin Proops, Solomon Associates

Review of selected data from the 2006 Solomon North and South American Fuels Study.

- Mechanical and operational availability;
- Turnaround intervals and durations;
- Impact of turnaround interval on unit maintenance cost;
- Process data, including crude preheat temperature vs. preheat train surface area, heater stack temperatures and oxygen, flash zone temperatures and pressures, and reported vacuum bottoms cutpoint;
- Coke yield vs. feed concarbon.

Design Practices for Optimum Vacuum Tower Performance
Trung Quan, Koch-Glitsch

The session will focus on current design practices to maximize the performance and reliability of the vacuum tower. Key topics that should be considered during evaluation of the vacuum tower should include packing selection, vapor feed distribution, wash bed design and operating variables, and upset protection. Careful attention to good design practices during a project will help ensure that performance and reliability goals are met. These same concepts can also help the unit engineer better understand and optimize the operation of existing towers.

Refinery Corrosion, Organic Acid Structure, and Athabasca Bitumen
Heather Dettman, CANMET Energy Technology Centre
Nana Li and *Jingli Luo*, University of Alberta

Total sulphur content (measured by elemental analyses) and total acid content (measured by total acid number (TAN)) have not been found to correlate well with corrosivity.

A fundamental study of the relationships of molecular structures of sulphur and organic acid compounds to refinery corrosivity is being perfomed. To understand acid species, the corrosivity of homologous series of organic acids with respect to temperature and vacuum are being assessed in a test unit that simulates corrosion found in vacuum distillation towers. The orgranic acids from globally-sourced heavy crude oils and bitumen including Athabasca bitumen are being isolated and characterized. Petroleum corrositivity in terms of different types of organic acids will be discussed.

Solving Opportunity Crude Treatment Challenges
Harold Eggert, GE

This presentation will discuss industry experiences and subsequent “Best Practices” that have been developed over the past several years, to help refineries process heavy opportunity crudes in a cost effective manner. Heavy, more viscous crudes create unique operating challenges that can increase fuel usage, create environmental compliance issues, and increase corrosion in crude fractionator overhead condensing systems. Education and adoption of “Best Practices” can help optimize the improved profit position that these crudes can provide a refiner.

Plant Automation & Decision Support: Real-Time Value Chain Management and Optimization

1:30 pm – 5:00 pm
National D

Presider
Craig Harclerode, OSIsoft

Planning and Scheduling Integration into Suncor's Project Cornerstone
Dean Trierwiler, Haverly Systems, Inc.

Recently, the Canadian Oilsands producer and refiner, Suncor Energy, completed a project, codename: Cornerstone, designed to transform their business through a major investment in people, processes, and technology. Improvements in planning and scheduling software technology and its dissemination throughout the corporation were a key vision of the project. Suncor partnered with Haverly Systems to make this vision a reality. This paper will review the overall planning and scheduling technology goals of Cornerstone and how they were met.

Refinery Production Planning Optimization with Integrated Supply Chain Management
Naveen Kumar Gupta and *Kumud Kumar Jain*, Indian Oil Corporation Limited

This paper describes the business process re-engineering enabling Integrated Supply Chain Management through collaborative multi-layer demand forecast process, matching supply chain planning, improved crude procurement and retro-analysis through feedback process.

Dealing with Crude Supply Problems Requires Quick, Accurate Scheduling Decisions
Robert Hutchings and *Dong Dong*, M3 Technology

Planning and scheduling teams are challenged to optimize the operation of a refinery over a 30 day period to maximize the value of widely varying crudes while meeting contractual gasoline delivery rates and specifications at controlled prices. This paper presents the results of case studies which illustrate the value to be derived from modeling the refinery in a scheduling system that enables optimal crude blending and simultaneous, multi-blend optimization of gasoline over approximately 30-day time horizon and that produces actual daily blend schedule and recipes.

Refinery Supply Chain Management Challenges
Craig McClure, Honeywell

Refiners have been searching for value that can be generated by integrating their supply chains through enterprise systems with minimal success. Perhaps the main problem is the misled focus on reducing costs (an earlier corporate objective) to enabling growth (current objective). But recent implementations suggest another key problem – insufficient trustworthiness of the supply chain management solution, which appears to be caused by a set of challenges, including insufficient accuracy to handle a client-driven supply chain. This paper will present the basics of this growth-driven approach and how to mitigate these challenges, and provide examples of how it has led to significant performance increases in operating refineries.

Automating Terminals, The Refinery Cash Register
Pete Sharpe, Emerson Process Management

Tank farms and terminals represent the point of sale (POS) for a refinery, with stringent custody transfer, quality control and documentation requirements. Inevitably, terminal automation means significant integration with corporate ERP systems, from sales orders to material movements, inventory control and quality certification. As refiners push production capacity, logistics constraints in the tank farm and terminals can often prevent achieving desired performance, cause extra demurrage costs and result in product contamination incidents. This paper will utilize a number of industry examples to illustrate what supply chain integration means for terminals and the value some companies have achieved.

Gasoline Processes Q&A

1:30 pm – 5:00 pm
National AB

Panelists
Richard Grubb, Chevron
Allen Kaiser, Delek Refining
John Metka, Jr., Sunoco
Michael Newton, Roddey Engineering Services
Javier Quintana, Valero Energy
Joe Zmich, UOP

See page 24 for questions.

