Q&A AND TECHNOLOGY FORUM

REFOCUS, REIMAGINE, REASSURE
MARRIOTT WATERFRONT BALTIMORE
SEPTEMBER 26 – 28, 2016

AFPM

2016

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2017 AFPM MEETINGS

AFPM

Annual Meeting
March 19-21, San Antonio, TX

International Petrochemical Conference
March 26-28, San Antonio, TX

International Base Oils & Waxes Conference
March 27, San Antonio, TX

Security Conference
April 24-26, San Antonio, TX

Labor Relations / Human Resources Conference
April 27-28, San Antonio, TX

National Occupational & Process Safety Conference
May 16-17, New Orleans, LA

Reliability & Maintenance Conference
May 23-26, New Orleans, LA

Q&A and Technology Forum
October 2-4, Austin, TX

Environmental Conference
October 15-17, Denver, CO

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2017 AFPM

TABLE OF CONTENTS

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2016 AFPM Q&A AND TECHNOLOGY FORUM

Refocus, Reimagine, Reassure

In a constantly changing environment, what can you do to remain *relevant*? How can you and your company be *profitable* and *sustainable*? These are the questions being asked as depressed crude prices continue to challenge the industry. Flexibility, value, reliability, and improvement are key factors to ensure success in this market.

The theme for the 2016 Q&A and Technology Forum is "*Refocus, Reimagine, Reassure*."

- Refocus – Listen to the market, adapt accordingly, manage costs, and capture opportunities to drive profitability.
- Reimagine – Use flexibility and creativity to continuously improve and provide stability in a changing market.
- Reassure – Foster a positive culture and establish and sustain best practices.

The primary goal of the Q&A and Technology Forum is to develop and support the next generation of technical leaders within the industry in addition to the outstanding technical information exchange that occurs at the meeting. We hope that attendees learn and engage in the forum and in turn provide benefit to their organizations through the knowledge exchange and the development of professional networks. Interaction with presenters and panelists, supplier organizations, industry experts, and peers directly fuels the growth and abilities of attendees.

Today's dynamic and competitive refining environment requires attention to optimization, efficiencies in operations and production, and world class technology and innovation to drive profitability. The shared knowledge and experience of the attendees at this forum can help guide you toward safely and profitably optimizing the assets and resources you are employing today and developing the next generation of technical leaders.

The five major components of the forum give attendees the industry's most comprehensive meeting on refinery operations and process technology. The table top exhibition showcases catalyst, chemical and technology providers, engineering companies, licensors, and other industry suppliers in one convenient location. In addition, the Q&A sessions have panels of industry experts from refining companies and technology providers who will respond to questions (pages 18-23) and engage attendees in a discussion of today's tough issues. This year, six Principles & Practices (P&P) sessions focus on practical issues, the fundamentals of good operations, the elimination of persistent problems, profitability and developing leaders.

The Plant Automation sessions will be kicked off this year by a one-hour panel discussion on Alarm Management. Join in the discussion as your questions are answered by both the panel and your fellow attendees. The remainder of the sessions will focus on alarm management, supply chain and optimization, and software applications.

Cybersecurity Day presentations will cover many aspects of cybersecurity, both business systems and industrial control systems, and how it affects today's refining and petrochemical industries. It is designed so that those in our industry who work in cybersecurity and those who are affected by cybersecurity can learn together.

A hands-on cybersecurity Capture-the-Flag team training exercise called "Cyber Attack! All Hands on Deck!!" sponsored by Booz Allen Hamilton will be held on Wednesday morning. This exercise is designed specifically for the refining and petrochemical industries.

As a registered attendee, you will be able to attend any of the Q&A, P&P, Plant Automation, or Cybersecurity Day 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 "individual" program from the diverse elements available in the different sessions.

SCHEDULE OF EVENTS

Sunday, September 25, 2016

3:00 pm – 6:30 pm	Registration – Badge Pick-up	Harborside Registration
5:00 pm – 5:30 pm	Emerging Leaders Pre-Reception	Harborside Foyer
5:30 pm – 6:30 pm	Q&A Kick-off Networking Event *Sponsored by Crystaphase*	Harborside Foyer

Monday, September 26, 2016

7:00 am – 6:30 pm	Registration	Harborside Registration
8:00 am – 8:55 am	• Presentation of the Lifetime Service Awards • Keynote Address	Harborside Ballroom C
9:00 am – 12:00 pm	• Gasoline Processes Q&A / Discussion • Principles & Practices: Emerging Leaders Town Hall • Plant Automation: Alarm Management	Harborside Ballroom C Harborside Ballroom D Harborside Ballroom B
10:00 am – 10:15 am	Coffee Break *Sponsored by SNC-Lavalin*	Harborside Foyer
12:00 pm – 2:00 pm	Lunch in Exhibit Hall	Grand Ballroom V & VI
2:00 pm – 5:15 pm	• Hydroprocessing Q&A • Principles & Practices: Gasoline Processes	Harborside Ballroom C Harborside Ballroom D
2:00 pm – 3:30 pm	Plant Automation: Supply Chain & Optimization	Harborside Ballroom B
3:30 pm – 3:45 pm	Refreshment Break	Harborside Foyer
3:45 pm – 5:15 pm	Plant Automation: Software Applications	Harborside Ballroom B
5:15 pm – 6:30 pm	Reception in Exhibit Hall	Grand Ballroom V & VI

SCHEDULE OF EVENTS

Tuesday, September 27, 2016

7:00 am – 5:00 pm	Registration	Harborside Registration
8:00 am – 12:00 pm	• Crude/Vacuum Distillation & Coking Q&A / Discussion	Harborside Ballroom C
	• Principles & Practices: Hydroprocessing	Harborside Ballroom D
	• Cybersecurity Day	Harborside Ballroom B
10:00 am – 10:15 am	Coffee Break	Harborside Foyer
12:00 pm – 2:00 pm	Lunch in Exhibit Hall	Grand Ballroom V & VI
2:00 pm – 5:15 pm	• FCC Q&A	Harborside Ballroom C
	• Principles & Practices: Crude/Vacuum Distillation & Coking	Harborside Ballroom D
	• Cybersecurity Day (continued)	Harborside Ballroom B
3:30 pm – 3:45 pm	Refreshment Break	Harborside Foyer
5:30 pm – 6:30 pm	Women in Refining Reception *Sponsored by LyondellBasell Industries*	Laurel Room

Wednesday, September 28, 2016

7:30 am – 10:00 am	Registration	Harborside Registration
8:00 am – 11:15 am	• Principles & Practices: FCC	Harborside Ballroom C
	• Principles & Practices: Fostering Profitability	Harborside Ballroom D
	• Cybersecurity: Cyber Attack! All Hands on Deck!! *Sponsored by Booz Allen Hamilton*	Harborside Ballroom B
9:30 am – 9:45 am	Coffee Break	Harborside Foyer

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:

- **Gasoline processes** (alkylation, ISOM, NHT, reforming, and Tier III with a town hall discussion following the question and answer session.)
- **Hydroprocessing** (safety, catalysts, operations, profitability, resid hydrocracking, mild hydrocracking, operations, hydroprocessing, and ULSD.)
- **Crude/vacuum distillation and coking** (safety, crude distillation, coker, current crude quality issues, and unit operation with a town hall discussion following the question and answer session.)
- **Fluid catalytic cracking** (FCC) (conversion, lab, emissions, inspection, rotating equipment, catalyst Rg-Rx, maintenance, inspection, corrosion, and exchangers.)

In the course of responding, the panelists will cover:

- **Success** – fostering leadership to drive profitability in this changing market.
- **Safety and Reliability** – 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 driving profitability, 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 AFPM Q&A and Technology Forum is the best place to find those people, whether panelists, technology vendors, or other attendees.

PRINCIPLES & PRACTICES SESSIONS

The Principles & Practices (P&P) sessions are discussion-oriented sessions, primarily designed for those whose overall operating experience is less than 15 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, profitability, 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:

- *Emerging leaders town hall* topics: work life balance, communication with managers, role models, and parallel path actions
- *Crude/vacuum distillation and coking* topics: operational excellence; unit controls and performance; high temperature corrosion; coker drum foaming; and coke drum best practices;
- *Fluid catalytic cracking* (FCC) topics: new and old equations tie together 75 years of FCC experience; and FCCU analysis using technology;
- *Gasoline processes* topics: solutions for producing higher octane gasoline; Tier III discussion; gasoline blending; and better plants program;
- *Hydroprocessing* topics: yesterday, today and tomorrow in hydroprocessing; solving the unsolved challenge; and fostering profitability;
- *Fostering profitability* topics: market drivers, challenges and opportunities; catalyst selection; capital project triage; crude selection and margins; refinery optimization; and lessons learned.

