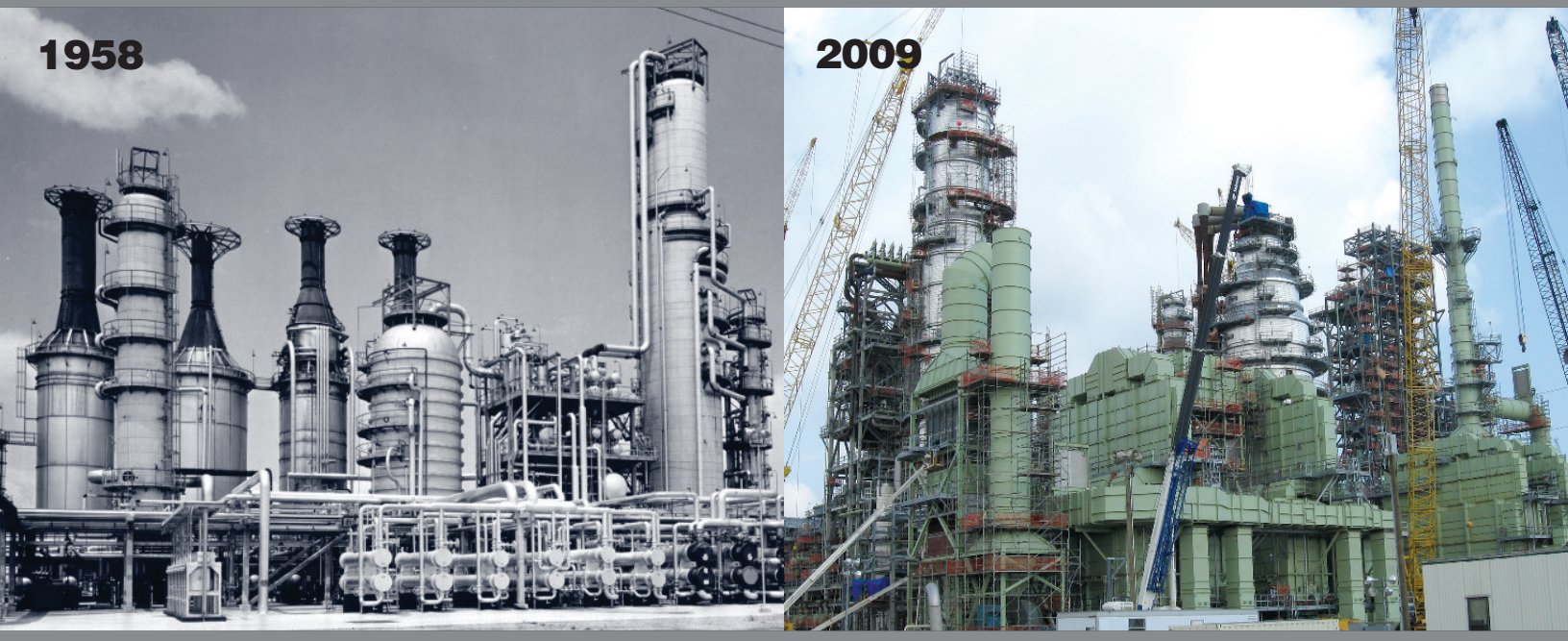
Fort Worth, Texas

2009 NPRA Q&A and Technology Forum

Omni Fort Worth Hotel
Fort Worth, Texas
October 11 – 14, 2009



NPRA

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Cover photos courtesy of Motiva Enterprises, Port Arthur, Texas (1958) and Marathon Oil Corporation, Garyville, LA.(2009). Marathon will complete a major expansion of the Garyville refinery this fall.

Schedule of Events

Sunday	**October 11, 2009**	
5:00 pm – 7:00 pm	Registration Meet and Greet	Ballroom Prefunction

Monday	**October 12, 2009**	
7:00 am – 6:30 pm	Registration	Ballroom Registration
8:00 am – 8:45 am	• General Session	Texas F
	• Keynote Address and Presentation of the Lifetime Service Awards	Texas F
8:45 am – 12:00 pm	• Energy P&P	Texas F
	• Blending, Biofuels, and Product Quality P&P	Fort Worth 1-4
9:00 am – 10:00 am	• Plant Automation: Plenary Session	Fort Worth 5-8
10:00 am – 10:15 am	Coffee Break	Ballroom Prefunction
10:15 am – 12:00 pm	Plant Automation: Fundamentals I	Fort Worth 5-8
12:00 pm – 2:00 pm	Lunch in Exhibit Hall	Texas A-E
2:00 pm – 5:15 pm	• Gasoline Processes Q&A	Texas F
	• FCC P&P	Fort Worth 1-4
	• Plant Automation: Fundamentals II	Fort Worth 5-8
3:15 pm – 3:30 pm	Refreshment Break	Ballroom Prefunction
5:15 pm – 6:30 pm	Reception in Exhibit Hall	Texas A-E

Tuesday	**October 13, 2009**	
7:00 am – 5:00 pm	Registration	Ballroom Registration
8:00 am – 8:45 am	General Session: Keynote	Texas F
8:45 am – 12:00 pm	• FCC Q&A	Texas F
	• Gasoline Processes P&P	Fort Worth 1-4
	• Plant Automation: Filling Knowledge Gaps	Fort Worth 5-8
10:00 am – 10:15 am	Coffee Break	Ballroom Prefunction
12:00 pm – 2:00 pm	Lunch	Texas A-E
2:00 pm – 5:15 pm	• Crude & Vacuum Distillation and Coking Q&A	Texas F
	• Hydroprocessing P&P	Fort Worth 1-4
	• Plant Automation: Cyber Security	Fort Worth 5-8
3:15 pm – 3:30 pm	Refreshment Break	Ballroom Prefunction

Wednesday	**October 14, 2009**	
7:30 am – 8:00 am	Continental Breakfast	Ballroom Prefunction
7:30 am – 10:00 am	Registration	Ballroom Registration
8:00 am – 11:00 am	Plant Automation: Enabling the Real-Time Enterprise (Why IT Matters)	Fort Worth 5-8
8:00 am – 11:15 am	• Hydroprocessing Q&A	Texas F
	• Crude & Vacuum Distillation and Coking P&P	Fort Worth 1-4
9:15 am – 9:30 am	Coffee Break	Ballroom Prefunction

2009 NPRA Q&A and Technology Forum

Even more than usual, the emphasis in 2009 is on operating efficiently and reducing production costs. Companies are focused on squeezing out nonessential costs to ensure their survival through the present economic downturn and taking a conservative approach to operations. The **2009 NPRA Q&A and Technology Forum** recognizes that priorities have shifted to maximizing the effectiveness of the resources that you already employ so the program addresses today's problems and challenges and helps you sort through potential solutions as you discuss these issues with panelists and other attendees. Today's competitive refining environment requires attention to process safety, superior technology, innovation, and efficient 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 can help steer you through the economic storm.

One of the emphases of the 2009 Q&A and Technology Forum program will be 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 to give attendees the industry's most comprehensive meeting on process technology and the optimization of refinery operations. This year the program includes an Exhibition which will showcase catalyst, chemical, and technology providers, engineering companies, licensors and other industry suppliers in one convenient location. As usual, the 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 while the Principles & Practices (P&P) 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 complements the Q&A sessions. Finally, the Plant Automation & Decision Support sessions will provide plant automation and information technology professionals a comprehensive program on the latest developments in this rapidly evolving field.

All attendees who register for the Q&A and Technology Forum will be able to attend any of the Q&A, Plant Automation, or P&P sessions, as well as the luncheons and reception in the exhibit hall. You will have more program choices and be able to structure your own 'personal' program from the diverse elements available in the different sessions.

Q&A Sessions

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 and environmental; desalting; furnace operations; distillation; coke product quality; and coker yields, throughput, and operations);
- Fluid catalytic cracking (FCC) (safety and environmental; catalyst; mechanical and reliability; and process);
- Gasoline processes (safety; alkylation; biofuels; blending; hydrotreating; isomerization; petrochemicals; and reforming);
- Distillate hydroprocessing (process safety; biodiesel; catalyst contaminants; corrosion; design issues; hydrocracking; pressure drop; and start-up/shutdown operations)

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.

The Questions

Each of these topics is important to the industry and the panel-led discussion will provide valuable guidance in operating safely, solving technical and operational challenges, improving the bottom line, and attaining excellence.

Others in the industry have confronted and solved the problems that you face right now. The NPRA Q&A and Technology Forum is the best place to find those people, whether panelists, technology vendors or other attendees.