Plant Automation & Decision Support: The Next Generation Control Room

7:30 am – 9:00 am
National D

Presider
Constantine Lau, Yokogawa Corporation

Next Generation Control Room: "In the Moment" Situational Awareness Drives Better Decisions
Kevyn Renner, Chevron Global Manufacturing

The next generation control room will provide a collaborative work environment for operations to make better decisions based on much enhanced Situational Awareness. This presentation focuses on the underlying technologies that are helping to provide a contextual view of the operating plant, deriving actionable information from multiple data sources and thereby laying a foundation for a proactive/predictive operating philosophy where "in the moment" situational awareness impacts safety, reliability and overall performance.

Gain Working Knowledge of the Operating System: Addressing a Critical Outcome of the Aging Workforce
Eddie Habibi, PAS

Increased global competition within the processing industry has forced process automation suppliers and engineering companies to take steps to streamline their operations and differentiate their operation. For the most part, the tools and work processes in the automation space have been established over two decades ago and present significant opportunity for improvement. PAS has worked as an agent of change with several vendors to revise the work processes with an advanced toolset virtually eliminating paper-based documentation, automating configuration error-checking, and most importantly, enabling remote collaboration between vendor locations, as well as vendors and their customers. This presentation reviews the benefits of changing the work processes and deliverables such that today's infrastructure is used to drive down costs, tighten schedules, and reduce project risks. The presentation includes examples and actual case studies and is a must-see for every processing company engaged or soon-to-be-engaged in any automation work.

Best Practices for Management and Training in an Era of Skills Depletion
Maurice Wilkins, Yokogawa Corporation

Manufacturing industry is faced with an impending crisis. There is an approaching mass exodus of skills from industry due to "Baby Boomer" retirements, with few young people wanting to take up the gauntlet. This paper identifies best practices that major companies are using to recruit new employees, train and retain existing employees and ensure that work is being done in a safe and timely way. It looks at tools being used to enable operations and management staff to have more visibility across the plant and enterprise and the impact that these will have on the control room of the future.

Gasoline Processes Principles & Practices

7:30 am – 11:00 am
National C

Presiders
Wayne Woodard, Valero Energy
Lee Turpin, Turpin Consulting, a division of T-Squared Technologies, Inc.

Safety Topic: LPG Practices
Chris McDowell, Tesoro Petroleum

This safety topic presents refiners with issues related to LPG practices in refineries. The presentation will include a brief review of LPG-related incidents in refineries and their impact on refinery operations. Attendees will discuss where incidents occur and possible causes. LPG handling issues that may not be addressed in routine refinery safety practices will be covered.

Reforming Technology
Wayne Woodard, Valero Energy
Alexander Sabitov, UOP

The process indicators commonly used by the industry may not be sufficient to identify CCR screen plugging in a timely manner. This presentation emphasizes the importance of using peak carbon analysis for the regenerated catalyst. Increased use of the peak carbon concept will improve catalyst life and continuous catalytic reforming unit reliability.

Alkylation Technology
Randy Peterson, DuPont™ STRATCO®
Richard Doss, CITGO Petroleum
TBD, UOP

The alkylation principles and practices session will address troubleshooting problems in both sulfuric acid and HF alkylation units. Identifying symptoms and determining root causes of problems will be emphasized for both technologies

Gasoline Blending
Scott Sayles, KBC Advanced Techologies

The principles and practices session on gasoline blending will be a review of refiners' options for pentanes disposition in future gasoline blending. As ethanol blending increases, high vapor pressure pentanes will be backed out of the gasoline pool and will need to find a new 'home' in the refinery's operations.

Regulations
Terry Higgins, Hart Downstream Energy Services

The presentation will provide an overview of pending gasoline/biofuel requirements and their impacts on gasoline blending. The primary focus will be on MSAT II (benzene regulation) and the Renewable Fuel Standard. The overview will also include an outlook for new regulatory initiatives (lower RVP, aromatics and sulfur).

Plant Automation & Decision Support: Concluding Keynote

9:30 am – 11:00 am
National D

Presider
Blake Larsen, Western Refining

Paradigms – Changing Models for Operator Interface Design
David A. Strobhar, Beville Engineering, Inc.

The paradigms or models that underlie much of the design of operator interfaces are either invalid or will be soon with advances in technology and automation. The impact of abandoning these paradigms on display design, workstation layout, and console staffing will be discussed.

Kevin Burton is a Section Manager in the Technical Services Department for HOVENSA LLC in St. Croix, US Virgin Islands. He oversees the process engineers in the Deep Conversion Complex who are responsible for providing technical support to the FCC, Dimersol, alkylation, sulfuric acid regeneration, delayed coker, sulfur recovery, and Wastewater units. Kevin has 17 years experience in the refining and chemical industries. He has held various roles in process engineering, project engineering, technical sales and service, and management with Mobil Oil, GRACE Dearborn, and HOVENSA LLC.

Kevin holds a BS in Chemistry and a MS in Chemical Engineering from Michigan Technological University.

Scott Flathouse is a Process Engineering Team Leader at ConocoPhillips' refinery in Borger, TX. His current areas of responsibilities include supervision of process engineers in the FCC, alkylation, hydrodesulfurization, and sulfur recovery units. His previous experience at the Borger refinery includes: FCC process engineering and operations support, and energy management including process engineering support for steam, fuel gas, and water systems. Prior to working for ConocoPhillips, Scott worked at Celanese Chemicals in a variety of roles, including process control engineering for distillation operations and production engineering for coal-fired boilers and power cogeneration systems.