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. The one-hour Plant Automation Q&A session on alarm management is a moderated forum featuring vendors answering pre-arranged questions as well as those from the audience. Presentations on the various operations and process control issues will follow.

The Plant Automation and Decision Support program will have four separate sessions:

- Alarm Management Q&A
- Alarm Management
- Supply Chain & Optimization
- Software Applications

CYBERSECURITY DAY

The Cybersecurity Day sessions are for those who work in information technology and/or industrial control/SCADA systems. The day starts with a featured presentation on cybersecurity and the industry followed by a panel on CISA and information sharing. Presentation titles are listed on page 11.

Unlike other cybersecurity conferences and workshops, Cybersecurity Day is designed so that those in the refining and petrochemical industries who work in cybersecurity and those who are affected by cybersecurity can hear presentations from cybersecurity subject matter experts from the refining and petrochemical industries.

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AFPM also thanks our media supporters:
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MONDAY
SEPTEMBER 26, 2016

GENERAL SESSION

8:00 am – 8:55 am
Harborside Ballroom C

Welcome

Chet M. Thompson
President
AFPM

Keynote
Managing Through Tough Times

James Mahoney
Board Member
Koch Industries, Inc.

2016 Peter G. Andrews Lifetime Service Award

The Peter G. Andrews Lifetime Service Award honors members who have made long lasting contributions to the value and vitality of the AFPM Q&A Meeting. Recipients of this award have served as Q&A panelists, Screening or Plant Automation & Decision Support 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 Award Recipient
Sam Lordo
Marketing Manager - NA Process
Nalco Champion

PRINCIPLES & PRACTICES: EMERGING LEADERS TOWN HALL

9:00 am – 12:00 pm
Harborside Ballroom D

Presiders:
Steve Perry, Motiva Enterprises LLC
Sam Lordo, Nalco Champion

Topic 1: Work Life Balance
Brandon Payne, GE Water & Process Technologies

Topic 2: Communicating with your Manager
Abigail Sup, Johnson Matthey Process Technologies

Topic 3: What actions does your "Role Model" do to be successful?
Christian Arnoux, Valero Energy Corporation

Topic 4: Skillset for working Parallel Path Actions
Richard Schultheis, LyondellBasell Industries

GASOLINE PROCESSES Q&A

9:00 am – 12:00 pm
Harborside Ballroom C
A/V Services Sponsored by CB&I

Matthew Hutchinson, Axens North America
James Kleiss, Valero Energy Corporation
Steven Philoon, UOP LLC - A Honeywell Company
Ken Rhodes, Marathon Petroleum Corporation

See page 18 for questions. This session will be split into two sections. The first half will be the traditional Q&A session, and the second half will be a town hall-type discussion.

PLANT AUTOMATION: ALARM MANAGEMENT

9:00 am – 10:00 am
Harborside Ballroom B

Q&A Session
Presider:
Randy Conley, Total Petrochemicals & Refining USA

Questions:
1. What are the optimal resource allotments and administration for a successful alarm management program?
2. What are the next steps after basic alarm optimization? Are there opportunities for improvement? (shelving, advanced alarming, suppression, etc.)
3. What are best practices and standards that should be addressed and how should they be addressed?

Plant Automation Q&A Questions will not be included in the Q&A Answer Book.

Panelists:

Steve Apple is the Global Director of Operator Performance Services for Schneider Electric. He deals with alarm management, loop tuning, high-performance HMI, and control room digitization and human design factors. Steve started his career as an automotive engineer with General Motors, later evolving to durability testing. He then took on the world of instrumentation and control for mineral processing, advancing later to chemical and refining process and process control.

Missy Jones, Senior Alarm Management Specialist, Honeywell Process Solutions has 17 years of industry experience and has been with the Honeywell organization for the past 14 years. Missy has been an Alarm Management consultant for 11 years advising clients on all aspects of the Alarm Management Lifecycle. Her experience includes the development of alarm philosophy documents, alarm analyses, alarm system assessments, alarm rationalization facilitation as well as alarm management product implementations on multiple control systems across varied industries. Missy is a member of ISA 18.2.

10:15 am – 12:00 pm
Harborside Ballroom B

Presider:
Michael Barham, Tesoro Corporation

Alarm Philosophy Document
Randy Conley, Total Petrochemicals & Refining USA
Missy Jones, Honeywell Process Solutions

This case study describes how TOTAL's PAR refinery alarm management core team worked with a Honeywell Alarm Management consultant and PAR stakeholders to develop an evergreen guidance document for a re-tooled alarm management program.

Alarm Management – 7 Steps in 30 Minutes
Bill Hollifield, PAS, Inc.

This presentation will show a condensed review of the 7-Step Methodology and step-by-step highlights, plus a closer look at Step 6 of Real-Time Alarm Management, to address more advanced alarm handling solutions such as controlled alarm shelving, state-based alarming, alarm flood suppression and operator alert systems. This discussion will also examine new case studies that illustrate how process and power facilities have recognized permanent reductions in the number of alarms by adopting the 7-Step Methodology.

Alarm Management and Cultural Change
Dan Butler, Sinclair Wyoming Refining Company

This presentation discusses our journey through alarm rationalization, implementation and management, and the change in culture that was required to make the change successful.

PLANT AUTOMATION: SUPPLY CHAIN & OPTIMIZATION

2:00 pm – 3:30 pm
Harborside Ballroom B

Presider:
Chandra Gannavarapu,
LyondellBasell Industries

Opportunity Crudes – Processing Heavy Crude Oils
Bill Cates, Hunt Refining Company

Processing new opportunity crude oils and crude blends means additional scrutiny to ensure the refinery is best utilized for its design of processing bottom of the barrel crudes. This presentation will discuss challenges with processing heavy opportunity crudes and how automation is providing additional insight into mitigating risks.

A Novel Approach to Intermediate Stream Pricing for Real-Time Optimization
Steve Trieber, Manufacturing Technology Network

A new method of computing the value of intermediate streams based on product market prices has been developed which is independent of LP intermediate stream shadow prices and which aligns the process real-time optimizers' pricing with the production goals of scheduling and planning. This method can be applied to real-time optimization by both linear multivariable constraint controllers and non-linear real-time optimizers based on first principles. The new method produces solutions that are better aligned with the planning and scheduling goals than either using shadow prices or treating the prices as mode tuning parameters that achieve a desired constraint pushing behavior.

This presentation will show the effects of using the new pricing strategy and its effects on the performance of an on-line unit RTO application.

Establishing the Resilient Supply Chain Optimization Process
Jose Sentmanat, LyondellBasell Industries

Numerous benchmark studies have concluded that supply chain optimization is difficult to achieve without an organized structure, a well-defined decision making process, a set of common goals between various groups, and established work processes for exceptions handling. The dilemma is how to establish such a system that functions irrespective of the changes in the organization structures, reward systems, or political conflicts that arise from the latter. The speaker seeks to reinforce that a culture of "Return on Capital Employed," with a thorough grounding in financial 'costs to serve' model, can make the supply chain optimization stand the test of time and outside pressures.

PLANT AUTOMATION: SOFTWARE APPLICATIONS

3:45 pm – 5:15 pm
Harborside Ballroom B

Presider:
Tim Olsen, Emerson Process Management

Eliminating Difficult to Control Processes with Procedural Automation
Darwin Logerot, ProSys, Inc.

Some processes are just difficult to start up and run. Every year, significant production is lost due to startup delays, product quality issues after startup, and mistakes or gaps in operator expertise. Using procedural automation has cut average startup times by a substantial amount, some as much as 50% or more.

The Cloud is Here for Smart Manufacturing
Pete Sharpe, Emerson Process Management
Larry Megan, Praxair, Inc.