Table Top Exhibition

This year NPRA introduces the Q&A and Technology Forum Table Top Exhibition. This exhibition will showcase catalyst, chemical, and technology providers, engineering companies, licensors and other industry suppliers in one convenient location. These companies are valuable resources in solving plant problems and improving performance. Attendees will have 5½ hours of exhibit hall time with lunch both Monday and Tuesday being served in the exhibit hall, as well as a 1½ hour reception on Monday evening. This time will offer an excellent opportunity to network with others and focus on your plant's particular needs.

Sponsors

Q&A Screening Meeting
Grace Davison

Q&A Panel Meeting
KBR

Monday Morning Coffee Break
Aspen Technology

Monday Afternoon Refreshment Break
BJ Chemical Services

Tuesday Morning Coffee Break
Grace Davison

Wednesday Early Bird Coffee & Rolls
URS Washington Division

Q&A Electronic Session Counters:
Baker Hughes

Conference Bag
BASF

Session Audio/Visual
Gasoline Processes Q&A
and Hydroprocessing Q&A
CB&I
Crude & Vacuum Distillation
and Coking Q&A
GE Water & Process Technologies

Show Daily
Hydrocarbon Processing

NPRA also thanks our
media supporters:
FUEL, *Hydrocarbon Engineering*, *Hydrocarbon Processing*, *Oil and Gas Journal*, and *PTQ*

Plant Automation & Decision Support

The Plant Automation & Decision Support 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. The Plant Automation & Decision Support program will have five separate sessions:

- A Plenary Session featuring "…A Look Back" 50 Years of Plant Automation by Dennis Cima, Chevron
- Fundamentals
- Filling Knowledge Gaps
- Cyber Security
- Enabling the Real-Time Enterprise (Why IT Matters)

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.

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 six P&P sessions address:

- Crude & vacuum distillation and coking topics such as: safety; desalting high-salt crudes; unconventional heat exchangers; pre-treating opportunity crudes; coke drum failure mechanisms; coker drum inspection techniques; and coker heater optimization.
- Energy management topics such as: a strategic overview of energy consumption; heater efficiency factors; factors that affect energy use of major consumers; crude preheat train efficiency; and the steam system's role in overall energy performance.
- Fluid Catalytic Cracking (FCC) topics such as: safety; troubleshooting; turnaround best practices; and environmental imperatives.
- Blending, Biofuels, and Product Quality topics such as: blending best practices; blending biofuels; managing RVP; and product quality issues.
- Gasoline topics such as: mitigation of reformer feed contaminants; reformer heater management; proven practices for alkylation unit turnarounds; and the consequences of different benzene reduction strategies.
- Hydroprocessing topics such as: auto depressuring systems; monitoring ULSD operations; and compressor reliability.

Post-Conference Refining Technology Seminars

The Post-Conference Refining Technology Seminars will be held Wednesday afternoon (October 14) between 12:00 pm and 5:00 pm. The seminars offered are:

- **Be Prepared for the Challenges in the New Paradigm**
  Criterion Catalysts and Technologies
  Criterion experts will present a series of papers and discussions on the application of cutting edge catalyst systems and some time-tested solutions which have proven to be robust in any environment. The seminar aims to provide you with some key operational tactics that fit your short and long-term strategies for success.

- **Hydrogen Plant Seminar and Q&A**
  Sud-Chemie
  The seminar will provide hands-on knowledge and key understanding to engineers, operators, and other hydrogen plant stakeholders. Pretreatment, steam methane reforming, and shift conversion will be covered along with critical catalysts applications, and overall plant optimization. Attendees will have an opportunity to ask questions, and share best practices.

General Session

8:00 am – 8:45 am
Texas F

Keynote
An Outlook for Transportation Fuels

Jeff Morris
President & CEO, Alon USA, LP

2009 Peter G. Andrews Lifetime Service Awards
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.

Lifetime Service Awards

Lee Turpin
Turpin Consulting

Steven Elwart
Ergon, Inc

Energy Management Principles & Practices

8:45 am – 12:00 pm
Texas F

Presiders
Mike Facker, Western Refining
Kevin Proops, Solomon Associates

Energy Consumption
Kevin Proops, Solomon Associates

Solomon data will be used to frame the discussion of refinery energy consumption. The areas that are identified as the most important or that offer the greatest potential for economical reductions will be discussed in more detail by subject matter experts

Factors Affecting Heater Efficiency
Andrew Craig, InServ

Process heaters are one of the major fuel consumers in a refinery and even small improvements in energy efficiency can yield significant savings.

Preheat Exchange Design and Optimization
Eric Hutchins, Processing Consulting Services, Inc. (PCS)

Crude preheat trains commonly offer significant opportunities to improve energy performance. Heat exchanger design and selection to optimize heat recovery, minimize the impact of fouling, and meet practical capital constraints will be reviewed along with non-traditional heat transfer equipment applications.

Steam System Optimization
Bruce Pretty, KBC Advanced Technologies

Pinch analysis can provide insights into the potential for improving steam system performance and ways to reduce energy consumption with low capital costs.

Blending , Biofuels, and Product Quality Principles & Practices

8:45 am – 12:00 pm
Fort Worth 1-4

Presiders
Sonny Loudon, CITGO Petroleum
Anthony Hall, Sunoco

RFS2 Regulation
Prabhakar Nair, UOP

The 2007 Energy Act introduced additional biofuels and additional complexity into the renewable fuels regulations. This presentation will address the key changes proposed by US EPA for the second renewable fuels iteration including the various categories of biofuels, sustainability requirements and implications for US refining industry.

Gasoline Blending Best Practices
Anthony Hall, Sunoco

Gasoline blending can be automated, but excellent performance is not automatic. This presentation will outline best practices for blending.

Biofuel Blending
Kim Peyton and Philip Bureman, Nalco

The introduction of large (and increasing) volumes of ethanol into the gasoline pool and several different types of biodiesel into diesel products has presented a number of challenges to maintaining product quality. This discussion will include topics such as biofuel production, transportation, storage, and combustion.

Ethanol Blending Light Component Alternatives
Solomon Associates

Additional quantities of ethanol in finished gasoline will displace other light components which will need an alternate disposition or a reconfiguration of the refinery's processes. There are several possible strategies to discuss.

Plant Automation: Plenary Session

9:00 am – 10:00 am
Fort Worth 5-8

Presider
Paul Bonner, Honeywell

"... A Look Back" 50 Years of Plant Automation
Dennis Cima, Chevron

The Plant Automation & Decision Support Committee celebrated 50 years of contribution to NPRA at last year's PADS Technology Conference. As we deal with the current challenges faced by the refining and petrochemical industries and look ahead in this Conference at even more difficult regulatory and business challenges that lie ahead, we need to take a look back over the las 50 years in Plant Automation, the advancements made, the challenges faced and overcome as we face the current challenges that lie ahead.

This presentation is a walk down memory lane for some and a peek into "ancient" history before the digital age for others. By taking "… a look back" we can take solace in the past Plant Automaton achievements to face new challenges.

Plant Automation: Fundamentals I

10:15 am – 12:00 pm
Fort Worth 5-8

Presider
Paul Bonner, Honeywell

Scheduling for Performance: From Managing Inventory to Managing Quality
Mark Georgen, Tesoro

Refineries are looking for ways to improve profits under the pressures of business climate, regulatory compliance, and customers' demands. One way is to improve the utilization of current assets through scheduling for performance. Scheduling refining processes is thus reaching beyond inventory management to quality management to cope with feedstock variations, process unit limitations, and product requirements. With the forecasting power of scheduling tools, our refineries are tracking the quality of crude oil charges to ensure that the crude units are operating in the right mode.

How Best to Represent Complex Process Operations in Refinery LP Models
Robert Powell, KBC

The vast majority of petroleum refiners use simple linear "Base-Delta" models to represent complex process units in their most important economic and planning tool, the venerable LP. In this presentation, a typical refinery LP will be used as a basis to quantify what level of technical detail makes sense in representing key units such as FCCs, hydrocrackers, and reformers in an LP. The study will start with the simplest approach (fixed yields), to the industry's current accepted methodology (Base-Delta) to the use of more advanced (non-linear models) and investigate if use of these different models lead to economically different optimum operations. As a side study, we will look at the penalty refiners pay for the inaccurate yields and properties generated by poor or outdated unit models in the LP.

Justification of DCS Investments and Measurement of Hard Dollar Benefits
Russell Brown, Solomon

In today's economy all major expenditures must have hard economic justification. In the past, hard dollar benefits of automation projects have been difficult to identify. Solomon Associates has developed and patented a methodology to baseline, target and measure the reliability impacts of new automation systems. This method has been proven by successful application on refinery process units, but is applicable to petrochemical, chemical, plastics, power and other industrial operations.