Scott received BSChE and MSChE degrees from Texas Tech University.

Richard Grubb has worked for Chevron since 1993. Prior to Chevron, he served in the U.S. Navy and worked for Dow Chemicals. From 1993 to 1998, he worked in Technology Marketing for the Hydroprocessing Team and primarily provided technical service, catalyst management, and new plant proposals for resid processes. From 1998 to present, he has worked in the Pascagoula Refinery on the Reformer Project, paraxylene unit, RDS unit, and hydrogen plants. Currently he is the Senior Process Engineer assigned to Reforming, NHT, Chemicals, and Hydrogen.

Rick graduated from the University of California at Berkeley in 1993 with a BSChE.

Dennis Haynes is an Industry Technical Consultant for Nalco Company, Energy Services Division, Sugar Land, Texas. He is responsible for technical support, program development and application optimization for the company's refinery process chemical programs used in crude management. He has experience in refinery in North America, Europe, Africa, and Asia Pacific.

Dennis holds a BSc degree from the University of British Columbia and has over 16 years of experience in the hydrocarbon processing industry.

Eric Hutchins is a Chemical Engineer for Process Consulting Services, Inc. specializing in revamp design services for the refining industry. Eric has more than 22 years experience in refining with extensive knowledge of the majority of refining processes. His responsibilities at Process Consulting Services include process design, equipment evaluation, unit field performance evaluations and identifying process equipment modifications that improve unit operability, reliability, and profitability. Prior to his work with Process Consulting Services, Eric held a number of positions with HOVENSA/HOVIC in St Croix, U.S. Virgin Islands, most recently Vice President of Technology. In this role, Eric had functional responsibility for diverse groups including Technical Services, Quality Control, Applications Engineering, Design Engineering, Management Information Systems (MIS), Inspection, and a Strategic Reliability Department.

Eric holds a BSChE from the University of New Mexico.

Allen Kaiser currently serves as the Process Engineering Group Lead for Delek Refining's facility in Tyler, Texas. He is responsible for directing the short- and medium-term efforts of the process engineering and technical support staff in the refinery. In addition, Allen has primary process engineering responsibility for the FCCU and sulfuric acid alkylation units. Prior to Delek, Allen worked as a Process Engineer and Technical Services Supervisor for Coffeyville Resources in Coffeyville, Kansas. During his time there, he performed daily process support and was involved in capital improvement projects for the crude, vacuum, hydrotreating, catalytic reforming and isomerization, FCCU, and HF acid alkylation units.

Allen holds a BSChE and a MSChE from Texas Tech University.

Max Lawrence is Hydroprocessing Advisor for Shell Global Solutions in Houston, TX. His responsibilities include delivering technical support to a variety of hydroprocessing units in the SOPUS and MOTIVA refineries and providing Process Engineering consulting services to Shell GS third party clients. Max started his career with Fluor Engineering Companies as a Process Engineer. After more than 20 years, including multi-year international and domestic assignments, Max retuned to Houston to work for Akzo Nobel in their catalyst marketing organization providing sales and technical support to users of hydroprocessing and FCC catalysts.

Max holds BS and MSChE degrees from Rice University.

Edward MacNeel, a Principal Advisor with Aspen Technology, is Aspen Tech's advanced process control (APC) best practice leader with experience in over 50 FCC's worldwide. He has over 30 years of experience in refining and chemicals in various roles including process engineering, technical support to operations, start-up support, process design, process control support to process engineers, project leadership in numerous APC FCC projects worldwide, and technical management. He worked for Shell Oil Company at several US locations and for Royal Dutch Shell, The Hague. He joined DMCC in 1992 which then merged with Aspen Tech in 1996.

Ed holds BSChE and Chemistry degrees from the University of California, Santa Barbara and completed all MSChE course work at LSU.

John Metka is a Lead Technical Services Engineer for Sunoco's Northeast Refining Complex. The Technical Services group consists of unit process engineers who are responsible for supporting Sunoco Northeast refining operations through process unit monitoring, optimization, troubleshooting, and small project development. John has experience in reforming, alkylation, isomerization, hydroprocessing, petrochemicals and process design. John has worked in the petroleum industry for more than 16 years. He has served in various technical services, operations, process design and process development roles for Sunoco and Foster Wheeler USA Corp.

John holds BSChE and MSChE degrees from Tufts University.

Mitchell Moloney is the Delayed Coker Best Practices Network Leader for ExxonMobil Research & Engineering in Fairfax, VA. Mitchell has 30 years combined experience with both Exxon and Mobil. His previous experience includes: Facilities Design Engineer, Process Engineer and Resid Upgrading Specialist, Delayed Coking and Visbreaker Specialist.

Mitchell holds a BSChE from Princeton University.

Michael Newton is Sr. Vice President for Roddey Engineering Services where he is involved in the monitoring of operations for many fixed-bed reformers, hydrotreaters, and crude units. He also has extensive experience in fixed-bed reformer catalyst regeneration. Michael is a licensed Professional Engineer and has been involved in the process design or revamp of hydrotreaters and fixed-bed reformers.

Michael graduated from Louisiana Tech University with a BSChE.

Jeffery Oberlin is the FCC Technical Service Manager of the Americas at Albemarle Corporation. He started his career with Amoco Oil Company in the Catalysis division of Research and Development. After nine years at Amoco, ultimately working in the FCC testing and technical service department, Jeff moved to a technical service engineer position with Akzo Nobel, currently known as Albemarle Corporation, and has over 10 years experience at Albemarle.