The Smart Manufacturing Leadership Coalition (SMLC) has been funded by the U.S. Department of Energy to build an open, cloud-based manufacturing platform that provides a marketplace and infrastructure for software vendors to develop and offer software solutions to manufacturing companies. The initial phase of the project's two test beds is nearing completion and a second round of funding to launch a Clean Energy Institute has been awarded to SMLC to further the program.

Big Data Analytics Applied to Real-World Control Systems – From Instruments to Advanced Controls
George Buckbee, Metso

The speaker's analysis has shown that most plant control systems are operating far below their potential. Furthermore, using big data analytics, it is possible to drive significant, targeted improvements in a very short time.

PRINCIPLES & PRACTICES: GASOLINE PROCESSES

2:00 pm – 5:15 pm
Harborside Ballroom D

Presiders:
Candace Vaughn, Motiva Enterprises LLC
Eric Hutchins, Solomon Associates

Solutions for Producing Higher Octane Gasoline
Marina Minin, UOP LLC - A Honeywell Company

Discussion on What the Industry is Doing to Get Ready for Tier III
Kevin Proops, Koch Industries, Inc.

Gasoline Blending Strategies
Darren York, KBC Advanced Technologies, Inc.
Eric Heavin, Yokogawa Corporation of America

Better Plants Program
Robert Bruce Lung, U.S. Department of Energy

HYDROPROCESSING Q&A

2:00 pm – 5:15 pm
Harborside Ballroom C
A/V Services Sponsored by Haldor Topsoe, Inc.

Subhasis Bhattacharya, Chevron Lummus Global LLC
Patrick Gripka, Criterion Catalysts & Technologies L.P.
Andrew Layton, KBC Advanced Technologies, Inc.
Jeffrey Mueller, Marathon Petroleum Corporation
Chad Perrott, ExxonMobil Chemical Co.
Joseph Rydberg, CITGO Petroleum Corporation

See page 19 for questions.

NOTES

TUESDAY
SEPTEMBER 27, 2016

PRINCIPLES & PRACTICES: HYDROPROCESSING

8:00 am – 12:00 pm
Harborside Ballroom D

Presiders:
Raul Adarme, Motiva Enterprises LLC
Lori McDowell, Matheson

Yesterday, Today and Tomorrow in Hydroprocessing
Sal Torrisi, Criterion Catalysts & Technologies L.P.

Solving the Unsolved Challenge – Troubleshooting Best Practices
Joe Rydberg, CITGO Petroleum Corporation

Town Hall – Fostering Profitability – How Can I Make an Impact?
Doug White, Emerson Process Management
Eric Hutchins, Solomon Associates
Shankar Vaidyanathan, Fluor Enterprises Inc.

PRINCIPLES & PRACTICES: CRUDE/VACUUM DISTILLATION & COKING

2:00 pm – 5:15 pm
Harborside Ballroom D

Presiders:
Chris McDowell, Tesoro Corporation
Kathleen Wills, Athlon Solutions

Operational Excellence in the Time of Tight Margins, Preheat Optimization and Fouling Monitoring
Andrew Sloley, Advisian

Unit Controls and Performance – Chloride Monitoring/Crude Unit
Eric Legare, Tesoro Corporation

High Temperature Corrosion
Brandon Payne, GE Water & Process Technologies

Coker Drum Foaming – Pt. 1 Mechanical Design
Ram Mallik, Fluor Enterprises Inc.

Coke Drum Best Practices – Chemical and Operational
Wole Olowu, Athlon Solutions

CRUDE / VACUUM DISTILLATION & COKING Q&A

8:00 am – 12:00 pm
Harborside Ballroom C

Rainer Bass, HollyFrontier Corporation
Shyama Maji, Essar Oil Limited
Ram Mallik, Fluor Enterprises Inc.
Pete Sharpe, Emerson Process Management
Jay Steiner, MERRICK & Company
Bruce Wright, Baker Hughes Incorporated

See page 20 for questions. This session will be split into two sections. The first half will be the traditional Q&A session, and the second half will be a town hall-type discussion.

FCC Q&A

2:00 pm – 5:15 pm
Harborside Ballroom C

Zach Bezon, United Refining Company
Luis Bougrat, UOP LLC – A Honeywell Company
Phillip Niccum, KP Engineering, LP
Eric Thraen, Flint Hills Resources, LP
W. Lee Wells, Houston Refining, LP
George Yaluris, Albemarle Corporation

See page 22 for questions.

CYBERSECURITY DAY

All sessions in Harborside Ballroom B

8:00 am – 10:00 am
Presider:
Jason Bottjen, Valero Energy Corporation

Keynote
Pragmatic Security in a Highly Connected World
Eric Cornelius
Director of Critical Infrastructure and Industrial Control Systems (ICS)
Cylance, Inc.

Cyber has proven itself to be a valuable and viable attack path to both criminals and nation states. Cyber attacks are a reality and are here to stay, but the business must go on. Contemporary thinking tells us that to be secure our networks must be segregated, yet vendors continue to drive towards increased connectivity. This presentation will provide a pragmatic approach to separating the hype from the substance and identifying a reality-based approach to security.

CISA / Information Sharing Panel
- *Michael Echols*, Executive Director and CEO, International Association of Certified ISAOs (IACI).
- *Kimberly Denbow*, Security, Operations & Engineering Services Director, American Gas Association
- *Evan Wolff*, Partner, Crowell & Moring LLC

10:15 am – 12:00 pm
Presider:
Scott Gautreau, Turner Industries Group

Legal Risks from Cyber-Threats in the Energy and Transportation Sectors
Lily Chinn and *Karl Heisler*,
Katten Muchin Rosenman LLP

Cybersecurity law is a patchwork of federal regulations and voluntary initiatives for our nation's most critical infrastructure. This presentation will assess the current regulatory environment for cybersecurity in the energy and transportation sectors and will explore the need for increased federal regulation.

Leveraging Security Insights and Techniques Across Communities
Philip Quade, National Security Agency

This presentation will provide an overview of the current threat environment and will seek to stimulate dialogue on a number of technical and operational strategies to mitigate the risks that cyber attackers see fit to exploit, leveraging our collective strengths, and the adversaries' weaknesses. A discussion of the knowledge and expertise that NSA has to offer in supporting other U.S. government partners and the private sector and how this can be applied to support the petrochemical manufacturing sector will be provided along with a vision for information sharing architectures that will create real-time shared situational awareness, employing an automated and integrated active cyber defense, automating resiliency and regeneration functions, and building a cyber workforce pyramid with skills at all experience levels to protect ICS assets from cyber attacks.

2:00 pm – 3:30 pm
Presider:
Marc Westbrock, Koch Industries, Inc.

Operational Blindspots: Why Securing Critical Infrastructure Starts with Improved Visibility
Mille Gandelsman, Indegy

The need for visibility and security in ICS networks is growing, as recent attacks, such as the Ukrainian electric utility, the New York City dam, and others, have demonstrated. In this session, we will examine what needs to be done in order to gain the visibility necessary to detect and respond to malicious and unauthorized activities in ICS networks.

How to Know if Your Control Systems Are Secure
Mark Littlejohn, Honeywell Process Solutions

Do you know if your process control system is secure? Do you know if a critical component is about to fail? Are you currently experiencing a cybersecurity incident? Monitoring your process control system for performance and security is a critical task. Unfortunately, few operational teams have the time required to perform this function effectively. Using managed security services, your systems can be monitored 24x7 and you can be notified immediately if a potential issue occurs. This presentation will show you how to stay ahead of problems at your facility at a fraction of the price of attempting to monitor on your own.

ICS Cybersecurity: You Cannot Secure What You Cannot See
David Zahn, PAS, Inc.

In this presentation, the requirements for a comprehensive, evergreen cyber asset inventory will be discussed as a necessary foundation for effective operational and cyber risk management. A case study example of how operations can leverage this insight to maximize productivity, avoid shutdowns, and proactively identify and address potential safety incidents, whether due to inadvertent mistakes by personnel or cyber attack, will also be provided.

3:45 pm – 5:15 pm
Presider:
Blake Larsen, Western Refining Company

Integrating Process Safety with Cybersecurity
John Cusimano, aeSolutions

This presentation will be a discussion of the ICS cybersecurity risk assessment process defined in ISA 62443, which many refer to as a cyber PHA or cyber HAZOP, and how this process establishes key linkages between process safety and cybersecurity.