Plant Automation: Fundamentals II

2:00 pm – 5:15 pm
Fort Worth 5-8

Presider
Paul Bonner, Honeywell

Optimal Gasoline Blending
David Seiver, ConocoPhillips

The ConocoPhillips Wood River refinery has three in-line (direct to pipeline) gasoline blenders that rely on a sophisticated optimization system utilizing on-line Near Infrared (NIR) analyzers to certify gasoline properties. Optimal Gasoline Blending contributes more than half of the APC savings of the entire refinery. The blending control system is a TDC-3000 utilizing Honeywell's Blend Ratio Control (BRC) to control recipe ratios. The systems needed to effectively and optimally in-line blend and on-line certify are many. The presentation focuses on the work processes, systems, and keys to optimally blend gasoline in a competitive refining economy.

Gasoline Processes Q&A

2:00 pm – 5:15 pm
Texas F

Audio/Visual Services Sponsored by CB&I

Russell Brown, Solomon Associates
Becca Bundick, Mustang Engineers
Pete Cooley, Flint Hills Resources
Kurt Detrick, UOP
William Kostka, ExxonMobil
Jonathan Rich, Motiva Enterprises

See page 18 for questions

FCC Principles & Practices

2:00 pm – 5:15 pm
Fort Worth 1-4

Presiders
Bill Wilson, BP and *CJ Farley*, Astron

Optimizing Blending Operations Across Chevron
Himal Munsif, Chevron and Dimitrios Varvarezos, Aspen Technology

Refineries today strive to maximize margins from available component streams, while producing a range of products that meet challenging regulatory and market requirements. Optimizing the overall blending process is the key for maximizing refinery profits. The tool used, Aspen MBO, is an event-based, multi-period and multi-blend solution that generates optimal blending schedules for both short and long-term campaigns.

This presentation shows the workflow around an optimized blending process that satisfies demand, reacts to changes in fuel standards and reduces costly quality giveaway, inventory holding costs, stock-outs and overages. It describes the successful deployment of Aspen MBO at eight Chevron refineries, the lessons learned and the benefits captured. The presentation discusses the project timeline, the organizational structure and the change management process associated with a rollout of such scope. The benefits of deploying a state-of-art blending solution are presented along with the challenges that were overcome along the way.

Removing the Trials and Tribulations of PID Tuning
Mark Darby, CMiD Solutions

A new approach based on optimization technology is described for reducing the time and effort required to tune PID loops, without the need to iterate. For interacting loops, modern identification techniques are used to develop an accurate multivariable dynamic model. For single loop applications, simplified modeling techniques tailored to instrument technician level can be used. The resulting model is used in an optimization that explicitly considers process-specific safety and operability objectives associated with the controlled and manipulated variables to determine optimal PID tuning parameters. A key feature of the approach is that robustness margins are explicitly addressed to ensure stability in case of future plant-model mismatch. The methodology and technology will be described in detail and results will be presented for an interesting industrial application.

Center for Operation Performance Alarm Research Results
Dave Strobhar, Beville Engineering

This presentation will demonstrate the results of alarm research funded by the Center for Operator Performance. Alarm rates were presented to subjects via two different display formats. Statistically significant differences were observed in performance for both alarm rate and presentation.

Safety
Mike Wardinsky, ConocoPhillips

ConocoPhillips has developed a safety system to reduce the risk of FCC ESP fires and explosions. This presentation reviews FCC ESP fire and explosion frequency, causes and prevention steps and then gives general industry guidelines for ESP fire and explosion risks as well as steps identified from LOPA reviews.

Turnaround Planning
TBD

FCC turnarounds are complex and demanding. Planning the turnaround well is essential to executing safe turnarounds that meet their targets for cost and schedule.

Troubleshooting Catalyst Losses
Gary Ash, Chevron
Bob Ludolph, Sunoco

This presentation will describe typical sources of catalyst losses and a systematic way to identify them.

Environmental Performance
Andrew Nation, BP
Bill Henning, ConocoPhillips

This presentation will address particulate matter (PM) emissions control with a focus on three main topics:

- a comparison of various PM measurement methodologies;
- PM emissions control using dry electrostatic precipitators;
- PM emissions control using wet gas scrubbers.

General Session

8:00 am – 8:45 am
Texas F

Keynote

Behind Enemy Lines – Sticking Up for the Refining Industry in Washington, DC

Greg Scott
Executive Vice President, NPRA

Plant Automation: Filling Knowledge Gaps

8:45 am – 12:00 pm
Fort Worth 5-8

Presider
Adi Punuru, ExxonMobil

Agile Supply Chain Planning
Craig Acuff, M3 Technology

Refinery planning begins with setting constraints and targets, and optimizing an objective function in a LP model. This presentation describes a planning workspace for accomplishing rapid iterative supply chain optimization including LP synthesis.

Optimization and Carbon Caps
Dustin Beebe, Prosys

In light of the tightening U.S. emission regulations, this presentation analyzes two major solutions: optimization via control and carbon sequestration. The range of possibilities and interaction between the solutions will be discussed.

Capturing As-Built Assets for Documentation and Virtualization
George Bauer, INOVx

Both refiners and producers in the oil and gas industry are beginning to develop intelligent virtual asset models for their key facilities based upon highly accurate laser scans of their assets. These laser scans and resulting models enable as-built asset documentation to be produced more efficiently while being more complete in content. In addition, these companies are finding these models can reduce the amount of rework and RFIs during the construction phase of projects by nearly 80%. The laser scanned as-built model enables engineering to accelerate the basic and detailed design phases, while significantly increasing the quality and accuracy of the final designs. The level and quality of detail in the laser scan based model is proving to surpass that produced by traditional surveying methods. In the later stages of the asset lifecycle, the virtual asset model is being leveraged as a basis for entirely new, virtualization enabled, work processes in areas such as reliability, operations, and maintenance.

Decision Support for Proactive Performance Detection
Hamdy Noureldin, Saudi Aramco

The presentation identifies new technologies and techniques in measuring plant data, operating the plant and controlling the plant using proactive and intelligent practices and technologies that focus on detecting errors, reconciling data, providing early detection of performance deteriorations, on line isolation and identification of faults, theory of consultants, digital and on-line risk monitoring and deployment of activity based costing that map such performance monitoring to the safety of the plant, the economic health of the plant, the integrity of the plant and the productivity of the operators running the plant.

Improving Plant Performance and Safety in Continuous Processes Through Modular Procedural Automation
Maurice Wilkins, Yokogawa

This presentation explores the issues surrounding procedural operations in continuous processes and proposes a standards-based approach to manage these that will provide operational savings and improve safety.

Gasoline Processes Principles & Practices

8:45 am – 12:00 pm
Fort Worth 1-4

Presiders
Larry Lew, Chevron
Kerry Rock, ABB Lummus

Reformer feed contaminants, their impact on operations and mitigation approaches
Michael Newton, Roddey Engineering
Bill Kostka, ExxonMobil Research & Engineering

This presentation will identify common reformer contaminants (sulfur, nitrogen, heavy hydrocarbons, chloride, and water), their impact on operations, and mitigation approaches.

Impact of various benzene reduction approaches
Becca Bundick, Mustang Engineers

The latest MSAT II regulations will be discussed as well as compliance strategies to reduce benzene levels in gasoline. The compliance strategies include reducing benzene precursors in catalytic reformer feed via fractionation, saturating benzene in light straight run naphtha, installing a reformate splitter to produce a benzene-rich stream followed by hydroprocessing to remove benzene, removing benzene from reformate, or purchasing benzene credits from other refineries.

Turnaround recommendations and best practices for sulfuric and HF alkylation units
Steve Mathur, Chevron
Rick Vice, Marathon Oil

Turnarounds in alkylation units present some special execution challenges. This presentation will address strategies and tactics that refiners have employed to improve turnaround performance.

Reformer heater management
Ed Shepherd, Chevron

The reformer heater is a major fuel consumer so its performance is important to optimizing reforming costs.

FCC Q&A

8:45 am – 12:00 pm
Texas F

Ting Chan, KBR
Richard Doss, CITGO Petroleum
Cheryl Joyal, BP
Mike McKee, Chevron
Jeff Sexton, Marathon Oil
Michael Zehender, Grace Davison

See page 20 for questions

Hydroprocessing Principles & Practices

2:00 pm – 5:15 pm
Fort Worth 1-4

Presiders
Garry Kirker, Valero Energy
Vito Bavaro, Shell Oil

Safety – SIS Autodepressuring
Robert Redelmeier, Shell Global Solutions

Safety-instrumented systems (SIS) provide additional security for hydrocracker operations, but need to be carefully designed to be effective and trouble-free. This presentation will discuss some proven practices for SIS autodpressuring.