Jeff holds a BSChE degree from Purdue University.

Charles Olsen is the Worldwide Technical Services Manager for ART. He has over 20 years of experience in hydroprocessing and has held a variety of technical service, research and technical management positions in Chevron and Grace Davison before joining Advanced Refining Technologies.

Charles holds a BSChE from the University of Minnesota, and MSChE and Ph.D in Chemical Engineering from the University of Illinois in Champaign-Urbana.

George Papoutsis has been with CITGO since 2001 and is currently the Process Technical Manager at CITGO's Corpus Christi, TX Refinery. George started with CITGO as a Process Engineer in the Petrochemicals Area and later held several positions in the Business Planning and Optimization Group. George's career began 18 years ago in UOP's career development program as a Development Engineer in Riverside, IL. He then spent five years in UOP's Field Operating Services Department as a Technical Advisor and Chief Technical Advisor, providing international as well as local technical service and support in both fuels and petrochemical technologies. He also spent a few years performing process and project work in the Light Fuels, Olefins and Derivatives Department.

George received his BSChE from Northeastern University.

Javier Quintana is the Director of Reforming, Isomerization and Aromatics Technologies at Valero Energy Corporation, and has been involved in developing and implementing Valero's MTBE phase-out strategy, and providing technology support to Valero's naphtha assets. He is a Technology Advisor in Valero's Strategic Development and Technology Group. Javier's primary responsibilities include developing capital projects in support of Valero's strategic objectives, including MSAT II regulatory compliance projects and further integration into aromatics production. Prior to joining Valero, Javier worked with UOP LLC for 22 years,

Javier holds a BSChE from Rensselaer Polytechnic Institute and MBA from Northwestern University's Kellogg School of Management.

Rama Rao is a Principal Process Engineer at Lummus Technology, a CB&I Company, Houston. He is presently working in the area of FCC process design, development and technical services. He has over 15 years of experience in this field.

Before joining Lummus Technology last year, Rama was working for Reliance Industries Limited where he was responsible for optimization and troubleshooting of 200 KBPSD FCC unit that was maximizing propylene production.

Prior to Reliance, he worked for 13 years with Research and Development Center of the Indian Oil Corporation Limited (IOC), India and was involved with R&D activities related to the FCC Technology and providing technical services to a number of IOC FCC units. He is the co-inventor of the Indmax FCC process developed by IOC R&D center for converting heavy feeds to light olefins. He was involved with the design and commercialization of the first Indmax FCC unit and he has about 8 patents and 17 publications/papers to his credit.

Rama has a MSChE from Indian Institute of Technology, Kanpur, India.

David Rapavi is a Supervisor in the Technical Services Department for HOVENSA LLC in St. Croix, US Virgin Islands. He oversees the process engineering group in the Base Refinery Complex which is responsible for providing technical support to the crude units, vacuum units, hydrotreaters, reformers, Sulfolane unit, and utilities. David has 11 years experience in the refining and chemical industries. He has held various roles in process engineering, project engineering, operations, and management with the Nepera Chemical Company, Inc. and HOVENSA LLC.

David holds a BSChE and a MSChE from the New Jersey Institute of Technology.

Chuck Ross is the Process Engineering Manager for Frontier Refining Inc. in Cheyenne, Wyoming where he supervises a team of engineers providing process designs for capital projects and refinery operations technical support. Prior to joining Frontier in 2005, he held a number of process engineering positions including those with Roddey Engineering Services, Saudi Aramco's Ras Tanura Refinery, Williams' Alaska North Pole Refinery, and Sinclair Refining in Sinclair, Wyoming.

Chuck earned a BSChE from the University of Wyoming and a MSChE from Oklahoma State University.

Todd Sandifer is the Technical Services Manager at Marathon's Catlettsburg Refinery. He is responsible for the Process Engineering, Process Design, and Process Controls groups. Todd has 18 years experience in process engineering, strategic planning, operations area management, and planning and economics management.

Todd holds a BSChE from Mississippi State University.

Steven Souers is the Hydrocracking Network Team Leader for Chevron where he is responsible for developing the annual business plan and focusing network team members on delivery of results and technical expertise for Chevron's worldwide hydrocracking operations. Steve spent most of his first 10 years in the corporate Hydroprocessing group providing technical support and services to Chevron facilities and licensees before transferring in 1987 to the Port Arthur refinery where he held a variety of assignments in Technical and Operations. In 1995 Steve transferred to the Pascagoula refinery as the resident expert in hydroprocessing where he provides technical expertise for two hydrocrackers and six hydrotreaters. He has been serving as Chevron's Hydrocracking Network Team Leader since 2004. Steve has worked for Chevron for over 30 years.

Steve holds a BSChE from the University of Illinois and is a registered professional engineer in Texas and Mississippi.

Bryan Stephens is the Director of Operations and Process Services for Western Refining in Yorktown, VA. His previous assignment with Western was the position of Operations Director at their El Paso Refinery. Before joining Western, he worked for Valero Energy in several roles including Director of Engineering and Director of Operations at the Texas City Refinery. Prior to his Valero experience, he worked for several other companies including Mobil Oil and Murphy Oil in process engineering, economics and planning, and operations.

Bryan has a BSChE from the University of Mississippi and an MBA from Louisiana State University.