Preview of "Cyber Attack! All Hands on Deck!!"
Representatives of Booz Allen Hamilton will give an overview of what to expect in Wednesday morning's cybersecurity exercise.

WEDNESDAY
SEPTEMBER 28, 2015

PRINCIPLES & PRACTICES: FOSTERING PROFITABILITY

8:00 am – 11:15 am
Harborside Ballroom D

Presiders:
Andy Moreland, Valero Energy Corporation
Robert Ohmes, KBC Advanced Technologies, Inc.

Part 1

Where is the Market Going: Key Drivers, Challenges, and Opportunities
Robert Ohmes, KBC Advanced Technologies, Inc.

Catalyst Selection
Chad Cavan and *Chris Anderle*, UOP LLC – A Honeywell Company

No and Low Capital Project Triage through Implementation Process
Chris Bodolus, CVR Energy, Inc.

Part 2

Refinery Optimization in a Low Crude Price and Tightening Margin Environment Town Hall

Crude Selection and Crude Margins
Daryl Hanson, Valero Energy Corporation

Inside Refinery Optimization
Steve Perry, Motiva Enterprises LLC

Lessons Learned From the Past
All presenters

PRINCIPLES & PRACTICES: FCC

8:00 am – 11:15 am
Harborside Ballroom C

Presiders:
Ann Benoit, Grace Catalysts Technologies
Dewey Stuart, Motiva Enterprises LLC

New and Old Equations Tie Together 75 Years of FCC Standpipe Experience
Phillip Niccum, KP Engineering, LP

FCCU Analysis Using TDL Technology
Joshua Christian, Servomex Co., Inc.

Yield Degradation
Patrick McSorley, UOP LLC – A Honeywell Company

CYBERSECURITY EXERCISE: CYBER ATTACK! ALL HANDS ON DECK!!

8:00 – 11:15 am
Harborside Ballroom B

Facilitated by Booz Allen Hamilton, this first ever AFPM hands-on cybersecurity exercise will simulate a cyber attack on a refinery's industrial control system that could bring the facility down unless you and your team fix it. Whether you are a control systems expert or technical manager, or just interested in how something like this could be fixed, you will feel the excitement of this "capture the flag"-style exercise. No cybersecurity nor IT/ICS experience is needed. Pre-registration required.

Rainer Bass is a Senior Economic and Planning Engineer for HollyFrontier in Dallas, Texas. He is responsible for strategic capital project development at all of the company's locations as well as strategy around specific threats and opportunities affecting commercial operations. He has been with HollyFrontier for over 9 years at various locations. Ranier holds a BS in Chemical Engineering from Kansas State University and

Zach Bezon is a process engineer for United Refining Company, Warren, Pennsylvania. He assists in the advancement and improvement of the refinery's processing facilities; this includes implementation of heat exchangers, distillation towers, vessels, pumps, tanks and new piping solutions. He has 5 years of experience in the oil refining industry. Zach holds a BS in Chemical Engineering from the University at Buffalo

Subhasis Bhattacharya is a consulting engineer in hydroprocessing for Chevron Downstream Technology, Richmond, California. He has over twenty-seven years of industry experience and has extensively worked in process design, plant commissioning, technical services and technology development. Subhasis has presented several papers on distillate and residue hydrocracking, catalytic dewaxing, and hydrofinishing technologies at national and international conferences. He is the author of the chapter on lubricant base oil hydroprocessing in the latest edition of the Handbook of Petroleum Refining Processes, McGraw-Hill Publication and has three patents. Subhasis has a Master's Degree in Chemical Engineering from Indian Institute of Technology, Kanpur.

Luis Bougrat is an FCC Technology Specialist within the UOP Technology Services Department. His current responsibilities include direct customer support, troubleshooting and knowledge transfer for operating units, revamps, and grassroots projects around the world. He has been involved in the refining industry for 8 years and has held various technical roles within the FCC, treating and renewables communities. These roles and responsibilities stretched across the R&D, Regional Services, Field Operating Services, and Technology Services departments within UOP. Luis holds a B.S. ChE degree from the Rose-Hulman Institute of Technology in Terre Haute, IN.

Patrick Gripka is the Regional Technical Manager for the Americas for Criterion Catalysts & Technologies. He is responsible for ensuring technical support quality. Patrick has been with Criterion for almost 20 years and has focused on providing technical support to Criterion's customers with estimates, design bases, startups, unit monitoring, troubleshooting and value creation opportunities. He has almost 30 years of experience in the industry. Patrick holds BS and MS degrees in Chemical Engineering from the University of Missouri – Rolla.

Matthew Hutchinson is Technology Manager for Reforming for Axens North America. He assumed this position in 2014 after having joined Axens in 2012 as a Senior Process Engineer leading various process designs for Prime-G+ and Prime-D technologies as well as multiple other process studies. Matt has over 14 years of refining and chemical plant experience in various technical and operations positions, primarily in reforming (CCR and fixed bed) and FCC. He started his career in 1998 in Sunoco's Engineering Associates program. Matt holds a BS in Chemical Engineering from from Cornell University.

James Kleiss is a Director at Valero, San Antonio Texas. He is responsible for strategic planning for all the Valero refineries in the USGC. This includes capital project development and economic evaluation of projects and business strategies. He has experience in refineries on the USGC as well as the USWC, Canada, and Europe. He has recently been involved in strategy development around processing light tight oil and low cost NGL's, and has 29 years of refining industry experience. James has a B.S. degree from Oklahoma State University.

Andrew Layton is a Principal consultant with KBC Advanced Technologies. He has 44 years in the refining industry in all regions of the world at many refineries and in R&D and Engineering and Design offices. Roles have included Refinery Technical, Supervisory and Operations, Major project start up leadership and Regional technology leads for Reforming and Hydroprocessing. He is currently involved in numerous reliability and profit studies. He also provides support in a range of areas including frequent turnaround and start up support to several refiners as part of Technical Support.

Q&A PANELISTS

Shyama Maji is heading the Operations function of Essar Oil refinery at Jamnagar India. He is responsible for operations of refinery process units, utilities and associated facilities. He has over 33 years of experience in Operations, Process and HSE functions including process safety, and has worked in some of the major Indian refineries and Mombasa Refinery, Kenya. Shyama holds a Chemical Engineering Degree from Jadavpur University and has over 33 years.

Ram Malik is a Director of Process Technology and Engineering at Fluor Enterprises Inc., Sugar Land, Texas. He is responsible for process design and engineering and technical support of refinery projects. In his 40 years of experience in the hydrocarbon processing industry, Ram has gained wide experience in design and build of numerous commercial Delayed Coking units working with Lummus Technology Division and Bechtel Coker Technology Group before joining Fluor. He is a Fluor Delayed Coking Technology Subject Matter Expert (SME). Ram holds a B. Tech (Honors) in Chemical Engineering degree from Andhra University and Post Graduate Diploma in Refining from Indian Institute of Petroleum, India.

Jeffrey Mueller currently serves as Operations Manager at Marathon Petroleum Company's Illinois Refining Division (IRD), overseeing the process operations at the plant. He has 14 years of experience in the refining industry and has been with Marathon since the beginning of his career. He has held the positions of Technical Services Manager at the IRD, Product Control Manager at the Texas Refining Division (TRD), and a variety of other assignments between Operations and Tech Services. Jeff holds a BSc degree from the University of Missouri-Rolla which is now Missouri University of Science & Technology.

Phillip Niccum is Senior Vice President of Process Engineering at KP Engineering. With over 35 years of engineering and management experience, he has been granted 15 U.S. patents and authored dozens of publications for major industry conferences and trade journals. Prior to joining KPE, Phillip spent 26 years at KBR in various capacities. Phillip began his engineering career with Texaco where he performed technical service and design work on Texaco FCC units. Phillip holds a BS in Chemical Engineering from California State Polytechnic University.

Chad Perrot is the MIDW Discipline Technical Lead for ExxonMobil in Spring, TX. He is responsible for global technical service of the fuels licensing platform. This includes transfer of technology, insuring technical quality for proposals, and mentoring engineers. With over 18 years in the hydrocarbon processing industry, he has experience in adsorbent, hydroprocessing, and reforming catalyst technologies with varied roles in engineering including: R&D, new unit commissioning, unit troubleshooting, profitability improvements, and more than 50 separate turnaround & startup experiences. Additionally, he has earned patents in hydroprocessing technology. Chad holds a B.S. in Chemical Engineering from the University of Illinois at Urbana-Champaign.

