Phoenix, Arizona

2006 NPRA Q&A and Technology Forum

Arizona Biltmore
Phoenix, Arizona
October 8 – 11, 2006

NPRA

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Schedule of Events

Sunday	**October 8, 2006**	
2:00 pm – 8:00 pm	Registration	Northwest Lobby
6:00 pm – 8:00 pm	Reception	Squaw Peak Lawn

Monday	**October 9, 2006**	
7:00 am – 5:00 pm	Registration	McArthur Registration
8:00 am – 8:30 am	Keynote Address	McArthur Ballroom Salon 4
8:30 am – 10:00 am	Plant Automation: Plenary Session	McArthur Ballroom Salon 1
8:30 am – 12:30 pm *(concurrent)*	• Crude/Vacuum/Coking Q&A	McArthur Ballroom Salon 4
	• Plant-wide Systems P&P	McArthur Ballroom Salon 3
	• Design & Operations Safety Session	Grand Room
10:00 am – 10:30 am	Coffee Break	McArthur Prefunction Area
10:30 am – 12:30 pm	Plant Automation: Process Efficiency	McArthur Ballroom Salon 1
12:30 pm – 1:30 pm	Lunch	McArthur Ballroom Salons 5-7
1:30 pm – 3:00 pm	Plant Automation: "Big Shift Change"	McArthur Ballroom Salon 1
1:30 pm – 5:00 pm *(concurrent)*	• Gasoline Q&A	McArthur Ballroom Salon 4
	• Crude/Vacuum/Coking P&P	McArthur Ballroom Salon 3
3:00 pm – 3:30 pm	Refreshment Break	
3:30 pm – 5:00 pm	Plant Automation: Supply Chain Management	McArthur Ballroom Salon 1

Tuesday	**October 10, 2006**	
7:00 am – 5:00 pm	Registration	McArthur Registration
8:00 am – 8:30 am	Lifetime Service Awards	McArthur Ballroom Salon 4
8:30 am – 10:00 am	Plant Automation: Security Issues	McArthur Ballroom Salon 1
8:30 am – 12:30 pm *(concurrent)*	• Hydroprocessing Q&A	McArthur Ballroom Salon 4
	• Gasoline P&P	McArthur Ballroom Salon 3
10:00 am – 10:30 am	Coffee Break	McArthur Prefunction Area
10:30 am – 12:30 pm	Plant Automation: Process Safety (Part I)	McArthur Ballroom Salon 1
12:30 pm – 1:30 pm	Lunch	McArthur Ballroom Salons 5-7
1:30 pm – 3:00 pm	Plant Automation: Process Safety (Part II)	McArthur Ballroom Salon 1
1:30 pm – 5:00 pm *(concurrent)*	• FCC Q&A	McArthur Ballroom Salon 4
	• Hydroprocessing P&P	McArthur Ballroom Salon 3
3:00 pm – 3:30 pm	Refreshment Break	McArthur Prefunction Area
3:30 pm – 5:00 pm	Plant Automation: "The Melting Pot"	McArthur Ballroom Salon 1

Wednesday	**October 11, 2006**	
7:00 am – 11:00 am	Registration	McArthur Registration
7:00 am – 7:30 am	Continental Breakfast	McArthur Prefunction Area
7:30 am – 9:00 am	Plant Automation: Energy Management	McArthur Ballroom Salon 1
7:30 am – 11:00 am	FCC P&P	McArthur Ballroom Salon 3
9:00 am – 9:30 am	Coffee Break	McArthur Prefunction Area
9:30 am – 11:00 am	Plant Automation: Concluding Keynote	McArthur Ballroom Salon 1

October 8 - 11, 2006

2006 NPRA Q&A and Technology Forum

The 2006 NPRA Q&A and Technology Forum addresses real problems and challenges that you face at your facility and helps you sort through solutions as you discuss them with panelists and in networking with other attendees. Today's competitive refining environment requires attention to plant safety, superior technology, innovation, and excellence in operations. Networking with refiners, petrochemical producers, catalyst and chemicals suppliers, process licensors, engineering firms, and other industry experts at the Q&A and Technology Forum keeps you on top of the latest developments as you cope with demanding business conditions.

Principles & Practices

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

- Crude / Vacuum Distillation and Coking
- Gasoline Processes
- FCC
- Distillate Hydroprocessing
- Plant-wide Systems

Design & Operations Safety Session

The Design and Operations Safety Session will present plant safety topics for process engineers, design engineers, and Operations supervisors and managers. The topics will include recognizing and eliminating hazards, siting structures in process plants, and pressure relief systems.

Plant Automation & Decision Support

For the second year, the Plant Automation and Decision Support Conference is being co-located with the Q&A and Technology Forum so that attendees whose responsibilities overlap between process engineering, unit operations, process control, and planning will be able to use their conference time effectively. This "conference within a conference" will have 10 separate sessions that will provide a comprehensive array of topics for plant automation and process engineering professionals.

- Plenary Session
- Process Efficiency
- Big Shift Change
- Supply Chain Management
- Security Issues
- Process Safety (Part I)
- Process Safety (Part II) – Panel Discussion
- The Melting Pot
- Energy Management
- Concluding Keynote

Attendees will be able to attend any of the Q&A, P&P, plant automation, or safety sessions. There will be one keynote session for all attendees on Monday and the hospitality suites will be open to every attendee.

Monday
October 9, 2006

Plant Automation & Decision Support

The NPRA Plant Automation and Decision Support Conference is ideal for those individuals who are responsible for plant automation, process control, planning and scheduling, IT and modeling/ simulation. Unlike other plant automation and decision support conferences, this conference is designed by operating companies for operating companies.

The Plant Automation and Decision Support Conference will have ten separate sessions:

- Plenary Session
- Process Efficiency
- Big Shift Change
- Supply Chain Management
- Security Issues
- Process Safety (Part I)
- Process Safety (Part II): Panel Discussion
- The Melting Pot
- Energy Management
- Concluding Keynote

Principles & Practices Sessions

The Principles & Practices (P&P) sessions are discussion-oriented sessions that complement the information exchange that occurs in the Q&A sessions. Each of the P&P sessions will address the fundamentals of good operation and the bedrock principles for the technologies that are commonly employed. These sessions will usually have short presentations which will be 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 five P&P sessions are:

- Crude & vacuum distillation and coking
- Gasoline processes
- FCC
- Distillate hydroprocessing
- Plant-wide Systems (Sulfur Recovery, Cooling Water, NOx Reduction Technologies, Safety Reviews)

Keynote Address

8:00 am – 8:30 am
McArthur Ballroom Salon 4

William Honnef
Senior Vice President of
Sales and Marketing
VeraSun Energy Corporation

Congress has decided that fuels in the U.S. will include renewables such as ethanol and biodiesel and has established minimum renewables volumes for the next several years. Bill Honnef of VeraSun will describe the ethanol supply outlook, the industry's challenges in distributing and blending it nationwide, and the prospects for a cellulosic ethanol production process that is competitive with current processes.

Sponsors

Screening Meeting
CB&I

Panel Meeting
Grace Davison

Opening Reception
BJ Chemical Services
Chevron Lummus Global
ExxonMobil Research & Engineering Company
Johnson Matthey Catalysts and Tracerco
KBC Advanced Technologies, Inc.
ProSys, Inc.

Hospitality Brochure
STRATCO, DuPont Refinery Solutions

Monday Morning Coffee Break
Air Products/Technip Hydrogen Alliance

Monday Afternoon Refreshment Break
BJ Chemical Services

Tuesday Morning Coffee Break
Praxair Inc.

Tuesday Afternoon Refreshment Break
CB&I

Wednesday Morning Continental Breakfast
OSIsoft

Energy Management Webinar
Matrikon

Conference Bags
GE Water and Process Technologies

Electronic Session Counters
Baker Petrolite Corporation

Monday
October 9, 2006

Plant Automation & Decision Support: Plenary Session

8:30 am – 10:00 am
McArthur Ballroom Salon 1

Presider
Steve Elwart, Ergon Refining

Keynote
"Open Operations and Maintenance"
Alan Johnston, President, MIMOSA

Business Drivers To Upgrade Automation Systems
Solomon Associates

Design & Operations Safety Session

8:30 am – 12:30 pm
Grand Room

This year's safety session includes presentations on recognizing hazards and control methods to eliminate them, an update of API's Recommended Practices 752 for siting temporary structures in operating plants, and the design and use of process pressure relief systems and blast overpressure studies.

