



2011 Annual Meeting  
March 20-22 ~ Marriott Rivercenter ~ San Antonio, TX

### **Program Descriptions**

#### **FCC TECHNOLOGY**

##### **“Multi-Stage Reaction Catalysts: A Breakthrough Innovation in FCC Catalyst Technology”**

**AM-11-01 ~ Alexis Shackelford, BASF Corporation; J.B. McLean, BASF Corporation; B.W. Hoffer, BASF Corporation**

BASF has commercialized the Multi Stage Reaction Catalyst (MSRC) platform, an FCC catalyst manufacturing innovation taking advantage of stages with different catalytic attributes within a single catalyst particle. Fortress™, the first product from this new platform, is designed for resid feedstock applications, where contaminant feed metal passivation is critical.

##### **“QUANTA™ TECHNOLOGY: IMPROVING THE CATALYTIC AND PHYSICAL PERFORMANCE OF FCC CATALYSTS ”**

**AM-11-03 ~ Augusto Quinones, INPROCAT Corporation**

In this paper we present **QUANTA™ TECHNOLOGY**. Quanta technology is a series of possible modification to existing FCC catalysts, both Equilibrium and fresh catalyst formulations, that yield improved gasoline yield, bottoms upgrading and improved coke selectivity. The modifications are physical in nature yet yield dramatic improvements given diffusion limited and secondary reactions. The fundamental principles behind technology with relevant examples for VGO and Resid applications will be presented. The technology may be of particular importance for propylene maximization.

##### **“The Low Sulfur Diet: New Catalytic Ways to Cost-Effectively Reduce Product Sulfur and SOx Emissions”**

**AM-11-04 ~ Alan Kramer, Albemarle**

This paper focuses on the sulfur balance around the FCC Unit, and the economic considerations behind choosing the most cost-effective solution for reducing product sulfur and SOx emissions with particular attention on the impact of today's “Rare Earth Crisis.”

##### **“Design and Operation of Holly Refining FCC SCR Unit”**

**AM-11-05 ~ Dr. Kevin Linfield, Airflow Sciences Corporation; Merle Fritz, Holly R&M; Dennis Salbilla, Haldor Topsoe, Inc.**

An SCR unit was installed on the Holly Tulsa FCC in late 2009. The existing ESP was removed from service resulting in a high “high dust” content flue gas SCR design. This required a custom SCR catalyst that would withstand the erosive environment and still perform well over the projected 5-year continuous run. Both CFD and physical flow modeling were performed to optimize the flow entering and SCR.

## **RELIABILITY**

### **“Improving Coker Productivity with Reliability-Centered Maintenance (RCM) Model”**

**AM-11-08 ~ Randall Hull, Marsulex Inc.**

Given high historical margins associated with Delayed Coker Units, it is imperative that refiners fully understand the total operating and maintenance requirements of these units in order to maximize both their productivity and reliability. This paper will discuss a maintenance and reliability model developed within a large refinery’s coker operation, which includes coke cutting, material handling and logistics. The model quantifies the impact of the preventive maintenance program on the direct and associated maintenance cost of the facility. It also provides the refiner the ability to better understand the return on increased investment of an effective Preventive Maintenance structure and the risk related to different types of failures. If effective data is available, Marsulex’s modeling program can be used to provide the refiner guidance on PM investment and related failure risk.

### **“BPCL Case Study: The Business Case for RBI”**

**AM-11-09 ~ Vinay Nihalni, Meridum; Roopesh Modathiyalath, BPCL – Kochi Refinery**

In this presentation we will discuss, how to effectively manage risk as well as optimize Operations & Maintenance budgets in a global economy. This presentation provides a real-world case study on how RBI can provide significant benefits in a very stringent jurisdictional environment where regulations require that all pressure containing equipment be opened every four (4) years for internal inspection. Based on the findings of an independent study, BPCL identified the need for establishing a risk-based mechanical integrity system.

## **PROCESS SAFETY**

### **“Tackling both Personal Safety & Process Safety “**

**AM-11-14 ~ Dawn Wurst, Flint Hills Resources**

Process Safety and Personal Safety ARE different. Facilities which are able to identify and leverage strengths unique to Personal Safety and to Process Safety, while also building on systems common to each have a better opportunity to be successful in Safety as a whole. This presentation walks through a mapping of these areas/systems, including specific examples of actions taken by one large refinery to improve on both fronts.