Steven Philoon is a Principal Platforming Technology Specialist for UOP LLC. His current responsibilities include providing direct support to a set of globally distributed customers, participating in technology development projects bringing commercial perspectives to the efforts, contributing to Engineering review meetings for new units and revamps and conducting on-site troubleshooting and unit performance assessments. During his 35 years with UOP he has held positions in R&D, Technical Service, Information Technology and Engineering Services. Steven holds a BSc degree in Chemical Engineering from the University of Wisconsin – Madison.

photo not available

Ken Rhodes is the Reformer and Aromatics Technologist from Marathon Petroleum located in Russell, Kentucky. He is the subject matter expert for CCRs and Petrochemical process units for Marathon's seven refineries. In his over 25 years of refinery experience, he has held various positions in operations and technical service for CCRs, sulfolane and cumene units as well as other refinery processes. Ken holds a BS in Chemical Engineering from West Virginia Institute of Technology.

Joseph Rydberg, is a Process Technologist at the CITGO Petroleum Lemont Refinery. He has over 15 years of experience in the refining industry, and he is responsible for technical support for daily refinery operations and project process development. His experience is primarily in hydroprocessing technical support, optimization, and troubleshooting. Joe holds a BSChe degree from the University of Illinois at Champaign-Urbana

Pete Sharpe is the Director, Industry Solutions Development for Emerson Process Management. He has over 37 years of experience in the process control industry, in both technical and management roles, specializing in automation in refineries and petrochemical plants. He is currently responsible for managing the engineering and development of Emerson's industry-specific solutions including advanced control, optimization, reliability and energy management technologies. Pete has been Emerson's representative on the Smart Manufacturing Leadership Coalition (SMLC) since its inception. He has been instrumental on the Platform Committee, working with Praxair and the SMLC team to establish real-time communications between the plant systems and the cloud-based applications. Pete holds a BS in Chemical Engineering from the University of Colorado and an MBA from the University of Houston.

Lee Wells is the Subject Matter Expert engineer responsible for the FCCU at the LyondellBasell Houston refinery. In this capacity, Lee leads the process design work for turnaround projects, mentors the FCC Unit operation support engineers, and assists in process optimization. Lee has been with LyondellBasell for 23 years and has 32 years of experience in the refining industry. He began his career at CITGO in Lake Charles, Louisiana supporting the FCC Units and Alky Unit, among others. He subsequently held positions in Economics and Production Planning. His career continued at Amoco in Texas City, Texas, where he did project work, supported the Alky Units, and performed PSV studies. Since joining LyondellBasell, he has supported the FCC Unit as a process engineer, an engineering Team Lead, and now in his current role. He also served for six years as the Energy Coordinator for the refinery. Lee holds a BSChE from Texas A&M University.

Jay Steiner is a Senior Process Engineer for MERRICK & Company, Energy Market Sector located in Greenwood Village, Colorado. He currently serves as the technical leader for the process engineering team. His duties include management of team resources, proposal review and development, process design and technology evaluation. He has over 15 years of petroleum refinery experience with over 12 years at the Phillips 66 Billings, Montana Refinery including 5 years as the crude/vacuum unit engineer. Jay holds a BSc degree in chemical engineering from Montana State University-Bozeman.

Bruce Wright is a Senior Engineer in Baker Hughes' Industrial Technology group in Sugar Land, Texas, specializing in the Hydrocarbon Process Industries. Bruce has over 38 years of industry experience and is currently involved in technical support and troubleshooting of refinery fouling problems, and foam control. Bruce has experience in product development and EH&S compliance. He is an inventor or co-inventor on eight US patents and has published eleven technical papers. Bruce holds a BS in Chemical Engineering from Rensselaer Polytechnic Institute in Troy, New York, and a MBA from the University of Houston. Bruce is a registered professional engineer in the state of Texas, and is a member of the American Institute of Chemical Engineers.

Eric Thraen is System Technical Lead for Flint Hills Resources at the Pine Bend, Minnesota refinery. He is responsible for process technical support of refinery operations and capital projects. He has been in the refining industry for 35 years and has experience in process engineering, operations and capital projects in the areas of FCC, alkylation, crude/vacuum distillation, delayed coking, and gasoline blending. He has provided engineering and operations support on large grassroots construction and major revamps in these areas. Eric holds a BS degree in Chemical Engineering from the University of Michigan.

George Yaluris currently manages the Americas FCC Technical Services team for Albemarle's Refinery Solutions business unit. He has over two decades of FCC experience providing technical support for the application of FCC catalysts, commercializing new catalysts, developing novel FCC catalyst and additive technologies and researching the chemistry of catalytic cracking processes. He is a co-inventor in 16 patents and has published more than 25 papers. George holds a Diploma in Chemical Engineering from the Aristotelian University of Thessaloniki – Greece and a Ph.D. in Chemical Engineering from the University of Wisconsin – Madison.

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GASOLINE PROCESSES

Safety

1 Do you have experience in isolating air-coolers to water-wash the process side while the unit continues to operate? What safety considerations do you consider before removing this equipment from operation?

2 What procedures do you use to test alkylation unit rapid de-inventory systems? Do you perform a functional test using acid?

3 What process safety management (PSM) factors do you consider when contemplating a reformer unit rate increase?

Theme

4 The economic benefit for propylene and amylene alkylation is improving. What considerations do you use in the feed pre-treatment and alkylation unit operations before increasing these feeds?

5 What are the typical dispositions of coker olefins, coker light naphtha, and coker heavy naphtha in refineries that you employ? How are the sulfur contaminants, such as dimethyl sulfide and dimethyl disulfide, best removed from these streams?

Alkylation

6 What is your experience in having to vent depropanizer off-gas in order to manage tower pressure and what might be the cause and solution to the problem?

7 How is propane content in the refrigeration loop optimized against the compressor capacity to minimize contactor temperature? Do you have a good process model to predict the optimum propane content?

ISOM

8 Do you have experience with starting an isomerization unit (alumina chloride catalyst type) without first acidizing the reactor loop? What was the impact on catalyst activity?

9 Describe your experience and application of advanced separation techniques such as DWC (divided-wall columns) to reduce capital investment and operating expense.

NHT

10 What strategies do you employ to meet cycle length targets in naphtha hydrotreaters that are reaching catalyst activity limits due to capacity increases or feedstock quality decreases?

11 What is your acceptable limit for organic chloride concentration in a naphtha hydrotreater feed? What are the possible consequences if this limit is exceeded?

Reforming

12 What operating strategies do you employ to successfully regenerate catalyst in a continuous catalyst regeneration (CCR) unit with a carbon content in excess of 10wt.%?

13 When the regenerator in a CCR unit is shut down for an extended period of time, how do you predict coke on catalyst with no catalyst circulation?

14 Do you have experience with CCR heel catalyst contaminating the circulating inventory during operation? How can this be prevented?

15 How do you remove the CCR heel catalyst from the unit during an outage and under what atmospheric conditions?

16 What is your best practice for inspecting and preventing erosion in CCR lift lines?

17 What are your strategies for managing feed sulfur to reforming units? What are the pros and cons of the different approaches?

Tier III

18 The increased production of light straight run (LSR) from crude units is likely to have an impact on refiners' plans for Tier III compliance. What strategies do you employ in order to manage this issue?

19 What range of sulfur targets for hydrotreated FCC gasoline do you anticipate for Tier III operation?

Town Hall Discussion Breakout Topics

A Are there new drivers for reformer catalyst selection and determination of changeout timing?

B What are the strategies for maximizing CCR unit turnaround cycle length? Is a ten-year cycle possible?

C How are refiners managing naphtha oversupply, Tier III gasoline requirements, and increased octane demand?

HYDROPROCESSING

Safety

20 When is it appropriate to neutralize austenitic stainless steel equipment to protect against stress corrosion cracking? What neutralization procedures and methodologies do you recommend?

21 What programs/systems do you employ to monitor hydrotreater furnaces and prevent tube failures/ loss of containment? Can you share your experiences (including reliability) using technologies to implement online temperature monitoring of tubeskin temperatures?

Hydrocracking Catalysts

22 Describe your strategies for optimizing the pre-treat and cracking catalyst cycles. How does this strategy vary when operating between maximum naphtha and maximum distillate modes? How does this impact catalyst selection for the next cycle?