Factors that Influence Vapor Cloud Explosion Energy
Jatin Shah, Principal Consultant, Baker Engineering and Risk Consultants, Inc.

No Hazard Left Behind
Ronald Meyers, Safety Engineer, Georgia Gulf

Blowdown Drums and Atmospheric Relief Systems
Patrick Berwanger, Founder and Former President, Berwanger, Inc.

Techniques for Hazard Recognition
David F. Coble, President, Coble, Taylor & Jones Safety Associates

Update of the API Facility Siting Task Force Work on 'Placement of Portable Buildings'
Willis Jernigan, Director, Health & Safety, Koch Industries

Plant-wide Systems Principles & Practices

8:30 am – 12:30 pm
McArthur Ballroom Salon 3

Presider
Jon Finch, Flying J

Control & Management of Highly Stressed Cooling Systems
GE Water & Process Technologies

Amine Plant/SRU/TGT/SWS: Basic 101 Overview
Huntsman

SCR and SNCR: Basic 101 Class – Overview, Design, Applications
GE Energy

How to Conduct an Effective Pre Start-Up Safety Review
AcuTech Consulting Group

Crude & Vacuum Distillation and Coking Q&A

8:30 am – 12:30 pm
McArthur Ballroom Salon 4

Panelists
Kevin Black, ConocoPhillips
Greg Cantley, Marathon Petroleum
Don Fruge, CITGO Petroleum
Alan Goliaszewski, GE Water and Process Technologies
Shri Goyal, Shell Global Solutions
Conrad Jenson, Holly Refining & Marketing

See page 15 for questions.

Monday
October 9, 2006

Plant Automation & Decision Support: Process Efficiency

10:30 am – 12:30 pm
McArthur Ballroom Salon 1

Presider
Steve Williams, Aspen Technologies

Implementation of Manufacturing Intelligence Within an Enterprise Monitoring System at Saudi Aramco
George Bauer, IndX Software

Using Dynamic Simulation to Validate Design and Operation
Majeep Jain, Engineering Specialist, *Jaleel Valappil*, Engineering Specialist, *Vibhor Mehrotra*, Engineering Supervisor, and *Amudha Valli*, Engineering Specialist, Bechtel Corporation

Increased demand for oil and gas has renewed interest in the technical development of refineries and gas plants with an emphasis on streamlining operations and improving process design which has led to tighter bounds on process design. Dynamic simulation is a proven tool for evaluating basic design of a plant during its evolutionary phase and simulating plant response under normal and critical situations. Dynamic simulations can also be used to perform controllability and operability studies.

This paper discusses engineering studies performed at Bechtel to validate process design and operation of an atmospheric distillation unit with a diluent rectifier column. A high fidelity dynamic model of the process plant was developed and used to study operability and controllability for various transient scenarios. Additional control strategies were tested and recommended to complement the existing control systems. Early operational guidelines were established based on these studies.

Large-Scale Adaptive Multivariable Controllers Eliminate Step Tests and Maximize Plant Performance
Umesh Mathur, President, Advanced Control Engineering Services,
Robert D. Rounding, Control Engineer, BP North American Gas SPU,
Daniel R. Webb, Plant Manager, INEOS Olefins & Polymers USA,
Victor L. Rice, V.P. Advanced Control & Optimization, Plant Automation Services, Inc.,
Barry Burr, Bryan Research & Engineering, and
Robert Conroy, Fluidity Engineering Solutions

A discussion of manifold benefits observed from use of an adaptive multivariable, model-predictive control (MPC) approach in two major light hydrocarbon plants; both projects were executed with absolutely no step tests. Operator acceptance has been exceptional.

Multivariable Control Without Step Testing, A Recent Implementation for BP in the UK
Roland Sims, APC Consultant, PAS,
David Lawrence, Instrument Technical Authority, BP, and
Victor Rice, VP APC&O Business, PAS

The session will present how a multivariable control was installed at a BP facility in the UK. The goal of the project was to install a multivariable control while minimizing plant disturbance during implementation of the project. The process of implementation will be illustrated showing exactly what steps were taken to minimize plant disturbance. The BP CATS project will be presented where not only was step testing not required, but where the commissioning process went very smoothly.

Plant Automation & Decision Support: "Big Shift Change"

1:30 am – 3:00 pm
McArthur Ballroom Salon 1

Identification and Capture of Knowledge at Risk – What the Refining Industry is Doing
John Paul Havener, Solomon Associates

The Performance Pentagon: Learning and Knowledge Management to Optimize Operations and Processes
Roger J. DeSanti, Professor, University of New Orleans, Louisiana State Univ.

How do you help people maintain, foster, and grow in their responsibilities? The five components necessary for effective learning and training will be discussed as they relate to gaining information and knowledge for the purposes of transformation and optimization in the workplace.

Planning the Lifecycle of the Automation System
Marjorie Ochsner, Senior Product Manager, Honeywell Process Solutions

A number of factors are important to consider when planning the life cycle of automation systems. This session will discuss various approaches and options for upgrades and migrations of aging DCS systems and other automation infrastructure. An analysis of the advantages and disadvantages of different approaches will be performed. Case studies based on real-world projects will be discussed to highlight specific scenarios and analyze the results that were achieved. The planning and implementation process will be emphasized to identify specific success factors.

Monday
October 9, 2006

Crude/Vacuum Distillation and Coking Principles & Practices

1:30 pm – 5:00 pm
McArthur Ballroom Salon 3

Presider
Kevin Proops, Flint Hills Resources

Desalting And Overhead System Corrosion
Nalco

Vacuum Unit Design: Dry or Wet?
Process Consulting Services

Coke Drum Reliability, Design and Replacement
CB&I

Delayed Coker Structure Safety
Flint Hills Resources

Coker Expansion Options
Foster Wheeler USA

Gasoline Processes Q&A

1:30 pm – 5:00 pm
McArthur Ballroom Salon 4

Panelists
A.S. Basu, Indian Oil
Angelo Furfaro, UOP
Ken Jinkerson, Western Refining
Steve Mathur, Chevron Products
John Quanci, Sunoco
Kerry Rock, CDTECH

See page 17 for questions.

Plant Automation & Decision Support: Supply Chain Management

3:30 pm – 5:00 pm
McArthur Ballroom Salon 1

Presider
Cliff Pedersen, Suncor Energy

Optimization of Feedstock Logistics Management and Blending
Cristiano Pinto de Costa, Logistic and Custody Transfer Engineer, COPESUL,
Gilberto Müller, Automation Process Control Engineer, COPESUL,
Érica R.P. Claro, Automation Senior Process & Control Engineer, COPESUL
Gastão D. C. Moraes, Automation Senior Process & Control Engineer, COPESUL,
Arturo Cervantes, Senior Consultant, Optience

COPESUL will describe optimization of raw material supply operations including ships receiving material, intermediate storage allocation, pipelines programming and control, blending and integration with planning and production scheduling optimization tools.

Oil and Gas Supply Chain Global Competitiveness: A Country in the Balance
Maria Victoria Riaño Salgar, Project Manager, Ecopetrol S.A., and
Andrew R. Nelson, Resolution Product Manager, Matrikon Inc.

Ecopetrol undertook a major initiative to enhance its competitiveness in international markets which involved a major rework of its business and financial systems to adopt industry best practices. One of the key strategies was to put in place a volumetric system to be the single source of validated volumetric information across the entire supply chain.

The steps taken by Ecopetrol greatly improved its knowledge of the state of the business, enabling tighter control of costs, more effective optimization of inventories and an enhanced ability to deal with external entities. The result is more effective control and greater competitiveness in national and international markets.

Petroleum Supply Chain Management Challenges and Solutions
Greg Janecek, Director, Business Development Petroleum Oil & Gas, Aspen Technology, Inc.

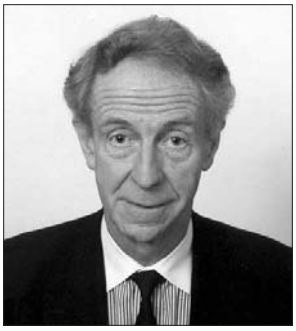
As a result of tightening supply of crude and finished products, most oil companies today have some initiatives in place to streamline their supply chains (by better planning and execution) and develop competencies to manage challenges like supply chain disruptions. This paper will present a case study showing what types of solutions companies are seeking, the reasons for these solutions, the anticipated benefits and the overall impact to the work process.