ULSD Unit Monitoring
Philip Hardesty, Marathon Oil
Josh Santrock, Marathon Oil

This presentation will cover the basics of monitoring the performance of a ULSD hydrotreater, identifying problems, and solving them.

Compressor Reliability
TBD

Good compressor reliability is essential to hydrotreater and hydrocracker operations to maintain catalyst performance, extend catalyst life, and operate safely. This presentation will describe the fundamentals of monitoring compressor performance and what types of improvements can deliver a step change in performance.

Plant Automation: Cyber Security

2:00 pm – 5:15 pm
Fort Worth 5-8

Presider
Steven Elwart, Ergon

CyberSecurity Roadmaps
Johan Nye, ExxonMobil Research & Engineering Company

Security Management – Key for Success
Ernie Rakaczky, Invensys

Throughout the process of implementing a strong Cyber Security Program we must make sure the considerations of a Life-Time of managing this program are also implemented. Through this presentation the key elements to be considered will be reviewed, from day-to-day operational requirements to the on-going continual optimization of the program.

We will look at the infrastructure that is needed and evaluate the cost of implementing that Infrastructure, weighing that cost against internal delivery resource and/or possible external partners. Essential Security Management attributes will be highlighted, with review of the required processes and procedures to succeed in managing the Cyber Security program for your process Control Network.

Cyber Security for Wireless Field and Plant Networks
Neil Peterson, Emerson

Modern wireless technology includes field networks for field devices and plant networks for assets and people. This presentation discusses the cyber security methods built in to a modern wireless system, including advanced standards-based encryption as well as authentication, verification, key management, and anti-jamming techniques.

Benchmarking Process Control Security
Russell Brown, Solomon

This presentation describes the key areas Solomon uses to benchmark process control cyber security. The benchmark study was part of the Solomon Worldwide APC and Automation study, and remains open for participation. In today's environment, it is important to understand how vulnerable your automation system is, and what you can do to improve your situation.

Panel Discussion: Cyber Security for the Refining Professional

Dealing with computers and technology is a fact of life for anyone working in today's refineries. NPRA surveyed technical professionals who do not work with IT or DCS and asked what areas in cyber security they would like to know more about and how cyber security relates to their responsibilities in the refinery.

This panel, consisting of two operating company representatives and two vendor company representatives, will answer the questions from the survey and will take questions from the floor.

The panel will explain, in terms everyone can understand, how to best utilize the cyber technology in the refinery and how cyber security is also everyone's responsibility.

Crude & Vacuum Distillation and Coking Q&A

2:00 pm – 5:15 pm
Texas F

Audio/Visual Services Sponsored by GE Water & Process Technologies

Kevin Bradley, Sunoco
Ronald Gonzales, ConocoPhillips
Vijay Krishnan, CITGO Petroleum
Sim Romero, KBC Advanced Technologies
Jeff Zurlo, GE Water & Process Technologies

See page 22 for questions

Plant Automation: Enabling The Real-Time Enterprise (Why IT Matters)

8:00 am – 11:00 am
Fort Worth 5-8

Presider
Steve Williams, Aspen Technology

The Digital Refinery: Progress and Promise
Doug White, Emerson

We are reminded daily of the rapid advances in computing and communication and the ways in which these advances change the way we live and work. Technology developments in high performance computing and high speed communication, and the advanced analytical and optimization methods based on this infrastructure have been the foundation for many advances in refinery sensors, automation, and information technologies. These advances have significantly changed the way refineries operate and will cause continuing change in the future, leading to what is termed "The Digital Refinery".

Enabling the Real-Time Enterprise
Cliff Pedersen, Pe^{X}I

Essentially all operating plants and factories have installed three levels of systems and software to increase plant/factory performance over the past thirty years - equipment monitoring/control (Operations & Asset Management), data retention/analysis (Production Management) and financial/fiduciary reporting (Business Management) with data transfer to a corporate Enterprise Resource Planning (ERP) system, the fourth level. Interchange of data/information between applications at each level as well as among levels has been achieved but usually on an application-to-application basis (point-to-point). As difficult as that was to achieve, the situation is exacerbated when the enterprise demands a more coordinated and synergized operation among the plants/factories - interfacing the plant/production systems to the business/enterprise systems has become a major issue.

This presentation examines the need for a common application interface whereby every application can push/pull data from every other application through a common transport layer, as well as introduce the Open O&M™ Initiative - a collaboration of standards based on connectivity, communications and on data interchange, driven by Owner/Operator companies to realize significant cost/performance benefits for the manufacturing industry.

From Taillights to Headlights
Glen Sartain, Teradata

This presentation illustrates specific examples of how the petrochemical refining industry relates to the supply chain story and how other manufacturing industry customers have found a great deal of success with integration of data and achieving an enterprise view of their business beyond Excel spreadsheets. We will parallel those experiences to show how you can achieve maximum benefit from changing the way you view your business.

Optimizing the Refining Fuels Value Chain by Leveraging Streaming Real Time Business Intelligence, Unified Communications, and Dynamic Office Business Applications
Mike Bannon, Microsoft

Advances in information technology (IT) are providing the opportunity to revolutionize the way the fuels value chains are managed and optimized. This presentation explores the journey down alternative paths to enable the session audience to both understand and make decisions regarding the adoption of these new technologies and which path best suits their needs.

Hydroprocessing Q&A

8:00 am – 11:15 am
Texas F

Audio/Visual Services Sponsored by CB&I

Allan Arbo, Irving Oil
Bill Bandy, Tesoro Petroleum
Jimmy Laurito, Marathon Oi
Ujjal Mukherjee, Chevron Lummus Global
Dave Pappal, Valero Energy
Steve Wiseman, Axens

See page 24 for questions

Crude & Vacuum Distillation and Coking Principles & Practices

8:00 am – 11:15 am
Fort Worth 1-4

Presiders
Daryl Hanson, Valero Energy
Eric Hutchins, PCS

Coker Heater Design / Optimization
Sim Romero, KBC Advanced Technologies

The presentation will address the various design and operating practices for a delayed coker's fired heater with a focus on heater fouling mechanisms and mitigation and the effects of feedstock, equipment design and operations on heater coil coking. Finally, innovative ideas, tools, and equipment will be presented.

Crude Pre-treatment and Overhead Treatment Developments
Larry Kremer, Baker Petrolite

Opportunity crudes can represent a challenge for crude desalters to handle. Pretreatment can help refiners handle variations in crude oil quality, crude handling, and blending to improve desalter performance and mitigate crude unit overhead corrosion.

Crude Desalter Best Practices and Optimization
Tom Collins, Petreco

This presentation will address best practices in desalting including mixing, interface control, distribution, voltages, and emulsion resolution and present a case history of a new, modified design.

Coke Drum Metallurgy, Design and Failure Mechanisms
Bob Wright, Stress Engineering

Understanding coke drum failure mechanisms leads to improvements in drum design that improve drum life and ensure mechanical integrity.

Current Coke Drum Inspection Techniques
Jacqueline Cameron, CIA Inspection

Laser profiling scanners and video cameras have routinely been deployed in coke drums since 1994 to measure deformities and check for visual indication of problems. The interpretation of bulge mapping and visual indications allows an operator to focus subsequent inspections on problem areas noted from this inspection. Cracks initiating from the outside diameter of a coke drum are difficult to distinguish until they are well through the cladding, but there are new technologies to profile these crack type indications.

Heat Recovery/Integration
Krishnan Chunangad, ABB Lummus,

Allan Arbo, Irving Oil, is Front End Engineering & Design Manager for Irving Oil Limited in Saint John, New Brunswick, Canada. He is currently part of the development team working on the proposed new "Eider Rock" Refinery in Saint John following several years in which he has provided leadership to, and managed the front end definition on the majority of the hydroprocessing, FCCU & other capital upgrade projects including the recent ULSD program. He began his career with Irving as a process engineer on the hydrocracker, hydrogen plant and HDS units, followed by three years on-shift as a field and console technician on several hydroprocessing and other refinery units and has over 18 years of refining experience in operations, technical management / support, and major capital project development.

Allen holds a BSChE from the University of New Brunswick.