23 How do you operate mid-distillate selective recycle hydrocracking units to generate more naphtha while minimizing fuel gas/ liquefied petroleum gas without catalyst replacement?

Operations

24 How do you manage reactor maldistribution once identified?

Profitability

25 For refinery complexes considering grassroots or brownfield expansion of gasoil conversion capacity, what are your typical capital expenditure (Capex) costs and relative refinery margin improvement between FCC and Hydrocracking? What are the key technology features that impact your economic decision? What are the crucial considerations that you address if they include both technologies to allow for future integration and optimization, especially around changing gasoline/ diesel ratio in the facility?

26 We are interested in minimizing our black oil production from the FCC by recycling heavy cycle oil and/or slurry to our FCC feed hydrotreater for aromatic saturation and further cracking. Do you have any experience with this operating mode or recommendations for reduced slurry make via optimization of an FCC pretreat unit?

Hydroprocessing

27 What methods do you use to reduce particulate loading on or debottleneck of existing filtration equipment in a hydroprocessing unit without reducing catalyst cycle life?

28 Our hydrotreating unit continues to suffer from pressure drop issues. Multiple graded bed schemes have provided incremental improvements. What other successful solutions to further mitigate pressure drop buildup do you employ?

29 Our hydrotreating unit continues to suffer from pressure drop issues. Multiple graded bed schemes have provided incremental improvements. What other successful solutions to further mitigate pressure drop buildup do you employ?

NOTES

Mild-Hydrocracking

30 What technologies do you use for mild hydrocracking of heavy gasoil over a range of conversions and product selectivity's? Please elaborate on commercial experiences.

31 With heavy gasoil hydrotreating and mild-hydrocracking units producing diesel product with 30-50 ppm sulfur, what options do you employ to recover maximum volume of ULSD? Are there other diesel quality concerns and how are they resolved? How does the yield and quality change over the cycle?

Operations

32 What are your current practices and experiences of performing on-line cleaning of heat exchangers vs. offline cleaning?

33 Can you share your experience with chemical additives to prevent fouling in naphtha hydrotreater feed side of the feed/effluent heat exchangers or resolve reactor pressure drop issues?

34 The cycle life of a high pressure ULSD unit operating for maximum aromatic saturation and liquid yield is limited by aromatics equilibrium at elevated temperatures. What strategies or solutions do you employ to extend operation with maximum liquid yield?

Hydroprocessing

35 What are possible causes of high product nitrogen in a naphtha hydrotreater processing coker naphtha that you see? Please include monitoring, identification, and troubleshooting techniques, inside and outside battery limit considerations, and mitigation options.

36 Which refinery water sources do you accept for hydrotreater water wash (e.g. stripped fractionator overhead water, stripper sour water, etc.)? What are typical water quality guidelines?

37 What is the impact of CO and/or CO2 on noble metal catalyst performance?

Resid Hydrocracking

38 What do you see for the future of ebullated bed technology considering changes in crude quality and availability?

39 Please summarize the current status of slurry hydrocracking technology commercialization.

ULSD

40 As it relates to overall catalyst cycle life management, please address the following issues:

A. What are typical cascading practices for catalyst reuse after regeneration and eventual disposal that you employ?
B. What quality control, catalyst properties and performance specifications, and/or warranties do you have in place for regenerated catalysts?
C. What are some of the key decision criteria you use in determining whether to send a catalyst for metals reclamation, regeneration, or disposal?

41 What are the considerations you use for extending hydrogen plant catalyst life cycles (i.e. lower production rates, furnace tube failure, etc.)?

CRUDE / VACUUM DISTILLATION & COKING

Safety

42 For heavy oil fractions being transported via truck, rail or barge, what are your typical H2S detection and monitoring methods? What are the mitigation options you employ?

43 Have you experienced high corrosion rates in carbon steel piping in resid service operating below 500 F? Please comment on corrosion mechanisms.

Crude Distillation

44 What issues do you consider to establish a purchased crude oil custody transfer best practices from various sources?

45 What criteria and requirements that you use to determine mixing equipment for crude tankage? How do you map the sludge level? What methods do you use for sludge removal to shorten time to clean?

46 What measurement methods (i.e. analytical, inferential, online analyzers) do you use in crude and coker units for feed, process and product quality management? How do you use the information to improve unit reliability and profitability?

47 Given the increased volatility of crude and product prices, what additional steps do you take to adjust their crude unit cut points to maximize profitability?

Q&A AND TECHNOLOGY FORUM: QUESTIONS 48 – 59

Crude Coker

48 What are your important considerations to evaluate the methods used for fouling detection and mitigation in preheat exchangers and furnaces in crude and coker units?

49 What criteria for materials of construction do you use for structured packing at the different sections of the crude, vacuum and coker towers? What criteria do you use to replace packing during turnaround?

Coker

50 In the absence of individual dip-leg sample points, how do you manage corrosion in the vacuum overhead system?

51 What key parameters of coker furnace tube design and metallurgy do you experience that can impact run length? What metallurgy do you use specifically to increase run length and tube life?

52 What are your best practices for a water wash system to control corrosion in delayed coking fractionator overhead and light-ends systems?

53 What operational improvements do you make to reduce silicone from antifoam agents in coker products?

54 When using coker LPG for propylene production, what contaminants are a concern for you and how do you mitigate them?

Answer Book Only

55 What are your effective ways to measure vacuum overflash flow in a gravity seal loop (not pumped)? Please comment on overflash measurement for controlling wash oil flow.

56 What mechanical / design alterations to the “standard” crude furnace design do you require to prevent fouling when processing LTOs?

57 Please discuss desalter level control equipment and its effectiveness at detecting and controlling rag layer, oil under carry and water carry over.

58 What techniques do you use to rapidly detect fouling in the top section of the crude tower besides top section differential pressure?

59 What is the contribution to salting in crude fractionators and overhead systems due to steam condensate amines and what are your mitigation strategies?

Town Hall Discussion Breakout Topics

A Safety Issues

B Curent Crude Quality Issues

C Unit Operation

NOTES

FCC

Process

60 When is your return on investment adequate enough to justify installing a desalter to treat purchased FCC feeds? What is the ROI based on (i.e., FCC catalyst impact, unit corrosion, etc.)? How do these desalters differ mechanically and operationally from a conventional crude oil desalter?

61 How many inside/outside operators staff your FCC plant? What other processes are included in their scope of responsibility?

62 We have run a full burn FCCU for many years. We are considering processing more resid and operating in a partial CO combustion mode. What is a carbon runaway and how can it be addressed?

63 What are your current methods used for regenerator cyclone temperature control? Do you use water sprays or steam injection?

64 What are your typical operating guidelines to prevent compressor surge episodes? How closely do your FCCU operators approach the actual surge line of a compressor before adjusting operation?

65 Please comment on which FCC feed types you are currently processing and what chemicals you are using for gas plant corrosion prevention. Is water washing sufficient to sustain adequate unit reliability?

66 In your experience, how does changing the feed cut points impact FCC conversion and product yields? How does the LP determine where to make these cut points?

67 As distillate demand has decreased, current economics favor maximizing gasoline and octane. What operating and catalyst changes do you recommend for increasing octane barrels?

68 What is your experience with processing raw crude in the FCC? What types of crude have you tried to process in the FCC? What are the yield impacts? Any corrosion issues associated with this mode of operation? What additional corrosion monitoring is needed?

69 Our FCC unit is limited by coke burn and high regenerator temperatures. What catalyst and operational changes have you implemented to maximize the conversion of heavy feeds and increase the amount of resid we can process without running into our regenerator limits and without increasing dry gas production?

70 What is your method for measuring naphthenic acid (TAN) in FCC feed? Is this method affected by VABP or con carbon content? Do you have data that validates an appropriate Integrity Operating Window (IOW) trigger level? If above the trigger level, what is your recommended corrective action (extra inspection, change crude/slate, etc.)?

Safety and Environmental

71 In your experience, what factors affect NOx emissions for a partial burn FCC with a CO Boiler? How do you achieve 50 ppm CO emissions while simultaneously minimizing NOx emissions through the stack?