Tuesday
October 10, 2006

2006 NPRA Q&A Peter G. Andrews Lifetime Service Awards

8:00 am – 8:30 am
McArthur Ballroom Salon 4

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.



Roger O. Pelham

Brian Moyse

Plant Automation & Decision Support: Security Issues

8:30 am – 10:00 am
McArthur Ballroom Salon 1

Presider
Blake Larsen, Western Refining

Three Basic Steps Towards Cyber Security in Your Process Control Environment
Rick Kaun, Senior Security Consultant, Matrikon Inc.

Since most control systems do not allow for the deployment of pure IT-based best practices it is up to the process control asset owners to come up with creative and intelligent ways of securing their systems on their own. Through extensive work with many clients in the process control space, we have come up with a number of solutions that will help move process control environments towards better cyber security. This presentation examines three different case studies each of which offers a different approach to security. The specific topics and benefits of these examples range from the power of planning and measuring your environment to the basics of a secure architecture and the ability to audit and log all remote access into your process control environment.

I3P Update
Ben Cook, Sandia National Laboratories

Presentation on Cyber Security from a Federal Level
Marcus Sachs, SRI International

Gasoline Principles & Practices

8:30 am – 12:30 pm
McArthur Ballroom Salon 3

Presider
Jerry Lane, BP

Unit Monitoring Best Practices: Critical Variables in Catalytic Reforming
Chevron

Principles and Practices Used in Catalytic Reformer Optimization
T-Squared Technologies

Principles and Practices to Manage Chloride on a Catalytic Reformer Stabilizer
Frontier Oil

Key Considerations for a Reforming Unit Revamp
UOP

Design and Operation of NHT Strippers to Protect Catalytic Reformers
Roddey Engineering

Hydroprocessing Q&A

8:30 am – 12:30 pm
McArthur Ballroom Salon 4

Panelists
Mike Dabkowski, Sunoco
Ted Hallen, Haldor Topsoe
Tom Kiliany, ExxonMobil Refining and Supply
Garry Kirker, Valero Energy
David Roland, Marathon Petroleum
James Turner, Fluor
Paul Zimmerman, UOP

See page 19 for questions.

Tuesday
October 10, 2006

Plant Automation & Decision Support: Process Safety (Part I)

10:30 am – 12:30 pm
McArthur Ballroom Salon 1

Presider
Rich Bowman, TOTAL Petrochemicals

Abnormal Situation Management Update
Dave Strobhar, Beville Engineering

Abnormal Situation Prevention In More Complex Systems
Ravi Kant, Principal Engineer, Emerson Process Management, and
Roger K. Pihlaja, Principal Engineer, Emerson Process Management

Abnormal situations include unexpected equipment and process unit malfunctions that result in significant anomalous operating conditions. The concepts and applications of abnormal situation prevention (ASP) will be extended to more complex systems and unit operations which involve multilevel collaborative diagnostics.

Alarm Management – More Than a Nuisance. A Business Improvement Opportunity
Bill Sheldon, Advanced Process Control Engineer, Chevron Phillips Chemical Company LP

Alarm management is often considered to be an issue of "safety" alone. While it is definitely a safety concern, alarm management can also be a great way to improve the bottom line!

This presentation offers an additional perspective on alarm management activities and provides sound business justification for the implementation of alarm management practices while promoting sound and prudent safety practices that act as a proper foundation for any alarm management initiative.

State Handling in Automation Technologies
Mik Marvan, Product Manager, Alarm Management Solutions, Matrikon Inc.
Rohit Patwardhan, Product Manager, Control Asset Optimization, Matrikon

Industrial processes are inherently complex and exist in many states. Distributive control and supervisory systems are changing to better address this reality. This workshop will delve into the topic of state handling using automation technologies in the domains of regulatory control, advanced process control, and advanced alarming methods.

Plant Automation & Decision Support: Process Safety (Part II)

1:30 pm – 3:00 pm
McArthur Ballroom Salon 1

Presider
Rich Bowman, TOTAL Petrochemicals

Panel Discussion on Process Safety
Bob Gale, Emerson Process Management
Eddie Habibi, PAS
Mik Marvan, Matrikon
Kevin Staggs, Honeywell Process Solutions

Operating company panelists and additional panelists to be announced.

Tuesday
October 10, 2006

Hydroprocessing Principles & Practices

1:30 pm – 5:00 pm
McArthur Ballroom Salon 3

Presider
Brent Stratton, Valero Energy

Hydrogen Generation Technology / Fundamentals
Air Products & Chemicals

ULSD Implementation Update
LYONDELL-CITGO Refining

Design/Operational Considerations for Hydrotreater Revamps for ULSD Operation
Fluor

Hydroprocessing Catalyst Activity / Deactivation Mechanisms and Management
Advanced Refining Technologies

FCC Q&A

1:30 pm – 5:00 pm
McArthur Ballroom Salon 4

Panelists
Dave Brosten, Shell Global Solutions
Alan English, KBC Advanced Technologies
Mark Gregory, Flint Hills Resources
Ziad Jawad, Shaw Stone & Webster
Dennis Kowalczyk, Grace Davison
Ken Peccatiello, Valero Energy

See page 21 for questions.

Plant Automation & Decision Support: "The Melting Pot"

3:30 pm – 5:00 pm
McArthur Ballroom Salon 1

Presider
Paul Millner, Chevron

ARRIS – Architecture for Refinery Real-time Interoperable Systems
Michael V. Brooks, Chevron

Self Organizing Networks: Discovering a New Emerging Wireless Technology
Dan Daugherty, Emerson Process Management

Strategic Implementation of Wireless Technologies
Brent E. McAdams, FreeWave Technologies, Inc.

The evolution in wireless technologies has opened the door to a new class of plant automation architecture that offers adopters a significant strategic advantage. Driven by significant and measurable cost savings in engineering, installation, and logistics, as well as dramatic improvements in the frequency and reliability of field data collection, automation experts and IT professionals are presented with an opportunity to deliver a major, positive impact to their respective company's bottom line.

This paper will explore the attributes of various wireless technologies, which include security, the elimination of wiring, power management and the ability to embed wireless into existing OEM technologies. Additionally, this paper will discuss the requirements of typical applications and deployment options that match capabilities with application needs and then examine alternatives in which wireless architecture can interface with existing systems for the purpose of preserving investments in existing infrastructure.

Wednesday
October 11, 2006

FCC Principles & Practices

7:30 am – 11:00 am
McArthur Ballroom Salon 3

Presider
Dave Mendrek, Murphy Oil

FCC Unit Industry Survey
Murphy Oil and UOP

Catalyst Section Key Equipment Health Monitoring
Flint Hills Resources

Main Column and Gas Con Section Key Equipment Health Monitoring
Murphy Oil

Performance Optimization Discussion
KBR and Shell Global Solutions

Performance Optimization Examples
Valero Energy, KBR, and Shell Global Solutions

Plant Automation & Decision Support: Energy Management

7:30 am – 9:00 am
McArthur Ballroom Salon 1

Presider
Anne Keller, Jacobs Consultancy

Energy System Real Time Optimization
Derya Uzturk, Senior Engineer, ExxonMobil Research and Engineering Company,
Howard D. Franklin, Senior Engineering Associate, ExxonMobil Research and Engineering Company,
John M. Righi, Senior Engineer, ExxonMobil Research and Engineering Company, and
Apostolos T. Georgiou, Senior Engineering Associate, ExxonMobil Research and Engineering Company

An energy system real-time optimization (ERTO) application is an online computer program consisting of a model of the utility system, a mathematical optimizer, a graphical user interface, and an interface to the plant process control system. The objective of the application is to determine and implement the energy system operating targets which minimizes the cost of utilities. ExxonMobil has developed significant experience delivering ERTO applications to refineries. ExxonMobil's experience at their Rotterdam Refinery will demonstrate how the technology can be applied.

An On-Line Advisory System for Optimizing Refinery Utility Systems
David F. Wilson, Flint Hills Resources,
Abraham Jimenez, Flint Hills Resources,
Jose de Souza, Aspentech, Inc.

Flint Hills Resources' Corpus Christi Refinery implemented Aspen Utilities to provide an on-line advisory system for optimizing utilities operations decisions. The paper will describe the goals and objectives of the project, some of the implementation experience and some recommended best practices for implementing and sustaining similar systems.