Edwin Yuh is a Senior Hydroprocessing Specialist in the Process Technology and Equipment group for UOP. Since joining UOP in 1979, Edwin has had assignments in Research & Development, Field Operating Services and Operating Technical Services. In his current position, he is responsible for providing technical support to UOP hydroprocessing units including establishing operating procedures, home office support for checkout and commissioning of new and revamped hydroprocessing units, troubleshooting and training. Edwin also provides support to UOP's engineering, research and project sales activities.

Edwin holds a BSChE from Columbia University and a MSChE from Northwestern University.

Joe Zmich is Senior Manager of the Gasoline Technologies Service & Sales Support department in the Catalysts, Adsorbents, & Specialties SBU of UOP LLC. He manages the group responsible for providing technical support to UOP licensees in all aspects of naphtha hydrotreating, Platforming, and isomerization technologies providing advice to improve profitability through operating conditions, feedstock processing, hardware change recommendations, monitoring conditions, unit performance reporting, catalyst selection, troubleshooting, turnaround support, and regeneration.

Joe holds a BSChE from Purdue University.

NPRA Q&A Screening Committee
The Q&A Screening Committee is a forum where NPRA members can discuss operations in the refining and petrochemical industries with special emphasis on process technology. The Q&A Screening Committee and panelists met on June 23-25 in Austin, TX, where the Committee selected 98 questions deemed most interesting and beneficial to the conference from those submitted. If you submitted questions which are not adequately covered by the selected questions, you may still present them from the floor during the appropriate session of the Q&A session. The following are members of the 2008 Screening Committee:

Matthew Baebler, Tesoro Corporation
Vito Bavaro, Shell Global Soluntions U.S.
David Brosten, Shell Global Solutions U.S.
Tim Campbell, Axens North America
Robert Carpenter, GE
Bill Cates, Hunt Refining Company
Ken Chlapik, Johnson Matthey Catalysts
Geri D'Angelo, Advanced Refining Technologies
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Warren Letzsch, Shaw Energy & Chemical
Larry Lew, Chevron Corporation
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Sam Lordo, Nalco Energy Services
Sonny Loudon, CITGO Petroleum Corporation
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Chris McDowell, Tesoro Corporation
Sherard McIntosh, KBR
Brad McKain, Marathon Petroleum Company
Joseph McLean, BASF Catalysts
Harvey McQuiston, Shaw Energy & Chemical
David Mendrek, Murphy Oil USA, Inc.
Rik Miller, ConocoPhillips
Paul Moote, Sinclair Oil Corporation
Brian Moyse, Haldor Topsoe A/S
Donald Mulraney, CB&I
Mart Nieskens, Shell Global Solutions U.S.
Fernando Oliveira, Petrobras
Kenneth Peccatiello, Valero Energy Corporation
Roger Pelham, Pelham Consulting
Randy Peterson, DuPont™ STRATCO®
Ron Pinaire, Flint Hills Resources, LLC
Kevin Proops, Solomon Associates
Javier Quintana, Valero Energy Corporation
Kerry Rock, CDTech
Bob Roddey, Roddey Engineering Services, Inc.
Gene Roundtree, ExxonMobil Research & Engineering Company
Glen Scheirer, ExxonMobil Research & Engineering Company
Kevin Sitton, ConocoPhillips
Jeff Spearman, Barnes and Click, Inc.
Bryan Stephens, Western Refining Company
Brent Stratton, Valero Energy Corporation
Russell Strong, Champion Technologies Inc.
Ralph Thompson, Chevron Corporation
Michael Toole, United Refining Company
Sal Torrisi, Criterion Catalysts & Technologies, USA
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Keith Whitt, Shell Global Solutions U.S.
Bill Wilson, BP Products North America
Craig Winslow, GE
Wayne Woodard, Valero Energy Corporation
Jeff Hazle, NPRA

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Chair

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Paul Sheth, Holly Corporation
BC Spear, BP Whiting
Loren Uden, LyondellBasell Industries
Marc Westbrock, Flint Hills Resources LLC

Hydroprocessing

Safety

1. What are your experiences taking reactor effluent samples? What safety issues do you consider when taking samples? What do you consider to be best practices?

2. Do you re-evaluate your unit operating procedures at regular intervals? How often? What principles/standards are these procedures reviewed against?

3. Have you experienced an uncontrolled exotherm in a hydrotreater when processing coker naphtha, light or heavy coker gas oil, or streams derived from synthetic crudes? Describe this event. What was damaged as a result of this exotherm? What are the remedies to avoid a re-occurrence?

4. What level of change in feed quality or product specification would trigger a management of change (MOC)?

5. What measures do you recommend to ensure that personnel are not exposed to hazardous materials such as nickel carbonyl, Ni(CO)4, or arsenic-contaminated dust during and after reactor shutdown?

6. What are the conditions that require activating a high rate depressurization on a hydrocracker? With regard to temperatures, which is the governing value, rate of change or absolute level? If voting logic is used, how is it implemented?

Process

7. What best practices do you recommend for ensuring reliable level measurements in the cold high pressure separator? Please comment on shielded taps, magnetic float indicators, radar detectors, and others.

8. Is ultra-low sulfur kerosene (ULSK), i.e. with less than 15 ppm sulfur, suitable for the jet fuel/kerosene pool? If not, what are the issues? Are there new operational issues that arise when operating a jet/kerosene unit in ULSK mode? Have you encountered any problems when switching from conventional jet/kerosene to ULSK operation and back?