72 Recent drone technology advancements have enabled refiners and contractors to improve the efficiency of maintenance and inspection activities. With this, how are your hot-work permits and general safety policies evolving to sustain adequate asset and personnel protection at all times? For instance, what additional safety permits or considerations would apply for drone use and aerial inspections?

73 What criteria do you use to justify sealless pumps in place of conventional double seal pumps in LPG services? What are the operational and reliability issues associated with these types of sealless pumps?

Q&A AND TECHNOLOGY FORUM: QUESTIONS 74 – 84

Catalyst

74 In your experience, what are the effects of different Ni passivation technologies on the performance of CO promoters and stack emissions?

75 In your experience, how does the shape of an FCC catalyst particle impact the fluidization properties of the catalyst? What other properties are important to monitor?

76 What FCC operating and catalytic changes can lower gasoline sulfur while retaining octane? How would feed hydrotreatment impact these options? How would the FCC operating and catalytic changes impact gasoline post-hydrotreating?

77 What are your best practices for mitigating operational or performance risks throughout a catalyst changeover?

78 What operational and catalytic changes have you implemented to optimize C4 olefin yield for the alkylation unit?

Mechanical/Reliability

79 What methods do you use to detect and monitor coke deposition in FCCU Risers? What prediction methods have been successful?

80 What is your best practice for removing feed nozzles during turnarounds when only the tips are planned to be replaced? Are there any pros/cons or advantages/ disadvantages of removing the nozzles while the system is hot or after it has cooled?

81 What are your inspection best practices for Third Stage Separator (TSS) systems throughout a scheduled turnaround? What types of issues or equipment damage should be would you proactively anticipate in order to mitigate potential turnaround delays?

82 Have any of your FCC units observed extensive corrosion in carbon steel piping operating below 500oF - particularly in the slurry circuit? What are your typical corrosion mechanisms? What metallurgies would you deem acceptable for high-temperature, high-sulfur streams?

83 What are the variables you consider that impact slurry oil pump life? What is the typical slurry oil pump life that you experience in normal service?

84 What effects, if any, have you observed concerning slurry pumparound exchanger fouling when processing shale oil/tight oil feeds?

NOTES

EXHIBITION INFORMATION

EXHIBITION HOURS

Monday, September 26

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

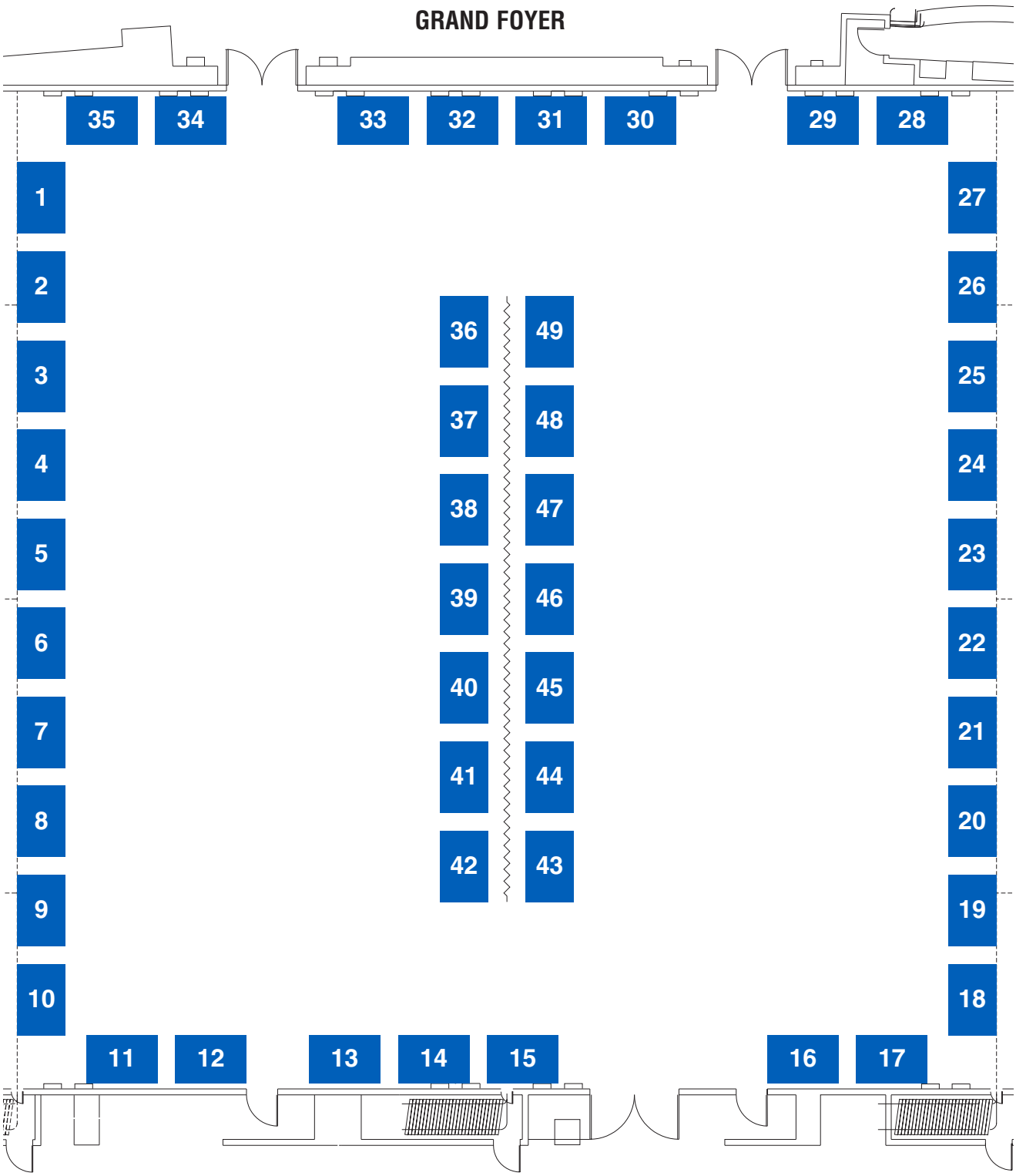
Reception / Tabletop Exhibition Open
5:15 pm – 6:30 pm

Tuesday, September 27

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

LIST OF EXHIBITORS: ALPHABETICAL BY COMPANY

MAP OF EXHIBITION



Advanced Refining Technologies (37)
7500 Grace Drive
Columbia, MD 21044
832-554-0710
Portia Sharp
Portia.sharp@grace.com
http://www.artcatalysts.com
Advanced Refining Technologies is a leading global supplier of hydroprocessing catalysts, with a complete portfolio of hydrocracking, distillate hydrotreating, fixed bed resid hydrotreating, and ebullated bed resid hydrocracking catalysts.

Air Products (8)
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Allentown, PA 18195-1501
610-481-5872
Sarah Farnand
farnansg@airproducts.com
http://www.airproducts.com/plantservices
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Albemarle Corporation (15)
2625 Bay Area Boulevard, Suite 250
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281-480-4747
Leonard Chan
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http://www.albemarle.com
As a leading supplier of catalyst solutions, Albemarle provides top-performance catalysts and leverages technology to extract maximum value from your unit.

Athlon Solutions (42)
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Houston, TX 77027
713-457-2400
Rhonda Warzecha
rhonda.warzecha@athlonsolutions.com
http://www.athlonsolutions.com
Athlon Solutions is the supplier of choice for specialty chemicals and services for many refiners, power plants, and chemical and petrochemical plants, as well as finished petroleum fuels.

BASF Corporation (1/2)
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Houston, TX 77002
713-498-1797
Teresa Garcia
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http://www.catalysts.basf.com
BASF, a global leader in catalyst solutions, adds value to the refinery through cutting-edge technology and best-in-class technical service. BASF's flexible portfolio of fluid catalytic cracking catalysts and additives supports a diverse range of feeds and operating objectives.

CB&I (34)
One CB&I Plaza
2103 Research Forest Drive
The Woodlands, TX 77380
832-513-1000
Kyle Findley
rkfindley@cbi.com
http://www.CBI.com
CB&I (NYSE: CBI) is a leading provider of technology and infrastructure for the energy industry. With over 125 years of experience and the expertise of more than 40,000 employees, CB&I provides reliable solutions to our customers around the world while maintaining a relentless focus on safety and an uncompromising standard of quality.