Industrial Energy Management by Using an On-line Tool
David Nelson, Chief Financial Officer, Nelson & Roseme, Inc.,
Susana Benedicto, Process Engineer, Repsol YPF,
Diego Ruiz, Chief Operating Officer, Soteica Europe, and
Carlos Ruiz, Director, Advanced Applications, Soteica Europe

Repsol's La Coruña Refinery is a high conversion site with coking and FCC units. The energy system is based on five steam headers and two cogeneration plants producing steam and electricity. Electrical deregulation and mandated CO2 emissions reductions have provided challenges. This presentation describes the tasks performed using modern on line information system tools (Visual MESA) to assist with the energy system management. A full model of the energy system has been done, including all of the constraints.

Plant Automation & Decision Support: Concluding Keynote

9:30 am – 11:00 am
McArthur Ballroom Salon 1

Presider
Rich Bowman, TOTAL Petrochemicals

The State of the Refining Industry Today and the Roles that Manufacturing and Process Control Play in It
Steve Cousins, Lion Oil

A.S. Basu is Technical Head of Indian Oil Corporation's Mathura Refinery where he recently led the pre-commissioning and start-up activities for the diesel hydrotreating, hydrogen and Penex units in 2005. Basu has 30 years of experience encompassing Operations, Technical Services, Planning, Safety and Environmental Protection at Indian Oil's various refineries. Basu has also worked at Indian Oil's New Delhi headquarters where he was responsible for production planning and distribution of petroleum products throughout a complex, nationwide retail network. Basu is a recognized FCC expert with both hands-on and technical service experience. Some of his significant contributions include conceptualization and formulation of proposals for adapting Indian Oil's refineries to changing fuel quality requirements.

Basu is a graduate of India's Chemical engineering school, Jadavpur University.

Kevin Black is Senior Consulting Engineer for ConocoPhillips, Carson, California. In his current position he is responsible for providing day-to-day process engineering and technical support for the vacuum distillation and coking Units. Kevin joined ConocoPhillips in 2002, following assignments in process engineering, operations, project management, purchasing as well as technical management with Shell Oil, Unocal, TOSCO and Phillips Petroleum.

Kevin holds a BSChE from North Carolina State University and is a Registered Professional Engineer in California.

Dave Brosten is an Advisor in Shell Oil's Central Support for FCC Operations in Houston, TX where he is responsible for troubleshooting unit problems, catalyst optimization and selection, and hardware optimization. Dave has also been involved in several major FCC revamp projects to upgrade units to close-coupled riser designs with high performance strippers and improved regeneration. Dave has spent his entire career at Shell Oil refineries supporting the catalytic cracking technologies, providing direct process support to FCCU's and FCC revamp projects. Dave has two patents in the FCC area.

Dave holds a BSChE from Montana State University.

Greg Cantley is the Crude & Vacuum Distillation Technologist for Marathon Petroleum Company and is actively involved with the expansion, optimization, and troubleshooting of Marathon's eleven crude and vacuum units. Greg started his career in Ashland's Process Engineering Department in Catlettsburg, KY performing process design work for all of the Ashland refineries. Later he joined Marathon and transitioned to troubleshooting and optimization of refinery distillation towers throughout the Marathon refinery system.

Greg holds a BSChE from West Virginia Institute of Technology.

Alan English is Senior Staff Consultant for KBC Advanced Technologies in Parsippany, NJ. Al has nearly 30-years experience in process engineering, R&D, troubleshooting, technology licensing, model development and design. He has provided consulting services on more than 40 FCC units worldwide, and advises clients on process optimization, design review, catalyst selection, troubleshooting and monitoring programs. He is also chairman of the FCC Process Technology Group which is responsible for developing FCC and alkylation technology within KBC. Before joining KBC in 1995, Al held research, process engineering and operations positions with Gulf, Chevron and Sun.

Al holds a BSChE from Lehigh University, a MS in technology management (EMTM) from Stevens Institute of Technology, and a PE license in PA. Al is the author or coauthor of 12 publications and holds 3 patents in FCC technology.

Don Fruge is the Process Design and Strategic Planning Manager at CITGO Petroleum's Lake Charles, LA refinery. He presently supervises the refinery's laboratory and all refinery process engineering, which includes unit monitoring and troubleshooting; catalyst and chemical evaluations; energy management and optimization; turnaround planning and support; and profitability initiatives. Prior to this position, Don served as Logistics Manager, Senior Process Design Engineer, Operations Field Engineer, Operations Engineering Section Supervisor, Economics Engineer, and Process Engineer.

Don holds a BSChE from McNeese State University.

Angelo Furfaro is Senior Manager of Petrochemical Operating Technical Services in the Process Technology and Equipment group of UOP. He is responsible for providing technical support to UOP licensees in all aspects of Platforming/ Isomerization/Aromatics and Aromatics Derivatives/Olefins/Detergents and Petrochemical technologies, including establishing operating procedures; optimizing unit performance; troubleshooting; and coordinating engineering revamps. Since joining UOP, Angelo has held positions in Experimental Design and Development, Field Operating Services, Separations & Aromatics Operating Technical Services, Platforming Operating Technical Services, and as Manager of both Platforming and Aromatics Operating Technical Services and has experience in a wide variety of refining process units.

Angelo holds a BSChE from the University of Colorado, Boulder.

Alan Goliaszewski is Senior Research Technologist for GE Water & Process Technologies in The Woodlands, TX. Over the past 14 years, Alan has been active in research and technical service activities for refinery process additives and fuel additives. He has held the position of Hydrocarbon Process Group Leader and has led activities for a broad range of refinery issues including fouling control, corrosion inhibition, H2S scavenging, alkylation, and phase separation including desalting, antifoaming, and solids settling. Prior to this assignment, Alan spent six years in the Unique Molecule Discovery Group for GE in Trevose, PA.

Alan holds a BS degree from St. Joseph's University, and MS and PhD degrees in Chemistry from Princeton University.

Shri Goyal is Shell Oil's Advisor of Coking and Heavy Oils Processing where he provides worldwide technical support and "best practices" development including safety, reliability, troubleshooting, monitoring, optimization, expansion and project development. He also leads Shell Oil's Coking TechNet group. Shri joined Shell Oil in 2000 after 20 years with Amoco where he worked on crude units, FCCUs, hydrotreaters, deasphalters and delayed cokers. He holds 11 US patents in refining processes.

Shri holds a BSChE from IIT, New Delhi, MSChE from IIT, Bombay and a PhD ChE from the University of Utah. He also holds diplomas in Ceramics Engineering, Engineering Administration and Business Management.

Mark Gregory is the Engineering and Reliability Manager at Flint Hills Resources' Pine Bend, MN refinery where he is responsible for all of the technical support groups (Senior Process Engineering, Fixed Equipment Engineering and Inspection, Instrument and Electrical Engineering, and Maintenance) and the Project Group which is responsible for the facility's capital and expense spending. In his 25-year career with Flint Hills Resources he has held positions at the Pine Bend and Corpus Christi refineries including technical service for the FCC/ Alkylation/Coker/Hydrotreating areas and as Assistant Operations Manager for the FCC/Alkylation/Crude/HDC and Coker areas.

Mark holds a BSChE from Michigan Technological University.

Ted Hallen is Senior Staff Engineer for the Hydroprocessing Group at Haldor Topsoe. Ted's experience includes 37 years in the process industries, with over 17 years at Unocal with responsibilities in operations, project execution, development, and technology sales and licensing. Ted's last position at Unocal was in the Process Technology and Licensing Business Group as Regional Sales Manager. Ted has been with Haldor Topsoe for 11 years in sales management and engineering positions. He is currently a Senior Staff Engineer where he functions as a consultant for other engineers, interfaces with the manufacturing and research organizations within the Haldor Topsoe Group as well as handling some selected sales responsibilities.

Ted holds a BSChE from the University of Utah.

Ziad Jawad is an FCC Design Specialist for Shaw Stone & Webster where he is responsible for process engineering in reliability and optimization FCC revamp projects. He previously spent 7 years as an Operations Support Engineer at the Delaware City Refinery. His responsibilities included process monitoring, troubleshooting, optimization, project design, and turnaround support. He has experience in the areas of FCC, Alkylation, Polymerization, Isomerization, and Amine / Caustic Treating.