Bill Bandy, Tesoro, is the Technical Manager at Tesoro Refining and Marketing Company's Mandan, ND petroleum refinery. He previously worked as a Hydroprocessing Consultant for Tesoro's refineries and as a Process Engineer responsible for several hydrotreater revamps at the Mandan refinery. He is a licensed Professional Engineer and has worked in the refining industry for 17 years.

Mr. Bandy holds a PhDChE from the Colorado School of Mines, a MEng from Clemson University, and a BSc from Rose-Hulman Institute of Technology.

Kevin Bradley, Sunoco, Inc,
Kevin is the Crude Unit Process Specialist for Sunoco Refining & Supply. He is responsible for identification and coordination of new opportunity crudes, standard crude unit practices across Sunoco facilities and the identification of crude unit capital projects that are aligned with the company's strategic operating goals and its vision of top tier performance in safety, reliability and energy utilization. He has nine years of experience with Sunoco in refinery Technical Services, Operations Supervision, Turnaround Coordination and Project Execution. Prior to joining Sunoco, he worked for ten years in the petrochemical industry in various technical and operational roles.

Kevin holds a BSChE from the University of Delaware.

Russell Brown, Solomon Associates, loversees Solomon's consulting efforts in the refining industry which focus on helping Fuels Study clients achieve sustainable improvement by maximizing margins on existing assets. Prior to accepting this position, Russell led Solomon's APC/Automation practicewhere he co-authored the Worldwide Refining APC/Automation Study. Additionally, Russell participated as a team member on performance improvement initiatives in the refining industry, serving as process control expert and light oils processing expert. He began his career as a Senior Engineer with Conoco R&D in 1990.

Throughout his career, Russell has focused on using mathematical and statistical techniques to develop innovative and profitable solutions for clients. Russell is a licensed PE in the state of Oklahoma.

Becca Bundick, Mustang Engineers, is a Senior Consulting Process Engineer for Mustang Engineers and Constructors, L.P., Houston Texas. Her 12 years with Mustang include process design assignments ranging from front-end studies to detailed process design for petroleum refining projects.

Becca holds a BSChE from Texas A&M University.

Ting Chan, KBR, is presently the FCC Technology Manager for KBR Technology in Houston. He is involved in FCC technology development and licensing activities for KBR's Fluid Catalytic Cracking Process. Ting started his career with Texaco and now has over 25 years of experience in the petroleum refining industry. Ting is the inventor for numerous US patents relatied to FCC and other refining technologies. In particular, he is the inventor of the FCC Direct-Coupled Cyclone Technology.

Ting received a BSChE from Massachusetts Institute of Technology and a MSChE from Texas A&M University. Mr. Chan is a registered professional engineer in Texas.

Pete Cooley, Flint Hills Resources, is a Senior Product Coordinator (Scheduler) for Flint Hills Resources refinery, Pine Bend, MN. He is currently responsible for product blending and optimization, product quality, and process engineering support in the tank farm area. He has five years of refinery experience as a process engineer in the sulfuric acid alkylation, fixed bed and CCR reforming, naphtha hydrotreating, and isomerization process units. He also has four years of experience in the gasoline blending and products distribution area.

Pete holds a BS degree from the University of Minnesota.

Kurt Detrick, UOP, is a Process Specialist in the Operating Technical Services department of UOP in Des Plaines, Illinois. He is responsible for technical support for UOP-licensed HF Alkylation, Detergent Alkylation, and light paraffin Isomerization units around the world. He has spent over 28 years of experience in the hydrocarbon processing industry.

Mr. Detrick holds a BSChE from Iowa State University.

Richard Doss, CITGO Petroleum, is Manager of the Senior Engineering Group at the CITGO Petroleum Corporation, Lake Charles, La. Refinery (LCMC). This group provides technical support, special studies and mentoring for all CITGO refinery locations. Richard has developed and presented seminars on operations optimization and troubleshooting for both CITGO and PDVSA locations. His background includes process engineering support for most refinery units. He supervised the LCMC Operations Engineering groups for the Thermal, Fluid Catalytic Cracking and Acid, Alkylation and Treating areas. He has worked at the LCMC since 1991, except for two years as technical support for the corporate office. He previously worked as process and project engineering support for the FCC and Alkylation units at the Farmland Industries, Coffeyville, Kansas, refinery.

Richard has a BSChE from the University of Tulsa. He is a registered Professional Engineer in the state of Oklahoma.

Ron Gonzales, ConocoPhillips, is one of the leaders of ConocoPhillips' Crude and Fractionation network which consists of engineers from all of the company's refineries. In this role, Ron is involved in the design, troubleshooting, optimization, and benchmarking of the crude and vacuum units, as well as fractionators used in various other services throughout the corporation. During his 17 years with the company, he has also held positions in controls, and modeling. Prior to joining the corporate engineering staff in 2002, Ron worked in operations at the Billings, Montana refinery for 10 years, where he focused on the crude/vacuum, FCC, and hydrotreating units.

Ron received an AS in Engineering from Northern Oklahoma College.

Cheryl Joyal, BP, is the FCCU Technical Consultant for BP Refining Technology located in Naperville, IL. She provides technical and operating support for 11 FCC units with a specialty in the area of FCCU Catalyst and Environmental technologies. She has spent most of her 22 years with Amoco/BP in the FCCU area and has held various central and site positions including operations engineer, refinery and chemical plant unit supervision, and refinery technology consultant before being appointed to her central global role.

Cheryl holds a BSChE Engineering/French from Carnegie-Mellon University, and an MSChE/PhD from Northwestern University.

Bill Kostka, ExxonMobil Research & Engineering, is the Group Lead for Reforming and Isomerization for ExxonMobil Research and Engineering Company, Fairfax, Virginia. He is responsible for all aspects of reforming and isomerization R&D, catalyst management and technical support, and also leads an IP team for light hydrocarbon upgrading. He has experience with refineries throughout the world. After graduation, he worked for Mobil Research and Development Corporation in Paulsboro, New Jersey until Mobil merged with Exxon in 1999. He has over 28 years of experience in the hydrocarbon processing industry.

Mr. Kostka holds BSChE, a MSChE, and a Ph.D. from Purdue University.

Vijay Krishnan, CITGO Petroleum, presently is a Senior Refining Consultant in the technical department of CITGO Refining & Chemicals, L.P. Corpus Christi Refinery which he joined in December 2008. Prior to that he spent 12 years in UOP LLC's engineering, Refining and Petrochemical Services, and Continuing Services Departments providing technical service for UOP technologies and consulting on profit improvement in refineries and petrochemical plants around the world. He has also worked for PDVSA at several refinery sites in Venezuela and Curacao in various technical and management capacities for 15 years and has been associated with many heavy oil and conversion projects and operation of refineries and petrochemical plants. Before that he worked at Syncrude Canada for 8 years in engineering and operations technical services.

Krish is a 1970 graduate Chemical Engineer from BITS, Pilani, India.

Jimmy Laurito, Marathon Oil Corporation, is the Technical Services Manager at the Marathon Petroleum Company St. Paul Park, MN refinery. He has served the company in numerous roles including operations supervision, project engineering, and process support at the company's Kentucky and Louisiana refining divisions. Throughout his career with Marathon he has typically been responsible for some aspect of hydroprocessing. Prior to joining Marathon, he was employed by Bryan Research & Engineering and PCI Engineering.

Mr. Laurito holds a BS in Biochemistry and a BSChE from Texas A&M University.

Mike McKee, Chevron, is the FCC Process Expert for Chevron Global Downstream, Richmond California, where he is responsible for technical support, technology application and business improvement for Chevron's global FCC units. He is also responsible for Chevron's various FCC customer-supplier relationships. Mike has 25 years of experience in the petroleum refining industry.

Mike holds a BSChE from the University of California at Davis.

Ujjal Mukherjee, Chevron Lummus Global, is the Technology Director for Chevron Lummus Global. He has worked in refining and petrochemicals for twenty-eight years of which the last eighteen years have been in high-pressure hydroprocessing involving process development, engineering, and operations. Ujjal has worked on projects in the Americas, Europe, Middle East, Asia, and Africa. His special area of expertise is technology development in residue and distillate hydrocracking. Ujjal has several patents in high-pressure hydroprocessing and has authored chapters on hydrocracking.

Ujjal holds a BSChE, a MSChE, and a MBA.

Dave Pappal, Valero Energy Corporation, is a Technology Advisor. His responsibilities include project development in support of Valero's strategic objectives, best practices development and operations support for hydroprocessing. Major activities since joining Valero have included low sulfur gasoline and ULSD project development, construction and commissioning.