9. Synthetic Canadian crudes are of increasing importance in the U.S. Have there been significant issues when processing Canadian crude-derived feedstocks? Specifically, are there any known catalyst fouling mechanisms, deactivation, and/or product quality issues?

Catalyst

10. Catalyst Supply/Availability Update – Panel and Audience Comments

11. Large quantities of spent ultra-low sulfur diesel (ULSD) catalyst will soon be coming available. What are the options for reuse? How successful has regeneration, rejuvenation, or reactivation of Type II sites been?

12. What specific variables guide your selection of catalyst type for ULSK production?

ULSD

13. What technologies are available for finding leaks in feed/effluent exchangers and what are the detection levels? Is seal welding of tubes required to prevent significant leaks?

14. For ULSD units, what product specifications besides sulfur content (e.g. API uplift, cetane number, cetane index, endpoint shift, aromatics, or others) govern unit operation? For these product properties, what magnitude of improvement have you experienced?

15. What are the causes of off-spec color problems at end of run (EOR)? How does EOR operation affect other product properties, yields, and hydrogen consumption? What unique or novel approaches have you used to overcome these problems?

16. Comment on the use of additives, dewaxing catalyst and associated operating conditions, or feed management to address ULSD cold flow properties.

17. What are the issues associated with co-processing naphtha and distillate in the same unit with the objective of simultaneously producing ULSD and reformer feed? Comment on fractionation strategies, EOR constraints, contaminant issues (e.g. silica, arsenic, nitrogen), or other considerations.

18. What are you doing to maximize diesel production? Comment on strategies such as feed diet, conversion, and fractionation techniques.

19. What reactor temperature strategies are you using for multi-bed ULSD reactors?

20. What operational changes are required to produce full-boiling range ULSD directly from the FCC pre-treat unit? Please describe your operating experiences (for audience).

Technology

21. What fuel specification changes do you anticipate for kerosene, diesel, and fuel oil?

22. Describe your experiences with variable frequency (VF) electric drivers for recycle compressors and compare them to steam turbine drivers. What are the advantages of each type of driver?

23. What is your experience with and acceptance of high efficiency plate exchangers in high pressure hydrotreating service?

24. New regulations on reducing total sulfur levels in refinery fuel gas present what challenges for conventional treating processes such as mercaptan extraction, amine, etc.? What hydroprocessing technologies can reduce sulfur to less than 40 ppm as required by the California South Coast Air Quality Management District (SCAQMD) regulations?

Hydrocracking

25. If you want to maximize diesel production, what vacuum gas oil (VGO) hydrocracking unit configuration do you recommend for maximizing conversion to diesel? What are the technical hurdles? Alternatively, can you maximize distillate yield just with a catalyst change? What are the strategic considerations and potential pitfalls of converting from naphtha to diesel-selective operation?

26. What catalytic solutions are available for cold flow property improvement in a high conversion and/or mild hydrocracker?

27. What technologies are available to upgrade light cycle oil (LCO) and/or heavy cycle oil (HCO) in hydrocrackers? What are the processing conditions for these feeds (catalyst type, hydrogen partial pressure, temperature and/or pressure)? What product yields and product qualities have you realized?

FCC

Safety

28. Following a shutdown from a power or utility loss, what are your general guidelines and recommended practices for:
    - Unloading coked or oil-soaked catalyst from the reactor;
    - Unloading partially regenerated catalyst from the regenerator?

29. What start-up precautions do you take to avoid water vapor over-pressure events in the slurry circuit of the main fractionator bottoms?

30. What are the benefits of reactor vapor line sampling and what safety issues have to be considered?

Catalyst

31. For refiners who do not have in-house catalyst evaluation capabilities, how are catalyst selections made? Discuss: frequency of evaluations, use of testing results from catalyst suppliers or third party laboratories, back-to-back unit trials, and catalyst change post-audit practices.

32. When would you consider using a catalyst additive to address fluidization problems?

33. How much gasoline sulfur reduction can be achieved with the use of additives? Have you seen sulfur reduction in the LCO fraction? How well do these additives perform? Where does the sulfur end up?

Environmental

34. On some older FCC units' designs, relief valves on the reactor and main fractionator discharged to the atmosphere.
    - What are the current design practices?
    - What are the drivers and economic implications of modifying an older system to be consistent with these current design practices?

Process Technology

35. What is the minimum information with regard to feed properties required to predict FCC yields?

36. What are the key parameters that determine coking and fouling tendencies of the main fractionator bottoms circuit? How have you established the target values for these key parameters? What are typical values for these key parameters?

37. What are the typical sulfur contents of FCC products for various FCC feed types and sulfur levels?

38. How often do you evaluate upgrading the FCC's process technology versus a maintenance-only turnaround? Is this considered every turnaround cycle?

39. What energy key performance indicators (KPIs) do you monitor for the FCC?

40. What are the options for increasing capacity of the main air blower?

Reliability

41. Both blinds and valves have been used to isolate the reactor from the main fractionator. What has been your experience with each?

42. The use of hydrogen induced cracking (HIC) resistant carbon steel has successfully mitigated hydrogen blistering and wet H2S cracking over the last few years. We have been running about six years without any internal surface blistering. What future inspection requirements should be put in place? How often should the equipment be inspected and which inspection practice should be followed?

43. What methods and best practices do you recommend for on-line cleaning of equipment in flue gas service (e.g. flue gas coolers, boilers, SCRs, ESPs, etc.)?