### **“Benchmarking Industrial Safety Culture and Performance”**

**AM-11-15 ~ Tom Lemm, DuPont Sustainable Solutions**

This paper will discuss a process developed by DuPont to manacure employee safety perception and corullate the results with safety performance. It will further discuss the connection between safety culture and process safety management, and compare results across a wide industrial spectrum including several companies with world class safety results.

### **“Predicting and Mitigating Risk of Catastrophic Incidents”**

**AM-11-18 ~ Neal Walters, A.T. Kearney**

Despite a strong focus on personal safety in oil & gas, petrochemicals, and other asset intensive industries, serious process safety incidents continue to occur; while most companies do not suffer catastrophic events, these incidents can still result in loss of containment of hydrocarbons or chemicals that account for a significant portion of the total capacity/opportunity loss at a site. This paper and presentation will discuss the most common underlying root causes and risk predictors of such incidents, and will recommend actions that can decrease and mitigate risk exposure.

## **HYDROPROCESSING**

### **“Refinery Configurations for Maximum Conversion to Middle Distillates”**

**AM-11-19 ~ Arun Arora, Chevron Lummus Global; Ujial Mukherjee, CB&I Lummus**

The demand for high sulfur fuel oil not destined for bunker fuel has seen a steady decline over the last several years and with the recent International Maritime Organization (IMO) specifications impacting bunker fuel oil there is an urgency in refiners worldwide to convert low value residue to high value products, in particular diesel. This paper evaluates several residue conversion solutions and recommends an optimum configuration for maximizing middle distillates.

### **“Successful Production of ULSD in Low Pressure Hydrotreaters”**

**AM-11-23 ~ Steven Mayo, Albemarle Corporation**

In this presentation production of ULSD in a low pressure hydrotreater will be covered from both a theoretical and practical perspective. Tips for longer cycles as well as pitfalls to avoid will be proposed.

### **“Exceed your Hydrocracker Potential using the Latest Generation Max Diesel Flexible Catalysts”**

**AM-11-24 ~ Ward Koester, Criterion Catalysts and Technologies; Herman Jongkind, Shell Global Solutions**

This paper outlines a series Criterion/Zeolyst Hydrocracking catalyst innovations that have enabled step improvements in selectivity in dcracking catalyst hydrogenation activity to maximize high quality diesel in Flexible naphtha/diesel operations.

## **FUELS REGULATIONS**

### **“How Expensive is the Cost to Operate? A Review of the Economics of Fuel Regulations”**

**AM-11-25 ~ Subbaraman Viswanathan, ADI Analytics LLC; Uday Turaga, ADI Analytics LLC**

This paper will review cost of various fuel legislations an dhow industry has innovated to meet them at competitive costs.

### **“The Path Forward for RFS II and Gasoline Markets?”**

**AM-11-26 ~ Kurt Barrow, Purvin & Gertz; Blake Eskew, Purvin & Gertz**

Advanced biofuels targets are now established through RFS II but the best path to compliance is uncertain. The relaxation of the gasoline “blend wall” opens the possibility of mid-level ethanol blends but E85, sugar-cane ethanol imports, biodiesel blending and perhaps cellulosic biofuels are also compliance options. The impact of RFS II on U.S. refiners is examined with a presentation on possible paths forward.

### **“Regulatory Impacts on Atlantic Basin Gasoline Supply and Demand”**

**AM-11-27 ~ Terry Higgins, HartEnergy**

This paper will review fuel regulatory and biofuel policies in teh US, EU, an dLatin America an dtheir impact on gasoline supply and demand.

### **“Strategic Options for Meeting Lower Sulphur Marine Fuel”**

**AM-11-28~ Karl Bartholomew, KBC Advanced Technologies, Inc.**

Within five to ten years, marine fuel sulfur specifications will dramatically change. Not only are global limits dropping by two-thirds, but the US and Canada will seperately and mor quickly introduce regulations only one-fifth of today’s maximum. Refiners have limited options to meet the new regualtions, including making marine distillates instead of residual fuel.