Conrad Jenson is the Operations Manager for Holly Refining and Marketing Corporation's Woods Cross, UT refinery. He has 16 years of refining experience with both engineering and operations assignments including Crude, SDA, FCC, HF Alkylation, and Sulfur Recovery units. Prior to joining Holly, Conrad held the position of Production Team Leader at the ConocoPhillips Sweeny refinery.

Conrad holds a BSChE from the University of Utah.

Ken Jinkerson is Director of Operations for Western Refining. In his 29 years in the refining industry his assignments have included Manager of Technical Services and Manager of Economics and Planning and he has worked for Shell Oil, Pester Refining, Derby Refining, Coastal Corporation and Mapco.

Ken holds BSChE and MSChE degrees from the University of Missouri at Rolla.

Tom Kiliany is Complex Engineer for ExxonMobil Refining and Supply Corporation in Torrance, CA. Tom is responsible for technical guidance of the hydrocracker, FCC feed hydrotreater, naphtha pretreater and reformer, distillate desulfurizer, hydrogen production, and sulfur recovery units. With 27 years of experience at ExxonMobil, Tom has had assignments in process development, catalyst research and development, as well as technical service. The technical service assignment led to grassroots startups of new technology in the Far East and Middle East.

Tom holds a BSChE in Chemical Engineering, with distinction, from Pennsylvania State University and a MSChE from Villanova University. He has received a total of 18 U.S. and foreign patents.

Dr. Garry Kirker is Director of Hydroprocessing for Valero Energy Corp. where he is responsible for the development of new hydroprocessing projects, expansion of existing units and optimization of Valero's hydroprocessing assets. He has worked in the refining industry for over 25 years and his professional experience includes over 22 years with Mobil and ExxonMobil in refining technology leadership positions focusing on hydroprocessing, including hydrotreating, hydrocracking and gas-to-liquids technologies.

Garry holds a Ph.D. in Physical Inorganic Chemistry from Iowa State University in the Kinetics and Mechanisms of Catalytic Systems.

Dennis Kowalczyk is a National Technical Sales Manager with Grace Davison. He is responsible for coordination of FCC catalyst & additive sales and technical service activities in the Eastern United States and Canada. He has extensive experience in FCC catalyst evaluation, FCC unit optimization, FCC reactor effluent studies, and process studies designed to select new FCC technology for unit revamps. Prior to joining Grace Davison, Dennis spent 19 years at Refining Process Services (RPS) as Director of Operations and 5 years with the Gulf Oil Corp. Dennis co-founded RPS as a consulting company dedicated to providing specialized independent technical and consulting services to the petroleum refining industry. At RPS, Dennis created TheFCCNetwork.com, a web site devoted to the subject of fluid catalytic cracking. He also co-developed and presented a number of training courses for FCC and petroleum refining.

Dennis holds a BSChE from West Virginia University and is a Licensed Professional Engineer in Pennsylvania.

Steve Mathur is the Sulfuric and HF Alkylation Team Leader and Process Expert for Chevron Global Refining in Richmond, CA. He is responsible for supporting all Chevron alkylation and olefins business units worldwide including troubleshooting operations and evaluation of new technologies. He began his career with an Exxon affiliate and worked for Champlin and Sunoco before joining Chevron 15 years ago.

Steve holds a BSChE from the Indian Institute of Technology, Roorkee and a MSChE from the University of Detroit.

Ken Peccatiello is a Director of FCC Technologies for Valero Energy Corporation in San Antonio, TX. Ken has over 28 years experience in FCC operations and technology including five years as ChevronTexaco's worldwide FCC expert providing best practice development and implementation, I&T support, operational support, project development and implementation, and training of personnel. He has also worked for WR Grace's technical service division and as Technical Superintendent at their Lake Charles, LA catalyst manufacturing facility. He began his career with Amoco Oil in 1977 at the research facility in Naperville, IL where he was involved with multiple FCC studies and the developmental stages of FCC resid processing. He later became Operating/Process Engineer for FCCU's #1 and #2 at the Amoco Texas City, TX refinery.

Ken holds a BSChE from the Illinois Institute of Technology.

Dr. John Quanci is the Manager of Process Technology for Sunoco Refining & Supply. The Process Technology group consists of the process specialists who are responsible for supporting and leading the evaluation, transfer and implementation of technology for all Sunoco locations as well as optimization and troubleshooting activities. John has led the reforming, isomerization, hydroprocessing and cleans fuels groups in R&D, refinery technical departments, and process engineering asset support groups. John has worked in the petroleum industry for more than 15 years in the U.S. and overseas as well as several years experience in the electronics specialty chemical industry.

John holds a BSChE from Cooper Union and M.A. and PhD degrees in Chemical Engineering from Princeton University.

Kerry Rock is Director of Technology for CDTECH in Houston, TX. He is currently responsible for directing technology development and marketing process technologies to the refining and petrochemical industries. He has over 35 years experience in the oil and gas, refining, chemical, and petrochemical industries which includes research and development, process design and management of projects for dehydrogenation, desulfurization, gasoline reformulation, fuel ethers, methanol, hydrogenation, oil and gas production, transportation and processing, biomass gasification, flue gas desulfurization and environmental emissions control.

Kerry holds BSChE and MSChE degrees from the University of Houston.

David Roland is the Technical Service Manager for Marathon Petroleum Company at the Catlettsburg, KY refinery where he is responsible for the refinery optimization, process engineering and process control groups. During his 19 years with Marathon he has held positions in refinery technical service, capital budget development, linear program modeling, controls, and operations planning at the Detroit and Garyville refineries and at Marathon headquarters in Findlay, OH.

Dave holds a BSChE from the University of Michigan and a MSChE from Wayne State University. He is a licensed professional engineer in the State of Michigan.

James Turner is Director II, Process Technology & Engineering for Fluor in Houston, TX. His 18 years with Fluor includes experience in process design of new refinery units and revamps and his technology expertise lies in hydrotreaters and hydrocrackers, refinery configuration, hydrogen management, clean fuels regulations, distillation, and ammonium bisulfide corrosion in hydroprocessing processes.

James holds a BSChE from Texas A&M University and is a registered professional engineer in Texas.

Paul Zimmerman is a senior hydroprocessing specialist in the Catalysts, Adsorbents, and Specialties group for UOP LLC. He is responsible for providing technical support for UOP hydroprocessing catalysts including optimization, troubleshooting, and operating procedures. Paul has held hydroprocessing positions at UOP in Development, Field Operating Services, and Operating Technical Services. Prior to UOP, he worked for Unocal's Processing Technology and Licensing group in Research and Development conducting hydrocracking pilot plant studies for new catalyst commercialization and process improvements.

Paul holds a MSChE from the University of Idaho.

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 27-29 in The Woodlands, TX, where the Committee selected 113 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 2006 Screening Committee:

Matthew Baebler, Tesoro Corporation
Dave Bartholic, Bar-Co Processes Joint Venture
Vito Bavaro, Criterion Catalysts & Technologies
Sandie Brandenberger, ConocoPhillips
David Brossard, Chevron Corporation
Ken Bruno, Albemarle Catalysts
Tim Campbell, Axens North America
Michael Capone, Praxair
Robert Carpenter, GE Water & Process Tech.
Bill Cates, Hunt Refining Company
Ken Chlapik, Johnson Matthey Catalysts
Geri D'Angelo, Advanced Refining Technologies
Bob Davis, R.E. Davis Chemical Corporation
Larry Denk, Aggreko
Daryl Dunham, ConocoPhillips
Gary Everett, LYONDELL-CITGO Refining
CJ Farley, BASF Catalysts
Jon Finch, Flying J
Angelo Furfaro, UOP
Joey Hagmann, Placid Refining Company
Stephen Haik, Motiva Enterprises
Fred Hill, Marathon Petroleum Company
David Hunt, Grace Davison
Jeff Johns, Chevron Corporation
Cheryl Joyal, BP
Daniel Kennedy, Pasadena Refining System
Garry Kirker, Valero Energy Corporation
Larry Kraus, Albemarle Catalysts
Lawrence Kremer, Baker Petrolite Corporation
Larry Lacijan, UOP
Jerry Lane, BP
Warren Letzsch, Shaw Stone & Webster
Larry Lew, Chevron Corporation
Glenn Liolios, STRATCO-DuPont
Linda Lord, Western Refining Company
Sam Lordo, NALCO Company
Bob Ludolph, Sunoco
Aris Macris, KBR
Tariq Malik, CITGO Petroleum Corporation
Ron Marrelli, Holly Refining & Marketing
Chris McDowell, Tesoro Corporation
Harvey McQuiston, Shaw Stone & Webster
David Mendrek, Murphy Oil USA
Rik Miller, ConocoPhillips
Michael Mills, GE Water & Process Technologies
Paul Moote, Sinclair Oil Corporation
Brian Moyse, Haldor Topsoe A/S
Donald Mulraney, CB&I
Dan Neuman, Tricat Industries
Joe Niedecken, Valero Energy Corporation
Mart Nieskens, Shell Global Solutions
Kenneth Peccatiello, Valero Energy Corporation
Roger Pelham, Pelham Consulting
Randy Peterson, STRATCO-DuPont
Kevin Proops, Flint Hills Resources
Kerry Rock, CDTech
Bob Roddey, Roddey Engineering Services, Inc.
Gene Roundtree, ExxonMobil Research & Engineering
Glen Scheirer, ExxonMobil Research & Engineering
Jeff Spearman, Barnes and Click
Brent Stratton, Valero Energy Corporation
Michael Toole, United Refining Company
Steve Tragesser, KBR
Lee Turpin, Turpin Consulting
Keith Whitt, Shell Global Solutions
Bill Wilson, BP Products North America
Irl Zuber, Motiva Enterprises