ChemTreat (7)
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804-935-2000
Ian Scarth
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http://www.chemtreat.com
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713-926-3330
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mike.bugel@chep.com
http://www.chepccc.com
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832-813-4390
Jonathan VanScoyoc
VANSCJ@cpchem.com
http://www.cpchem.com
Leading supplier of sulfur chemicals and sulfiding injection services for refinery and petrochemical applications. Services include catalyst sulfiding, hydrotreating catalysis, and on-site catalyst services.

Clariant Corporation (31)
1600 W. Hill Street
Louisville, KY 40210
502-634-7200
Lucy Innes
lucy.innes@clariant.com
http://www.clariant.com/catalysts
A world leader in specialty chemicals, catalysts and additives, Clariant delivers value with innovative and sustainable catalytic solutions for refinery applications.

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Paula Ezernack
paula.ezernack@shell.com
http://www.criterioncatalysts.com
Criterion Catalysts & Technologies - A history of catalyst innovations, providing flexible solutions for hydroprocessing needs.

Crystaphase (6)
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terry.lafleur@dorfketal.com
http://www.dorfketalusa.com
Refineries and petrochemical plants worldwide rely on Dorf Ketal for innovative problem solving and a growing list of new advanced process chemistries, lubricant additive components, and fuel additives.

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Sarah Kurz
sekurz@dow.com
http://www.dow.com
From specialized services like the REFINERY AMINE MANAGEMENT℠ PROGRAM 360 to a comprehensive line of specialty solvents, Dow Oil, Gas and Mining provides complete solutions for refinery amine treating needs.

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http://www.cleantechnologies.dupont.com
The DuPont Clean Technologies division brings real-world experience, history of innovation, problem-solving success, and strong brands to the refining marketplace; including STRATCO® Alkylation, BELCO® Air Quality Control Sytems, IsoTherming® Hydroprocessing and DynaWave® SRU Solutions.

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Emerson Process Management delivers automation solutions that safely improve your plant's flexibility and responsiveness to opportune market conditions.

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http://www.eurecat.com
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katie.bettes@wika.com
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WIKA is dedicated to making advances in pressure, temperature, level, flow and calibration technologies. We offer a broad portfolio of measurement instruments, and we provide services to support your design, installation, repair and calibration needs. Wherever you are in the world, you can depend on WIKA.

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Trevose, PA 19053
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Jeffrey Zurlo
jeffrey.zurlo@ge.com
http://www.gewater.com
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Grace Catalysts Technologies (36)
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Portia.sharp@grace.com
http://www.grace.com
Grace Catalysts Technologies is the global leader for FCC catalysts and additives, offering solutions-oriented approaches backed by a broad, highly differentiated portfolio, industry-leading technical service, and a flexible manufacturing system.

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P. O. Box 2290
302 Midway
Freeport, TX 77542-2290
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Honeywell UOP (16)
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Amy Scheffen
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http://www.uop.com/
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Confidential and independent pilot plant testing services that can simulate most refinery process technologies including delayed coking, desalting, distillation, fixed bed catalytic processing, solvent refining (deasphalting, dewaxing, extraction) and thermal cracking.

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Jennifer Rennick
jennifer.rennick@matthey.com
http://www.jmprotech.com
Johnson Matthey Process Technologies is a global supplier of catalysts and additives, licensing technologies, process diagnostics and other services related to the petrochemical, syngas, oil refining and gas processing industries.

Johnson Matthey Process Technologies/Tracerco (40)
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andy.burleigh@tracerco.com
http://www.tracerco.com
Tracerco FCC Studies measure velocity, distribution and residence time of the catalyst and/or vapor phase through any part of the FCC system. Tracerco can investigate the performance of termination devices, cyclones and distribution devices. Tracerco's new InDepth™ tool measures refractory thicknesses of operating vessels, risers, and standpipes.

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http://www.jvic.com
JV Industrial Companies, Ltd. (JVIC) is the premier provider of turnaround, construction, fabrication,and catalyst services. Experienced project management and planning teams, coupled with an extensive base of highly qualified craftsmen, perform world-class turnarounds and FCCU revamp projects throughout the United States.

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15021 Katy Freeway, Suite 600
Houston, TX 77094
281-293-8200
Robert Ohmes
rohmes@kbcat.com
http://www.kbcat.com
KBC, a Yokogawa company, is a leading consultancy and software provider to the global hydrocarbon processing industry.

KBR Technology (30)
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713-753-6688
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http://refining.kbr.com
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http://www.prosys.com
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16834 Titan Drive
Houston, TX 77058
281-461-7200
Crystal Brockington
cbrockington@nalco.com
http://www.quantumtec.net
Quantum Technical Services helps you troubleshoot, diagnose, and solve complex problems. Services include tower scans, pipe scans, tracer studies, heat exchanger monitoring, infrared thermography, and cooling tower fill monitoring.

Refined Technologies (22)
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Building 9
Spring, TX 77388
832-482-4248
Kevin Roberts
kroberts@r-t-i.com
http://www.r-t-i.com
Refined Technologies Inc. is focused on implementing strategic chemistry. Strategic chemistry is the timely use of chemistry and planning, designed to improve client operating margins. Our patented process applies to upgraders, refineries, ethylene crackers, gas plants and SAGD sites.

Richard Industrial Group, Inc. (44)
750 Pearl Street
Beaumont, TX 77701-3312
855-612-2242
Richard Gaona
richard.gaona@rig-rds.com
http://www.richardig.com
We provide full service engineering, procurement, construction and pipe fabrication services to the refining and petrochemical industries across the United States. In addition, we provide electrical and instrumentation field services, as well as automation and control systems assistance. Through our construction division we also perform turnaround and maintenance.

Sabin Metal Corporation (24)
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East Hampton, NY 11937-2630
631-329-1717
Daniel Fisher
dfisher@sabinmetal.com
http://www.sabinmetal.com
Sabin Metals Corporation provides customers with logistical support, precious metal financial services, pre-reclaim kilning and safe, accurate and responsible processing, sampling and refining of precious metal-bearing catalysts.

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Top bed grading and catalyst support media for the prevention of pressure drop increase in the refining & petrochemical industry.

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amcwhorter@technip.com
http://www.technip.com
Technip Stone & Webster Process Technology provides world leading ethylene, refining, hydrogen and petrochemical technologies. Services include technology licensing, process design/engineering, procurement and construction, proprietary equipment including cracking furnaces, project and construction management and feasibility studies.

Unicat Catalyst (20)
1600 E. Highway 6, Suite 320
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832-621-9804
Lewis Ludwig
Lewis.Ludwig@unicatcatalyst.com
http://www.unicatcatalyst.com
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VEGA Americas, Inc. (26)
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David Williams
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WIKA Instrument, LP (18)
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http://www.wika.com
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Blake Collins
blake.collins@woodgroup.com
https://www. woodgroup.com
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XOS (9)
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East Greenbush, NY 12061-4137
773-454-1114
Shaun Spiro
sspiro@xos.com
http://www.xos.com
XOS manufactures X-ray analyzers that offer elemental analysis solutions for the petroleum industry that improve efficiency by providing leading precision and maintenance-free uptimes for months.

NOTES

HOSPITALITY DIRECTORY

This guide is a directory 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 AFPM's policy not to conflict with regularly scheduled Association sessions and activities and to close by 1:00 am.

Company	Location and Dates
Albemarle Corporation	Dover A 9/26
Athlon Solutions	Grand Ballroom 3 9/26
Axens North America, Inc.	Dover B&C 9/26
BASF Corporation	Suite ____ 9/27
CB&I	Grand Ballroom 4 9/26
Criterion Catalysts & Technologies L.P.	Laurel C&D 9/26
Dow Oil, Gas and Mining	Suite ____ 9/26
DuPont Clean Technologies	Grand Ballroom 1 9/26
Emerson Process Management	Suite ____ 9/25, 26
Haldor Topsoe, Inc.	Grand Ballroom 7&8 9/26, 27
Honeywell Process Solutions	Essex B 9/25, 26, 27
Honeywell UOP	Essex A 9/25, 26, 27
Johnson Matthey Process Technologies	Raven's Room 9/25, 26, 27
Norton Engineering Consultants, Inc.	Grand Ballroom 10 9/25, 26
Solenis	Essex C 9/25
Technip Stone & Webster Process Technology	Grand Ballroom 9 9/26

Companies in **bold** are sponsors.

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