Prior to joining Valero, Mr. Pappal worked with Mobil Technology Company at the Paulsboro Technical Center. Experienced in all the major refining process areas including FCC, catalytic reforming, aromatics technologies, conventional and catalytic lubes and hydroprocessing/hydrocracking. Served as a member of transition teams to integrate Mobil assets into ExxonMobil prior to and after the closing of the Exxon and Mobil merger.

Dave holds a BSChE from Pennsylvania State University and an MSChE and Biochemical Engineering degree from the University of Pennsylvania.

Sim Romero, KBC Advanced Technologies, a Principal Consultant where he supports refiners on questions involving the expansion, optimization and troubleshooting of their resid conversion units. Sim has over 25 years experience in delayed coking and heavy oil conversion and has worked for Valero Energy, Conoco, BP, ARCO, Bechtel and ExxonMobil

Jonathan Rich, Motiva Enterprises, is a Process Engineering Technical Specialist for the Motiva Enterprises Refining Company, Convent, Louisiana. He is responsible for technical support and oversight for refinery optimizations involving hydroprocessing, margin optimization and energy utilization and also serves as a mentor for process engineers. He has over 23 years of experience in the hydrocarbon processing industry at several refineries in the United States.

Jonathan holds a BSChE from Oklahoma State University.

Jeff Sexton, Marathon Oil Corporation, is the Cat Cracking technologist for Marathon Oil Company located in Findlay, Ohio. He is responsible for FCC technical and operating performance across Marathon's seven refinery system. This includes responsibility for technology selection, optimization, catalyst selection, environmental performance, reliability and unit debottlenecking. Marathon has revamped all seven units resulting in an increase of system capacity by 25% while maintaining 98% mechanical availability during Jeff's tenure. Jeff previously worked for UOP in a variety of FCC assignments and has worked on over 40 different FCC units around the world. He has authored over 20 technical papers, holds six pending patents and has made several presentations at the NPRA and other industry forums. Jeff is the currently chairman of the U.S. EPA Consent Decree FCC Technical Team and PSRI Technical Advisory Committee.

Jeff holds a BSChE from Rose-Hulman Institute of Technology.

Steve Wiseman, Axens, is the Manager of Technical Services for Axens North America, Houston, Texas. Steve is responsible for the technical support for all of the Axens licensed units and catalyst sales in North America, Mexico and Columbia. He was previously with Akzo Nobel Catalyst / Albemarle for 15 years and prior to that with Valero Refining Company and Sinclair Oil Corp.

Steve received his BSChE from the University of Kansas.

Michael Zehender, Grace Davison, is the National Technical Sales Manager for Grace FCC Catalysts in Houston, Texas. He is responsible for technical service and sales of FCC catalysts to customer accounts in North America. He has 20 years experience in the petroleum processing industry including 16 years experience with FCC units. He has worked for HOVENSA LLC and Valero Energy in addition to his nine years with Grace Davison. His experience includes refineries in North America and all of Asia.

Mike holds a BSChE degree from the University of Cincinnati.

Jeffrey Zurlo, GE Water & Process Technologies, is an HPI Technology Manager where he provides global technical support, solutions development, and program optimization in the hydrocarbon process industry with a focus on phase separations, amine and sulfur treatment, and fuel additives. He has 19 years of experience in process engineering, technical support, and technical sales.

Jeff holds a BSChE from Stevens Institute of Technology.

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Gasoline

Safety

1. What do you do with your HF acid unit inventory during turnarounds?

2. What procedures do you use to protect personnel opening and entering HF and sulfuric alkylation unit vessels and piping during turnarounds? How do you determine the required PPE level? Do you step down the level of PPE required at certain stages of the turnaround?

Alkylation

3. What are refiners' experiences in obtaining carbon steel piping and fittings with low residual element (RE) content for HF alkylation units with respect to availability and cost?

4. Have you had issues with the fresh HF acid pump suction head? Do you have any recommendations for using a medium besides charging nitrogen to the fresh acid drum?

5. Where do you send the acid soluble oil (ASO) produced in the HF alkylation unit? What are the pros and cons of each alternative?

6. Water content in the HF acid catalyst is a variable that can be used for improving alkylate octane. Higher water concentration improves octane, but accelerates corrosion. In your experience, what is the target water concentration that provides the best balance between alkylate octane and corrosion rates? If you employ continuous monitoring of water concentration in the acid via an on-line analyzer, how do you control the water concentration?

7. Do you conduct a component mass balance on the unit in order to determine true alkylate yield? What steps are involved and what benefits do you obtain from gathering data and calculating a true yield?

8. What test methods do you use for analyzing total fluoride in alkylate, butane, and propane? How do you use these data?

9. What benefits do you obtain from on-line water washing of the deisobutanizer column in a sulfuric acid alkylation unit? What precautions need to be taken? Discuss pros and cons of on-line vs. off-line washing.

10. What is the development status of solid acid catalyst for alkylation? How does it compare economically to conventional liquid acid technology?

Biofuels

11. What are your plans for increasing ethanol blending? What limits do you foresee on higher ethanol content in blends?

12. Are you considering any biofuel components other than ethanol in gasoline

Blending

13. For those using NIR analyzers for blending, how often do you update your models? Who updates your model (internal resources, NIR vendor, other)? What is typical agreement between lab data and NIR data? Are you using other analyzer systems besides NIR for blending?

14. The RVP specifications for reformulated blendstocks for oxygenate blending (RBOB) continue to ratchet down and will likely continue to do so given the increasing volumes of ethanol in the pool. What strategies are you using to get the pool RVP to lower values? Are there any economical dispositions for pentanes?

Hydrotreating

15. What are the latest sulfur guard bed catalyst/adsorbent types and what run lengths have they achieved? Please list the alternative catalyst/adsorbent types and any new technology that is in bench testing, pilot plant testing or commercial applications. Is anyone using any of these commercially?

16. What operating parameters and/or catalyst types do your recommend for minimizing octane losses in FCC gasoline hydrotreaters? Please provide some details of the technology, the operating parameters, and the results.

17. How low can the hydrogen to hydrocarbon ratio be in the FCC gasoline hydrotreating unit before you experience high reactor pressure drop? Please provide some details of your experiences with respect to run length limitations and operating performance.

Isomerization

18. With MSAT II regulations driving some refiners to maximize benzene precursor rejection from reforming unit feed, the C7+ content of isomerization feed is expected to increase. What criteria set the limit of heavy material in the isomerization unit feed, and what are the implications for each type of isomerization catalyst (zeolitic vs. chlorided alumina, etc.)?

Petrochemicals

19. Are there any new glycol types that are available to increase the yields for UDEX-type units? Please share the applications of these glycols from the standpoint of optimum feed range and solvent to oil ratios. What is your experience with these alternatives?

20. Are there any new clay types or technology available to treat for Bromine Index (BI) economically? What can you do to obtain longer clay life (e.g. increased temperature)? What maximum temperature for clay operation do you recommend? What is your experience with plugging problems in the bed at end of life?

Reforming

21. How low can the benzene content of the reformate go just by tailoring the feed (e.g. prefractionation)? How does the quality of feed fractionation, feed composition, and type of reformer affect the ultimate benzene level? Given all of the variables, what is the lowest design level you would recommend?

22. How do you mitigate fouling in reforming recycle compressors? Please address both centrifugal and reciprocating types. What are the pros and cons of your method and the principal alternatives?

23. The biofuels mandate and changes in feed distillation are expected to reduce severity targets in reforming units. How do the operating strategies of the CCR regenerator change with low coke make?

24. When there is a substantial amount of hydrogen in fuel gas it is difficult to visually inspect the reaction furnace flames and check for flame impingement on the tubes. What do you use to reliably monitor temperatures of reformer furnace tubes, e.g. skin thermocouples, ceramic coatings, spot or continuous infrared (IR) scans, etc.? What frequency do you recommend for each method and how reliable are they?

25. Do you have problems with the reliability and performance of regenerator gas blowers in CCR reforming units with Chlorsorb systems? Is there any alternative technology for this application? Our blowers in this service tend to fail once per year on average and sometimes within two months. What is the reliability experience of other refiners for these blowers?

FCC

Safety & Environmental

26. During start-up and shutdown, do you keep the FCC emergency shutdown system fully active, or do you have to bypass some or all interlocks? Is the high reactor level included as an FCC Interlock during normal operations? Have the FCCU vessel level instruments caused any nuisance trips and how have you addressed this?

27. What are your guidelines for "safe parking" to maintain safe and reliable operations:
    - When FCC slide valves close and feed is diverted;
    - While dry circulating for extended periods of time?

28. What options are available to minimize CO emissions while operating with torch oil during FCCU start-up? Are there similar considerations during hot standby operation?