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Al Cabodi, U.S. Oil & Refining Company
Ernie Cagle, Murphy Oil USA, Inc.
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Larry Cunningham, Afton Chemical Corporation
Steve Cousins, Lion Oil Company
Joel Elstein, Flying J
Rick Fontenot, Lyondell Chemical Company
Paul Fritz, Sinclair Oil Corporation
Jim Gillingham, Valero Energy Corporation
Steve Jackson, Hunt Refining Company
Vince Kelley, Sunoco
Pat Kimmet, CHS, Inc.
Greg Kropf, Chevron Corporation
Dave Lamp, Holly Corporation
Mike Lewis, Motiva Enterprises
Keith Osborn, Coffeyville Resources
Joe Coco, Flint Hills Resources
Jaspal Singh, Indian Oil Corporation Limited
Stephen Smiejan, Hess Corporation
Jim Stump, Frontier El Dorado Refining Company
Roy Whitt, Marathon Petroleum Company

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Paul Millner, Chevron Corporation
Cliff Pedersen, Suncor Energy
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Paul Bucknam, Hess Corporation
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Bill Jones, CITGO Petroleum Corporation
Faheem Kazimi, Pasadena Refining System
Fritz Kin, Marathon Petroleum Company
Steve Lackey, Sinclair Oil Corporation
Rock Lowery, ConocoPhillips
Brenda Overton, Air Products and Chemicals
Gil Parker, Placid Refining Company
Randy Patton, Valero Energy Corporation
Shade Schroeder, National Cooperative Refinery Association
Eddie Seal, TOTAL Petrochemicals USA
Dick Smullen, HOVENSA
Joe Thurm, Sunoco
Bill Turnage, Murphy Oil USA
Larry Whipple, Western Refining Company

Rick Brown, NPRA
Secretary

Crude / Vacuum Distillation and Coking

Crude Preheat and Desalting

1. Have you experienced fouling on the crude side of preheat exchangers in desalted crude service as a result of caustic injection for chloride control? Please discuss your experiences.

2. What processing issues have occurred from crude oils containing elements such as arsenic, mercury and selenium that pose health, safety and environmental issues? Have there been any recent improvements in detection methodologies for heavy metals in crude oil? Have you had success using the desalter to remove heavy metals from crude oil?

3. What methods are used to remove solids from desalter effluent water? Can you provide design criteria for these applications?

4. Are there any new technologies for monitoring desalter interface levels? How do they differ from conventional floats (internal and external), capacitance probes and agar probes? What parameters (service factor, serviceability, etc.) are important in selecting interface level detectors?

5. Many refineries are experiencing problems with high conductivity crudes or crude components. How do these conductive components affect desalting? What precautions should refineries take when processing high conductivity crudes?

6. What has been your recent experience with improved heat exchanger technology (e.g. twisted-tube, helical baffle, plate and frame, rod-baffle) in heavy oil and crude preheat services? What methods have been used to effectively clean these bundles? What has been your experience with chemical vs. mechanical (high pressure water) cleaning? Please compare the cost and effectiveness of each cleaning method.

Opportunity Crudes

7. What problems have you experienced processing crudes with high levels of amine-based H2S scavengers?

8. What is your experience with processing high calcium content crudes (such as Doba)? What problems do high calcium levels cause and what levels of calcium can be tolerated without operating problems? What mitigation strategies have been attempted (both successful and unsuccessful)?

9. Is there a correlation between high TAN jet fuel metals levels and JFTOT test failure? Will a mild caustic wash improve stability?

10. What additives used in crude oil production and transportation impact crude unit operation and reliability? What forums exist to discuss and evaluate impacts of existing and new chemicals used in crude oil production on crude unit operation?

Process

11. How have you minimized entrainment from the vacuum tower flash zone? Please describe the c-factor, wash oil contaminant levels, wash oil rate, and tower internals employed in your more challenging applications. Do you collect the overflash / slop wax? Where is it routed? How do you minimize coking in the slop wax piping, pumps, and meters?

12. What are the available options to boost diesel cetane other than conventional hydrotreating and hydrocracking? Is increasing distillate T90 a practical way to improve pool cetane?

Coker Operations

13. What other feedstocks besides vacuum tower bottoms or FCC slurry are fed directly to the coker (crude, fuel oil, recovered slop oil, etc.)?

14. What is your experience regarding the maximum operating temperature for the coker fractionator bottoms liquid? What is the residence time at this temperature?

15. What is the typical overlap (ASTM Method D2887, in °F) between the heavy coker gas oil (HCGO) 5% point and the light coker gas oil (LCGO) 95% point? What is your LCGO D2887 95% target, and what determines it?

16. What range of energy consumption (MBTU/bbl) is typical for cokers? What process changes provide the most cost effective improvements in energy efficiency, and what is the best way to monitor energy consumption to ensure optimal performance? Is there a correlation between liquid yield and energy consumption?

17. Have you closed a water balance around the coker furnace, drum and fractionator? What fraction of the water comes from steam purges? What has been done to reduce steam purges? What are typical values for sour water production per barrel of coker feed? To what coking cycle time does this correspond?

18. To what coke drum outage do you operate your cokers? Please reference the outage to the face of the top center nozzle, as well as the top weld seam and tangent line. What are the average coke drum vapor velocities and drum diameters for these outages?

19. If you are producing shot coke, what is the estimated density of your coke while it is still in the coke drum and what is its estimated void fraction?

20. Is there a relationship between green coke's percent volatile matter (VCM) and calcined coke's vibrated bulk density (VBD)? Does this relationship change with coker feed type?

21. In your experience, are coke drum hot spots (blowouts) related to feed properties and/or coke drum operating conditions? What indicators do you use to predict hot spots? What steps do you take to reduce the impacts of hot spots?

22. Have you observed post-switch coke drum foaming while initially steaming the coke drums to blowdown? What can cause this to occur, and how do you minimize foaming?

23. Have you experienced elevated coke drum vapor temperature (>300°F) at pressures below 5 psig after the coke bed is covered with water? How do you explain this?

24. What is the most effective way to inject coke drum overhead quench? Should the injection be in the horizontal or vertical run of the vapor line? Are spray nozzles effective? What is your typical frequency for cleaning vapor lines? Where is most of the plugging occurring in your system?

Coker Equipment

25. What are your maximum allowed coker heater tube metal temperatures and how do you measure tube temperatures? How does metallurgy (5 or 9% chrome, stainless steel or high nickel alloy) affect this limit? Have you used ceramic-coated radiant tubes, and if so, has this extended heater run length?

26. Do you have a split feed/dual entry into your coke drums? Have there been problems with feed line plugging and keeping both flow paths open?

27. What has been your experience with coke drum switch valves (feed and vapor)? What are the pros and cons of ball valves vs. Wilson-Snyder switch valves?

28. What type of coke drum level detectors have you used and how successful are they?

Gasoline Processes

Alkylation

29. What are the operational handles used to increase product octane when alkylating propylene and/or isopentane?

30. How have you handled the isobutylene diverted from MTBE production? If it has been fed to the alkylation unit, describe the impact on alkylate yield, acid consumption, and octane.