44. What type(s) of isolation valves do you use for the wet gas compressor? How are they actuated?

45. What is an acceptable range for wt% ash in the main column bottoms circuit, what values are typical, and what is the significance of particle size distribution (PSD)? What types of slurry pumps have proven reliable in this service?

46. What are the key parameters that influence your company's philosophy regarding replacement of refractory in a coking environment? Are these parameters different for cast, gunned, or packed refractories? Discuss recent developments in refractory that improve refractory service life in coking environments.

47. For refiners who operate reactor strippers with structured packing, describe the mechanical condition of this equipment when inspected during turnarounds. Were any repairs or changes required?

Crude & Vacuum Distillation & Coking

Safety

48. What precautions do you take when sampling hot streams such as reduced crude or streams which contain high concentrations of hydrogen sulfide?

49. How do you maintain availability and reliability of coke drum relief valves? What inspection frequency and mitigation strategies are adequate to minimize accumulation of coke in the relief valve inlets?

Desalting

50. What are some of the issues with respect to desalting bitumen-derived crude? Specifically, discuss BS&W and salt, and methods to enhance their removal.

51. List the sources that you use for desalter wash water and the advantages and disadvantages of each water source.

Atmospheric Distillation

52. How do you design hot-end crude preheat exchangers (crude vs. gasoil or resid) that stay clean between turnarounds? What fouling factors are calculated in these services for well-designed exchangers? Is crude oil typically on the tube or shell side? What were the important design criteria: high velocity/pressure drop; unconventional exchanger types (spiral or twisted tube bundles); or something else?

53. What are you doing to mitigate the impacts of processing bitumen-derived crudes on preheat train fouling, furnace operation, and fractionation performance?

54. Given current diesel margins, how are you modifying crude and vacuum tower operation to maximize distillate yields and minimize “650°F minus” give away to FCC feed? Discuss the impact on atmospheric gas oil (AGO) and vacuum gas oil (VGO) recovery.

55. When maximizing distillate production, the temperature profile in the atmospheric crude tower changes. How do you determine a lower limit for the overhead temperature? What criteria are most important? What do you do to mitigate salt deposition and corrosion inside the tower and under external insulation?

56. What practices do you employ, both operational and mechanical, to limit or avoid liquid carryover in the overhead of the atmospheric crude tower?

57. Traditionally, total acid number (TAN) has been used to indicate the corrosion potential of crude oils and product streams. What other indicators are you using and what operating windows, with and without chemical treatment, have you established for these indicators?

58. The old rule of thumb for gas velocity through air cooled fin fans of 20 fps was a limit specifically for hydrocrackers. What is the allowable gas velocity through fin fans in other wet services such as crude units and cokers? How did you determine this limit and how do you monitor it?

59. How is jet fuel processed downstream of the crude unit? If it is caustic treated, have you experienced color or low conductivity issues? Is there potential for stratification in the finished product tank?

Vacuum Distillation

60. What are some proven design practices and operating guidelines to minimize vacuum tower wash bed coking? What are the most reliable methods for calculating the true over flash in the vacuum tower?

61. What types of instrumentation, analysis, and controls are needed for monitoring the vacuum tower wash bed to ensure maximum run lengths and yields?

62. What are some common causes for reduced vacuum system performance? Wax? Elemental sulfur? What do you do to predict, detect, and prevent performance degradation?

Q&A and Technology Forum: Questions 63 – 69

Notes

Coking

63. What crude and/or resid properties and plant operating parameters predict delayed coke quality, e.g. volatile combustible material, shot coke, Hargrove Index, or others?

64. What operating practices have you used to minimize vapor emissions (i.e., light hydrocarbons) when opening coke drums to the atmosphere?

65. How do you predict whether a delayed coker drum has hot spots or is ready for a blowout?

66. What are your current experiences with coke drum life and how do you measure and monitor their condition? What on-line inspection techniques do you use? What improvements have been made to coke drum design and what techniques are used to replace them? What parameters are specified for drum cycle management to optimize unit production and drum life?

Utilities

67. Recovery of heat from overhead condensing systems is typically limited by temperature difference and available cold sinks. A good sink is treated, demineralized water to feed water to deaerators. Discuss:
    - Current temperature of deaerator feed water.
    - Experience with existing waste heat recovery systems to preheat deaerator feed water.
    - Economic payouts to further increase deaerator feed water temperature by recovering heat from overhead condensing systems.
    - Rebalancing the steam system to utilize steam backed out of the deaerators.

68. If you were adding new boilers to the refinery, what boiler design criteria would you consider and how do they relate to water quality requirements? What quality measurement do you use and what water preparation process would you recommend, e.g., softener, reverse osmosis (RO), demineralizer, etc.?

69. How do you evaluate and control the risk of Legionnaires' disease in your facility?

Gasoline Processes

Safety

70. How frequently do you have fires on reformer reactor flanges? What bolting techniques and gasket types do you use to prevent leaks? What other fixes, such as flange resurfacing, have you employed? Do you use steam rings as a temporary fix?

71. Is your company planning to install modified HF acid capability (usage of a volatility suppressing additive)? What are the incentives for doing this? What alternatives have you considered?

Alkylation

72. What feed contaminants can lead to metal corrosion in both sulfuric acid and HF alkylation units? What operating conditions promote corrosion? What do you do to reduce corrosion and/or remove contaminants?

73. Does alkylate volume yield decrease if T90 increases? Have you quantified the costs and benefits of reducing T90 by changing reaction conditions?