29. For FCCU's with low (less than or equal to 40 vppm) stack NOx levels, what operational issues have occurred, and how have you addressed them? Please include your experience with respect to regenerator operations and back-end control equipment.

30. Have you used spent NaOH in the wet gas scrubber (WGS) to reduce NaOH costs? What are the benefits and concerns when using spent NaOH?

31. Please describe your experience using SOx reducing additives, NOx reducing additives and non-Pt combustion promoters to reduce regenerator stack emissions in commercial units with respect to usage rate, level of emissions control and cost effectiveness. When using SOx reducing additives upstream of a WGS how have you optimized additive rate versus NaOH usage and have you experienced any issues with scrubber purge water quality?

32. Please describe your experience injecting NH3 to an electrostatic precipitator (ESP) for particulate matter (PM) control. Is there also an impact on stack NOx emissions? What variables impact these observed responses? Have you observed a visible plume as a result of ammonia slip?

Mechanical & Reliability

33. What mechanical modifications and operating guidelines have you implemented to extend cyclone life and overall unit reliability?

34. What safety precautions do you employ for inspection and monitoring of expansion joints in catalyst standpipes? Do you use snuffing steam rings or water sprays, and a system to detect loss of bellows containment? For monitoring, do you use inter-ply pressure detection, skin temperature monitoring or online techniques?

35. After applying cooling steam to hot spots on cold wall catalyst transfer lines, flue gas lines, or vessels we have seen these hot spots migrate or disappear altogether. Can you explain this? What is the best cooling medium for mitigating hot spots and how should these hot spots be monitored throughout the run? Does turning steam on and off damage the refractory or is there a better method to monitor the hot spots?
    - Have you experienced a recurring refractory failure in FCC flue gas lines? What was the root cause and did you address it?

36. Have you experienced FCC transfer line fouling or coking between the reactor and main fractionator while operating at low riser outlet temperature? What impact does that have on slurry circuit operations?
    - During FCC start-ups, how often do you have to change the circulating slurry pump strainers? How long does it take you to clean a strainer from pump switch to ready to use?
    - Do you design equipment or redundancy differently for different feed types?

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Notes

Process

37. Do you start the wet gas compressor (WGC) with the second stage discharge to the gas plant open, blocked or partially blocked? What are the potential consequences of starting with the valve fully open or closed? Do you use a small bypass valve around this block valve to limit the flow of gas to the gas plant at start-up?

38. What key process and catalyst variables should be monitored and controlled to prevent or resolve catalyst circulation issues?

39. What major areas do you evaluate for profit improvement opportunities and what actual benefits have you realized? How do you benchmark performance to identify which areas to target for improvement?

40. What issues do you consider when processing high nitrogen/high aromatic feeds such as whole synthetic crudes, gas oils from synthetic crudes, or heavy coker gas oils? Do you have any experience with different levels of hydrotreating of these feeds? How well do process models predict performance for these types of feeds?

41. What concentrations of oxygen, CO and CO2 have you observed in FCC fuel gas due to entrainment from the regenerator to the riser? What other compounds (e.g. acetone, phenols) can be formed from these oxygen sources? Where do they end up in the products, and at what levels?

42. For a severely hydrotreated feed operation, what catalyst and operating condition options do you have for increasing regenerator temperature in order to maintain low CO emissions and regenerator operability?

Catalyst

43. Please discuss strategies to maximize LCO yield from the FCCU to increase refinery diesel yields under the following scenarios:
    - Reducing gasoline yield while maintaining octane;
    - Minimizing the increase in bottoms yield;
    - Rapidly adjusting operations to meet shifting economics favoring maximum LCO or maximum gasoline.

44. What impacts do unconventional metals (Pb, Ca, K, Mg, Fe) have on catalyst performance and how do you mitigate these effects? Are there interactions between any of these metals? How does Fe affect SO2 emissions?

45. What levels of ZSM-5 crystal are you using in the FCC unit inventory? What impact does it have on the full range gasoline distillation? How does the concentration of feedstock metals (particularly nickel and vanadium) affect the deactivation rate of ZSM-5 and its resulting propylene and butylene selectivities? What research efforts are underway to improve ZSM-5's activity maintenance, especially directed towards increasing the propylene yield?

46. What is your experience using gasoline sulfur reduction additives for long-term control of gasoline sulfur and during cat feed hydrotreater (CFH) turnarounds?

Crude & Vacuum Distillation & Coking

Safety

47. What are your current practices for vessel and tower entry during turnarounds regarding personal protection equipment (PPE), harnesses and fresh air? What criteria do you use for establishing exclusion zones?

Desalting

48. How do you evaluate and manage downstream increases in chemical oxygen demand (COD) in the desalter brine before discharge to wastewater?

Furnaces

49. How are you managing heater and boiler firing in light of ultra-low NOx burner implementations? Please address CO, NOx, O2 and flame stability. How are you minimizing maintenance and fouling in ultra-low NOx burners?

50. What methods do you use to predict and/or measure corrosion for two-phase flow in furnace transfer lines?

Crude Distillation

51. What are your concerns when feeding crude units with transmix containing additive packages, ethanol, biodiesel, etc

52. What parameters are important when designing or revamping a crude tower overhead system?

Vacuum Distillation

53. What kinds of flow meters are you using to measure flow of vacuum tower bottoms (VTB)? How accurate are they and what do you do to maximize accuracy of these measurements? Are there any recent technology advances in this area?

54. During an upset in our vacuum tower, the diesel section temperature surged 100°F. Following the episode, differential pressure increased on the draw/pumparound cooler. After washing the cooler, we found a high concentration of iron and chloride. Can you offer an explanation as to the origin of this iron chloride?

55. What are your limitations on vacuum tower bottoms operating conditions when maximizing resid cut point?

Turnarounds

56. What are your current typical turn-around cycle lengths for CDU/VDU's? What are the most common criteria used to establish that cycle length?

Coking — Safety & Environmental

57. Are your operators logging and investigating incidents when personal or area monitors detect H2S below IDLH (immediately dangerous to life and health) range? Is this common on coker top head decks?

58. The 2007 and 2008 Q&A panels have described practices and procedures to minimize emissions from coke drums. Have you quantified the particulate and volatile organic compounds (VOC) emissions? How effective are your remediation steps?

Q&A and Technology Forum: Questions 59 – 67

Notes

Product Quality

59. What is the lowest practical volatile carbon matter (VCM) coke from a delayed coker? Please answer for fuel and anode grades.

60. What coke morphology could we expect when processing hydrotreated heavy oils and residuum? Are there compatibility issues when blending these streams with non-hydrotreated resid? What kind of furnace run length can we expect when processing a large percentage of hydrotreated feed in the coker?

61. Some coker feeds produce soft, high VCM "sandy coke". The coke bed has a tendency to collapse during the cutting process causing cycle delays. What resid properties and operation variables cause these problems? How can these be adjusted to minimize problems? Can you recommend some practices to reduce coke drum bed collapse?

Yield and Throughput

62. In grassroots designs, what technologies best maximize transportation fuels from heavy vacuum residue? Is solvent deasphalting more cost effective than delayed coking?

63. How can coke yield and recycle rate be reduced to increase coker capacity? What is the lowest recycle rate you have achieved for commercial operations?

64. What factors affect coker and visbreaker furnace fouling and which ones are most important? Is sodium a key driver? Are there effective operational or design changes to minmize fouling? Are antifoulants effective in reducing furnace fouling?

Operations

65. What operational changes are required if larger (and thicker) coke drums are installed? Please comment on cutting time, drum warming, and quench rates.

66. What factors contribute to fouling or corrosion in coke drum overhead piping?

67. What best practices do you recommend for filtration of heavy coker gas oil (HCGO)? Where is the backwash stream sent and what are the impacts on coker operations?

Hydroprocessing

Safety

68. What responses do you recommend for different sizes of hydrotreater furnace tube leaks? Discuss different response options for large ruptures versus very small leaks.

69. What criteria do you use for deciding whether remote manual and/or auto depressuring instrumentation and equipment are required for non-hydrocracking applications such as diesel or gasoil hydrotreaters?

Biodiesel

70. What challenges and concerns do you have with hydroprocessing biodiesel made from sources such as palm oil, vegetable oil or animal fats?

Hydrocracking

71. What hydrocracker-naphtha sulfur levels do you see at end of cycle versus start of run? How do you handle sulfur above 0.2 wppm for the naphtha reformer?

72. What technologies are available for controlling polynuclear aromatics (PNA) in high-conversion hydrocracking operations and how have you controlled PNA apart from bleed management? Do you measure PNA specifically or do you employ other techniques to control catalyst deactivation?