31. What is the current status of solid bed alkylation technology? For those working on this technology, how does it compare in yield, octane, capital and operating costs with current alkylation processes?

32. What is the optimum turnaround interval for alkylation plants? What benefits can be realized if the turnaround interval is out of step with that of the FCCU and what modifications need to be made to the alkylation unit to enable "out of step" intervals?

33. API Recommended Practice 751 calls for all joints in HF acid service to be inspected at least once every ten years. How do you comply with this recommended practice? Have you used non-destructive testing techniques to avoid breaking and re-making flanges?

34. We have seen high corrosion rates in our spent acid degasser and run-down lines due to heated acid. What is your experience with operating the degasser without heating, and is there any downside to this operation?

35. What recent advancements have been made in sulfuric acid alkylation technology?

36. Have you had a de-isobutanizer feed line failure in a sulfuric acid alkylation unit? If so, what was the root cause and what steps did you take to prevent future incidents?

Ethanol

37. Discuss how ethanol blending requirements have impacted refining operations including: 1) blend formulations; 2) octane balance; 3) driveability specifications; 4) lab testing and procedures; and 5) reformer severities.

38. What needs to be considered to rerun gasoline containing ethanol?

Extraction

39. Corrosion issues have been encountered in solvent-based aromatic extraction units where the feeds are derived from naphtha reforming as well as purchased reformates and thermally cracked naphthas. Purchased feedstocks are likely to contain oxygen, potentially leading to corrosion in oxygen strippers as well as the extraction unit. What are the corrosion mechanisms and how are they best addressed? Are there reliable methods to check for oxygen ingress?

Hydrotreating

40. How have you handled fouling/pressure drop problems for the following cases? 1) processing visbreaker or coker naphtha mixed with straight run naphtha in a diene saturation reactor upstream of a hydrotreater for catalytic reformer feed; 2) processing FCC light gasoline mixed with light straight run naphtha in a hydrotreater upstream of a C5/C6 isomerization unit?

41. How robust/flexible is your FCC gasoline post-treatment unit in terms of accommodating large changes in feed sulfur and/or feedrate?

42. What is a typical octane loss across an FCC gasoline hydrotreater?

Isomerization

43. What is the commercial availability of isomerization catalyst that can tolerate feed moisture in excess of 100 ppbw? What are the moisture limits for these catalysts? Describe your experience with this type of isomerization catalyst.

44. What is the optimum turnaround interval for C5/C6 isomerization units when the catalyst is not replaced? What are the differences between chlorided and non-chlorided isomerization catalysts? How does the dry out procedure change when chlorided catalyst is not changed out during the turnaround?

45. Chlorides can slip into LPG and isomerate streams during start up and unit upsets. Have you provided chloride guards for these streams? Describe your experience.

46. What octane do you actually achieve in a once-through C5/C6 isomerization unit: 1) without deisopentanizing the feed? 2) with deisopentanized feed? What is the maximum octane that should be achieved in each operation?

Reforming

47. Is sulfur injection (e.g. DMDS) to avoid metal-catalyzed coke formation in a continuous catalyst regeneration reformer widely practiced? Describe your experience.

48. What parameters do you use to determine when to change the catalyst in a catalytic reforming unit? Are these parameters the same in continuous regeneration, semi-regenerated (semi-regen), and cyclic units? In the selection of replacement catalysts for semi-regen or cyclic units, how do you decide whether to use Pt/Re catalysts with promoters, balanced Pt/Re or skewed Pt/Re catalysts?

49. Comment on the reliability of "Johnson screen" (or other profile wire) internals in fixed bed reactors. What is your experience with repairing these internal parts? What types of repairs have been successfully implemented?

50. Describe any experience you may have with gasket failures in the catalytic reformer's reaction circuit. Have you identified a type of gasket that solved the problem? Please specify the type of process and the operating pressure and temperature. Does your recommended gasket material change if the flanges are insulated?

51. Regarding the sulfiding step done during regeneration of a semi-regen reformer: 1) What is the purpose of sulfiding the catalyst? 2) When in the regeneration procedure should the sulfiding step take place? 3) What sulfiding agent is used, and how/where is the material injected? 4) What are the impacts of too little and too much sulfiding material? 5) How do you know whether the sulfiding is complete? 6) Should the sulfiding procedure be changed as the catalyst surface area decreases with successive regenerations?

52. What issues do you face when processing naphthas from synthetic crudes? Specifically, what upgrades may be required for hydrotreating and reforming naphtha derived from synthetic crude?

53. What materials do you use for a semi-regen reformer's product separator demister pad? What is a typical life for a demister pad?

54. Describe your experience with deformation of scallops in a semi-regen reformer, specifically related to lifting and/or bowing of profile wire scallops. What symptoms did you experience while operating or while regenerating the catalyst that pointed to this issue?

Hydroprocessing

Hydrogen

55. Regarding hydrogen recovery, please describe: 1) best practices for increasing hydrogen recovery; 2) current state-of-the-art in hydrogen recovery; and 3) your benchmark for percent hydrogen lost to fuel gas or mass balance closure.

56. What is your hierarchy for managing hydrogen sources for different hydroprocessing units? What adjustments do you make when the hydrogen demand is greater than hydrogen supply?

57. What are the mechanisms for steam-methane reformer catalyst deactivation? Are you more likely to see deactivation in the top, middle or bottom of the reformer tube? What are the indications of this deactivation? How can conditions be optimized to prevent these localized problems?

58. What techniques do you use for steam-methane reformer catalyst loading? Are there others? What are their relative benefits?

59. What is the expected life of adsorbents in pressure-swing adsorption (PSA) units? What contaminants affect or shorten life? What methods do you use to measure residual life?

Safety & Reliability

60. How do you monitor furnace tube metal temperatures? Compare the relative reliability and accuracy of tube skin thermocouples with that of thermography.

61. What do you use to blanket your hydrotreating feed drums? What are the pros and cons of each blanketing medium?

62. How do you ensure that emergency depressuring valves and interlocks are functioning properly during long periods of non use? Are there on-line methods to determine whether this equipment will operate when needed?

Catalyst

63. What are the critical criteria for ULSD catalyst selection? Can catalyst selection be done by modeling alone or is pilot plant testing required? How do you predict catalyst stability / deactivation?

64. What are the most common contaminants in ULSD feedstocks? What are the relative impacts of arsenic, silicon, sodium, and other metals? Are the effects of these contaminants the same for cobalt/molybdenum (Co/Mo) and nickel/molybdenum (Ni/Mo) catalysts?

65. Describe your experience with commercial regeneration of the newer Type II catalysts. What activity recovery did you achieve?

66. ULSD catalyst suppliers reported expansion plans in 2005. What is the status of these announced plans and how will they affect catalyst supply and lead times for ordering catalyst?

ULSD

67. How has ULSD catalyst performed relative to predicted performance? What monitoring tools are you utilizing to optimize unit performance and determine end-of-run for ULSD catalyst?

68. Describe your experience producing ULSD in a single bed or an under-sized reactor.

69. Are you using a hydrocracker to produce ULSD? If so, how is it integrated into your operation?

70. How do you handle cracked stocks in ULSD units? Please discuss the percentage of cracked stocks in your ULSD unit feedstock. Describe your practices for “phasing in” cracked stocks in an ULSD unit.

71. How have the qualities/properties of FCC light cycle oil (LCO) changed following implementation of high severity FCC feed hydrotreating? Is it easier or harder to process the LCO into ULSD?

72. Have you used hydrocracking catalyst in the last bed of an ULSD unit to improve performance such as desulfurization or aromatic saturation? Describe your experience.

73. How do you handle off-spec product when producing ULSD? Are off-spec products immediately routed to different tankage or are other options considered? When making these decisions, are you relying on lab data or an on-line analyzer?

74. Does the actual (post start-of-run) hydrogen consumption in your ULSD unit(s) match the design conditions? Have you had to rebalance your hydrogen system?

75. What methods are you using to detect leaks in feed/effluent heat exchangers in ULSD hydrotreater operation? What preventive measures are you taking to minimize leaks?

Process

76. When processing unusual feedstocks such as aromatic extracts from lube oil processing, de-asphalted oils (DAOs), low-metal resids, etc. in hydroprocessing units, what issues have come up (e.g. poly-nuclear aromatics condensation, excessive hydrogen consumption, severe deactivation, etc.)? What reliable correlations or analyses are available to characterize unusual feedstocks, predict their hydrogen consumption, yield pattern, and product quality, etc.?