74. Have you experienced a shortage of KOH supply for your HF alkylation unit? Are you concerned about KOH availability? What are your alternatives if KOH is unavailable?

75. The butane stream from a catalytic polymerization (cat poly) unit which contains 69% isobutane, 14% butylenes, and 17% normal butane would appear to be an excellent alkylation unit feedstock, especially if isobutane is in short supply. In the case where the cat poly unit uses solid phosphoric acid (SPA) catalyst, what are the consequences of having trace amounts of phosphoric acid in the alkylation feed? Do you have a rule of thumb for estimating the increase in acid consumption based on phosphoric acid concentration in the feed? Are you aware of any refiner which has fed a cat poly butane stream to an alkylation unit?

76. The regeneration of feed dryers/sulfur guard beds on butane isomerization units generates a butane slop stream. Will processing this butane slop stream in an HF or sulfuric acid alkylation unit cause any problems? If so, what else may be done with this slop stream?

77. What is your experience with cooling water exchangers in an HF alkylation unit? How long do you go between cleanings? Do you have a special water treatment program for cooling towers dedicated to the alkylation unit?

78. For HF alkylation units, have you changed your criteria for materials given the low availability of low carbon/non-recycled steel? Are you heat treating welds? Can you control Brinell Hardness with welding procedures? For small bore pipe, do you recommend using flanges or threaded pipe?

Blending

79. It has been reported that di-isobutylene (isooctene) causes a stability problem when blended in gasoline. Do you have experience blending di-isobutylene in gasoline and, if so, were there stability or other problems?

Isomerization

80. Where in the isomerization reactor catalyst bed does the hydrogenation of benzene (exothermic) occur? How does this affect the other isomerization reactions? What concentration of benzene in the isomerization feed is acceptable?

81. Has the optimum feed for light naphtha isomerization units changed given that: 1) ethanol blending reduces the octane value of other blendstocks; 2) the demand for premium gasoline is down; and 3) ethanol blending increases RVP compliance costs? Are you removing pentane from the isomerization unit feed stream or shutting down the unit? Or, are the units still valuable for isomerizing normal hexane and saturating benzene?

82. In light of coming benzene regulations, are you using (or planning to use) the isomerization unit for benzene conversion? How does this affect isomerization catalyst performance and unit operation? How does this affect the gasoline pool? How does benzene saturation in an isomerization unit compare to a dedicated benzene saturation reactor/catalyst?

Petrochemicals

83. Since Sulfolane-based aromatic recovery units are experiencing corrosion related problems, are there alternative solvents available? What are the advantages and disadvantages of these alternatives?

84. What is your experience with cleaning multi-upcomer trays in aromatics extraction service? What cleaning methods are most effective?

85. Olefins that are formed in the catalytic reforming process must be removed or converted when the reformate is processed in an aromatics extraction unit. Historically, what unit operations have been used to remove/convert the olefins in the reformate? Are there any good alternatives to clay treating? How do the alternatives compare to clay treating with respect to capital cost, maintenance, operating cost, environmental impact, and effectiveness of olefin removal? What can you do in the reformer to reduce olefin production?

Catalytic Reforming

86. The reformer's feed properties can be affected when the refinery is maximizing refinery diesel yield. How do these changes to reformer feed affect performance with respect to C5+ yield, hydrogen production, cycle length, and economics?

87. Iron contamination of CCR, cyclic, and semi-regen reformer catalyst is a common problem. What level of iron concentration typically justifies catalyst replacement due to poor catalyst performance?

88. What is your experience with feed side fouling on combined feed/effluent (CFE) exchangers? What is the foulant? How often do you clean them and what cleaning techniques do you use? On Texas Towers (vertical shell & tube exchangers), how do you extract the bundle from the shell if it gets stuck?

89. What are the typical problem areas for CCR catalyst circulation loops? What are the most reliable valve types? How frequently do you conduct fines surveys and what is a reasonable range for fines make?

90. What determines the minimum feedrate for a fixed bed reformer? What process indicators would tell you that the feedrate is too low?

91. In a catalytic reformer with a given pressure, severity, and feed quality (N+2A), what are the major factors that determine the C5+ yield? How do you optimize yield? Have you quantified the impact of pentane and/or hexane content in the feed?

92. What criteria do you use to determine end of run (EOR) catalyst life for a CCR? How many regeneration cycles have you achieved between catalyst replacements?

93. On a CCR, what causes the regenerator chlorination zone to plug off before the regeneration zone?

94. In monitoring catalytic reformer operation, how often do you perform a feed/product analysis and what analytical methods do you use? How often do you perform a mass balance and what is the acceptable mass balance closure? What is a typical mass balance closure?

95. How often do you perform CCR and cyclic reformer turnarounds? What determines the turnaround interval? What actions can you take to extend the turnaround cycle?

96. How do you manage sulfur in the feed to a catalytic reformer? What is the minimum allowable sulfur for CCR, semi-regen, and cyclic reformer feeds? What are your sampling frequencies and allowable ranges? What is your experience with carburization and/or metal-catalyzed coking?

97. What technologies and adsorbents are you using for net hydrogen off gas chloride traps and what operating problems have you experienced? What are the criteria for changing out the adsorbents and how often are the beds changed?

98. What metallurgy are you using for mesh pads in reformer compressor suction knockout drums? How often are the mesh pads inspected and how often are they replaced? Are the same criteria used for mesh pads in product separators?

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