73. Please discuss the impact of cold high-pressure separator (CHPS) temperature on ammonia (NH3) concentration in the vapor and potential downstream corrosion issues associated with high NH3 concentration. In particular, discuss operating with the CHPS temperature above 150°F

Corrosion

74. To prevent ammonium chloride (NH4Cl) deposition, do you maintain the bulk flowing temperature or the exchanger tube metal surface temperature above the deposition point? What margin do you try to maintain between this temperature and the calculated deposition temperature.

75. What advances in feed filtering of coker gasoil have been made over the past three years in hardware or process best practices?

Pressure Drop

76. Please describe your experience using non-traditional grading materials (or other similar products) versus traditional grading materials for mitigating reactor pressure drop problems due to particulates for naphtha, distillate and gasoil applications.

77. Please describe your experiences operating fluid catalytic cracking (FCC) pretreat units in mild hydrocracking (MHC) mode. What changes are required in catalyst and equipment? Comment on the quality of converted diesel.

Design

78. What is the proper design practice for splitting two phase flow ahead of a fired heater in hydroprocessing units? What design features do you recommend to avoid flow maldistribution problems ?

79. Please describe your experiences using alternative tube designs, such as twisted tube exchanger bundles, in hydroprocessing preheat service. Have you experienced any cleaning issues or efficiency issues?

80. Please describe the advantages and disadvantages of dual processing coker naphtha with straight run diesel/kerosene streams in a single hydrotreater with downstream fractionation. Please address cost, fouling, flexibility, and hydrogen partial pressure.

Q&A and Technology Forum: Questions 81 – 87

Notes

Start-up/Shutdown/Turnaround

81. Does anyone bottom dump and water wash the reactor walls during catalyst change-out where nitrogen-blanketing would otherwise be required? When using the water flood approach, we have experienced extended delays when dumping and reloading ULSD reactor vessels. What can we do to expedite this without compromising safety?

82. What techniques are you using to shut down and start up units without flaring? What equipment modifications have you made to eliminate flaring during shutdown/start-up?

83. Is ammonia used in the startup of a hydrocracker? Does it depend on catalyst activity? If ammonia is not introduced, then at what temperature is the VGO (vacuum gas oil) introduced? Are there concerns with permanent poisoning of the cracking catalyst with organic nitrogen if VGO is introduced at lower temperatures during initial sulfiding and startup?

84. It is a common industry practice to maintain hydrogen sulfide (H2S) presence when circulating hydrogen (H2) at operating temperature. What experience do you have where activity was not significantly impacted as a result of high temperature operation without H2S presence? Please indicate how long you operated in this condition. Is there any difference or concerns with heating up with nitrogen (N2) instead of H2 in terms of reduction?

85. After a catalyst loading, is it your standard practice to flush the unit to cutter stock or slop until product is clear rather than recirculating back to a feed tank or directly back to the unit charge? What are the concerns and risks with recirculation?

Catalyst Contaminants

86. Typically silica has been associated with naphtha streams, but it is now being seen in heavy oil feeds. Have you experienced silica in heavy oil feeds? How does this impact catalyst life and how do you eliminate the silica or mitigate its impact?

87. How do you deal with catalyst deactivation issues when both silica and arsenic are present in hydrotreater feed?

Exhibition Hours

Monday
October 12, 2009

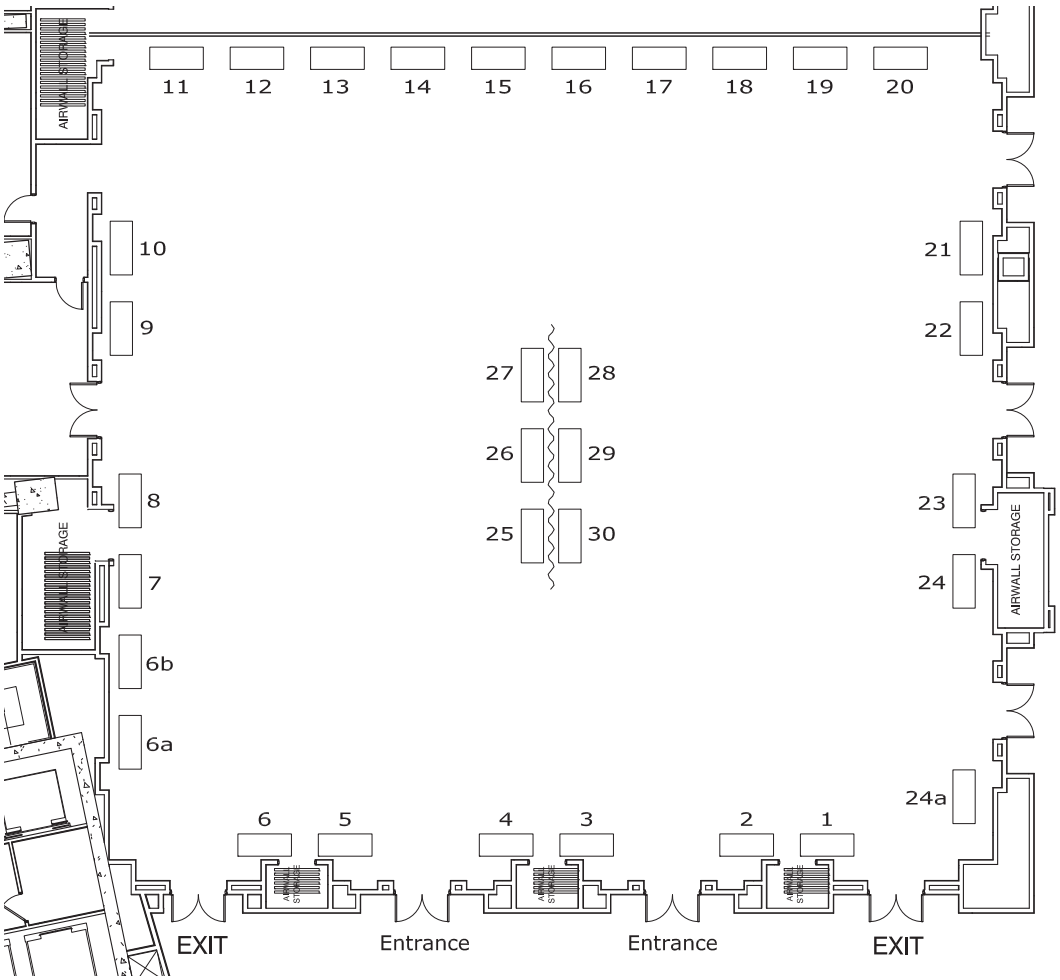
Lunch / Tabletop
Exhibition Open
12:00 pm – 2:00 pm
Texas A-E

Reception / Tabletop
Exhibition Open
5:15 pm – 6:30 pm
Texas A-E

Tuesday
October 13, 2009

Lunch / Tabletop
Exhibition Open
12:00 pm – 2:00 pm

Map of Exhibition



List of Exhibitors: Alphabetical by Company

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ProSys, Inc.	15
Shaw Stone & Webster	5
Tracerco	3
United Laboratories LLC	11
UOP LLC	24

Arkema, Inc. (7)
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http://www.arkema-inc.com
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This guide is a listing of the companies who host hospitality functions at the Q&A and Technology Forum. Open hours are determined by the individual host in compliance with NPRA's policy not to conflict with regularly scheduled Association sessions and activites to close by 1:00 am.

Company	Location and Dates
Albemarle	Sundance 3 October 11, 12, 13
Axens North America, Inc.	Sundance 1 October 12, 13
CB&I / Lummus Technology / CDTECH	Sundance 6 October 12
Champion Technologies, Inc.	Texas I October 12
Criterion Catalysts & Technologies	Sundance 6 October 13
DuPont™ Clean Technologies	Suite _____ October 12, 13
Emerson Process Management	Sundance 5 October 12, 13
Grace Davison / ART	Texas G /Texas H October 12, 13
GE Water & Process Technologies	Suite _____ October 12
Gulf Chemical & Metallurgical Corp.	Texas J October 12
Haldor Topsoe, Inc.	Presidential Suite _____ October 12, 13
Honeywell Process Solutions	Stockyards 2 October 12
INTERCAT, Inc.	Presidential Suite _____ October 5, 6, 7
Johnson Matthey Catalysts / TRACERCO	Sundance 4 October 12
Process Dynamics	Suite _____ October 11
Shaw	Suite _____ October 12
Süd-Chemie Inc.	Presidential Suite _____ October 12
UOP LLC	Suite _____ October 12, 13

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