77. What do you do to take a hydroprocessing unit to a “safe condition” for interruptions that you expect to be brief, e.g. a power outage that may last a few hours? What do you do for a smooth recovery to full operational status? What do you do differently when the interruption may last 3-4 days or more?

78. What options are available for low pressure hydrotreaters (total pressure < 500 psig) for production of ULSD and low aromatics products? What is the quantity and quality of the LCO that can be processed in these low pressure units?

79. What experiences have you had with high pressure drop in a reactor’s lower bed? What were the likely causes? Do you have any effective techniques for preventing it?

80. Are you using real-time optimization (RTO) of hydrotreater/hydrocracker operations based on on-line analyses of feed and product qualities? Do you adjust operating conditions based on catalyst activity/deactivation modeling?

FCC

Environmental

81. In order to achieve a flare-less start-up, how and when do you start up the wet gas compressor prior to introducing feed to the unit. What stream do you use and how do you control it?

82. To what extent does electrostatic precipitator (ESP) performance decline over the operating cycle in terms of opacity trends and daily fines collection? Can a performance curve be generated assuming constant conditions (similar upstream processing, no change in regenerator cyclones performance, and well maintained insulator purge)?

83. Our side-entry regenerator dense bed has three temperature indicators (TI) whose readings are over 100°F apart (colder near the spent catalyst inlet). The unit has a modern air grid and a dense phase "ski jump" spent catalyst distributor. We use the average bed temperature in heat balance calculations. Typical temperatures are 1230-1315°F in the bed, 1290-1335°F in the dilute phase, 1350-1400°F at the cyclone outlets and 1405°F in the flue gas. Flue gas NOx is very low with less than 0.5 vol% O2 in the stack. What are the incentives for better bed temperature measurement and for reducing afterburn (and bed maldistribution)? What are the incentives for improving the spent catalyst distributor design? Will oxygen enrichment improve or worsen temperature differentials? How can we minimize the risk of increasing NOx emissions if we make any modifications?

84. What is your experience with controlling FCC stack NOx emissions during partial burn operation? Please comment on low-NOx CO boiler burners, additive/catalyst applications, operating variable adjustments, and flue gas NOx conversion equipment.

85. Selective catalytic reduction (SCR) units have recently been added to reduce NOx from the FCC stack. What issues may limit the SCR unit from matching the 5-year cycle length for the FCCU?

86. What are some design considerations for FCC flue gas scrubbers (FGS) to reduce the impact of excessive catalyst loading that might occur during unit upsets? What monitoring equipment and operating practices have you employed to reduce the risk of acidic conditions downstream of the FGS?

Catalyst

87. Some ZSM-5 additives are designed to maximize propylene production while others maximize butylene. What range of C3 vs. C4 ratio have you observed with these additives? Describe the zeolite chemistry that is controlling the C3 vs. C4 selectivity.

88. How successful have you been in reducing FCC naphtha sulfur levels in the FCC riser and reactor? What levels of FCC naphtha desulfurization have you achieved? How do key reaction variables affect FCC naphtha sulfur levels? What types of catalyst technology are used for FCC gasoline sulfur reduction and what benefits have you achieved?

Equipment

89. What are the causes of catalyst fines deposition in high velocity sections of flue gas systems (orifice chambers, third-stage separators, underflow nozzles, and expander casings)? Are there specific operating parameters or catalyst/additive properties that are more likely to result in fouling of this type?

90. What methods are you using to keep power recovery expander blades clean? Have you tried on-stream chemical cleaning? How effective are these methods and what are some of the associated problems?

91. The addition of wet flue gas scrubbers and possibly selective catalytic reduction (SCR) units increase the backpressure on CO boilers or waste heat boilers. What are the issues that must be considered if forced draft or induced draft fans are added to keep the existing boiler from being modified? Have you chosen to install fans in this service? (Poll the audience)

92. Please describe your recent experience with the use of ceramics in high velocity areas for erosion resistance. In which equipment have ceramics been used and how did it perform?

93. What types of isolation valves do you recommend for spent catalyst unloading and for third-stage separator fines underflow?

94. What metallurgy do you recommend for the spent catalyst unloading line? Please describe any failures that you may have experienced and their root causes. What operating controls are necessary to eliminate the failures and what is the best way to monitor them?

95. The main fractionator bottoms slurry settler typically has a pressure safety valve (PSV) for over-pressure protection. Is this PSV sized to relieve pressure from water vaporization that might occur during start-up as the system is heating up?

96. What performance benefits have you realized from installing structured packing in an FCC catalyst stripper? What operating difficulties have you encountered? How many turnaround cycles has the packing been in service and what was the condition of the structured packing when inspected during a turnaround?

97. What experience have you had with coking of shell side bundles in FCC debutanizer gasoline reboilers? What was the reboiler inlet temperature of the heating medium and is there a critical temperature which has proven to mitigate the coke formation? Do you have any experience changing tube material from carbon steel to chrome (or other metallurgy) which has reduced coke formation?

98. Have you tried refrigerated cooling of the main fractionator overhead vapor (after air and water cooling) to unload the wet gas compressor? For what circumstances would you recommend refrigerated cooling? What is the lowest practical overhead receiver temperature?

Process

99. What procedures have you employed to "pressure bump" the FCC reactor and/or regenerator during operations to dislodge obstructions in cyclone dip legs or discharge valves? Are any special considerations required during a regenerator pressure bump if a flue gas expander is located downstream of the regenerator? What considerations are necessary for the main column overhead system when performing a reactor pressure bump?

100. What best practices have you employed to ensure that FCC naphtha is on-spec for corrosion (copper and/or silver strip) immediately following start-ups from turnaround or outages?

101. What best practices have you employed to ensure that LPG is on-spec for sulfur and mercaptans immediately following start-ups from turnarounds or outages? Are there additional best practices for the treaters?

102. What are the potential causes of excessive foaming and carryover in LPG liquid-liquid amine contactors?

103. For cycle oil with a gravity close to that of water, conventional coalescing technology has been ineffective for adequate water separation. Are there advanced coalescer designs available for this application or is a different drying method more appropriate?

104. What key parameter affects the 90-day color stability of untreated FCC light cycle oil? Which analytical method is most reliable for predicting the color stability of this stream? What treatments are available and how much improvement can be expected?

105. Have you seen an increase in sour water cyanide content or in incidents of carbonate stress corrosion cracking in FCC units processing hydrotreated or low sulfur feeds? How does the sulfur to nitrogen ratio in the feed impact cyanide formation? How do you monitor the corrosion potential?

106. What are typical phenol levels in the sour water from a FCCU and how can the phenol be minimized?

107. Describe your experience processing extraneous naphtha streams in the FCCU. What types of streams can be upgraded? What factors are considered to determine the best injection point: pre-feed nozzle; mixed with feed; upper nozzle; stripper; or gas plant?

108. Describe your experience processing aromatic extracts generated from Furfural and/or NMP extraction units during the manufacture of lube oil basestocks? Does crude origin have any impact (e.g. vacuum gas oil (VGO) and vacuum resid (VR) derived from Arab Mix / high sulfur Middle East crude)? What is the impact of the Furfural and/or NMP extraction on delta coke? What is the impact on fouling in the main fractionator bottoms circuit? Are there any reliable correlations to characterize feeds in these situations and predict the impacts? In your opinion, should these types of materials be processed in the FCC?

109. What are the possible causes of coke formation in the first 10 feet of the riser above the feed injection point? How is coke formation impacted by feed distillation and riser mix zone design?

110. How often do you tune your FCC simulation model ("tuning" is understood to include a complete heat and mass balance)? How often do you use reactor mix sampling to tune the model? How often do you tune your FCCU linear program (LP)? (Please poll the audience to supplement the panel's answers.)

111. When designing or revamping a FCC, under what operating conditions would you consider adding a catalyst cooler? In a retrofit case, what needs to be checked when adding a catalyst cooler?

112. For units that operate in partial burn, what are typical compliance practices to meet the MACT II 500 ppm CO standard when the CO boiler is shut down? What are the typical operating handles used in transitioning from partial burn to full burn if this option is used for compliance? What are some ways to optimize the unit in this mode of operation?

113. For resid FCC units converted to operation with lighter feeds, what options are available to prevent regenerator temperature from dropping below acceptable levels? What are the operating and economic considerations for each option?

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