This paper provides a context for decision-making by first reviewing the current, and projected, supply/demand positions as well as the regulatory environment. We then discuss a methodology for evaluating some refining options. Holistic, facility-wide simulations finally test technical and economic projections as we evaluate potential outcome scenarios.

**“U.S. Refiners Face Important Changes in Distillate Demand”**

**AM-11-29 ~ Alfred Luaces, Purvin & Gertz, Inc.**

This presentation examines the upcoming heating oil specifications in the Northeast U.S and other global trends that are likely to affect U.S. Refiners. Increasingly stringent sulfur specifications for heating oil could spur some investments as well as increase competitive pressure on less sophisticated refineries. Development of export markets for diesel could continue to provide a viable option for many refiners.

**MANAGEMENT**

**“A Rising Tide of Product Imports May Derail a Potential Recovery for US Refineries”**

**AM-11-30~ Charles Kemp, Baker & O'Brien, Inc.; Rick Thomas, Baker & O'Brien, Inc.**

Will new complex refineries in the Middle East and Asia/Pacific put pressure on US Refining markets? We will discuss global restructuring of the refining industry and how new product imports may impact the potential recovery of refiners, in particular those serving the Atlantic basin markets.

**“US Downstream Landscape Evolution and its Corporate Implications”**

**AM-11-31 ~ Alan Gelder, Wood Mackenzie Inc.**

Wood Mackenzie will explore the business outlook for the US Downstream market, identifying key market uncertainties the range of industry business models will be reviewed along with their alignment with future market trends.

**“Petrobras Medium Distillates Maximization Program”**

**AM-11-32 ~Geraldo Santos, Petrobras**

In order to meet the burge ongoing diesel and jet demand fore casted for Brazil Petrobras launched the “Medium Distillates Maximization Program” in 2008. This program was implemented across the 12 refineries in the Petrobras system with the objective to increase the production of middle distillates and thus decrease external dependence on imported fuels.

**“Improving Profitability in the Era of Lower Utilization”**

**AM-11-33 ~ Eric Streit, KBC Advanced Technologies, Inc.; Robert Ohmes, KBC Advanced Technologies, Inc.**

This presentation will focus on sharing lessins learned by the refining industry while adapting to the current economic climate of lower margins and refinery retionalization. Techniques for maximizing profitability at lower utilization levels will be presented.

### **“Social Media: Redefining Public Relations in our Industry”**

**AM-11-34 ~ Jaime Ortegón, ioMosaic Corporation**

In this presentation, I will discuss the emergence of **Social Media** and its surprisingly strong and newfound influence on today's news outlets. Additionally, I will analyze its impact on **Risk Communication** and **Public Relations**, discussing new considerations companies in the energy industry must now make regarding Social Media's instantaneous and globally visible platform of today's news and commentary.

### **FCC OPERATIONS**

#### **“Twenty Questions: Identify Probable Cause of High FCC Catalyst Loss”**

**AM-11-35 ~ Phillip Niccum, KBR**

The answers to twenty key questions provide a basis to list the more likely causes of high catalyst losses from fluid catalytic cracking (**FCC**) units. Armed with a listing of probable causes, a refiner can develop cost effective mitigation strategies to solve the loss problem on-line or during the next unit shut-down.

#### **“Preventing the Most Common Environmental Excursions on the FCC”**

**AM-11-38 ~ Ray Fletcher, Intercat**

Guidelines are provided to help the process engineer eliminate the root causes leading to the most common environmental excursions. Furthermore, practical suggestions are provided to enable optimization of the FCC regenerator for minimum emissions and optimum combustion efficiency.

#### **“Population Balance Modeling: An Approach for Understanding FCC Particulate Generation.**

**AM-11-39 ~ Jennifer Wade, BASF Corporation; David Stockwell, BASF Corporation; S.B. Reddy Karri, PSRI**

Industry demands a more attrition proof FCC catalyst without sacrificing performance or yield structure. In order to successfully design such a catalyst, we need to understand how catalyst particles attrit in commercial units. Population balance modeling is a tool that has been employed to identify how catalysts degrade in both commercial units and lab test methods such as the conical jet cup designed by PSRI.

### **OPERATIONS, SAFETY**

#### **“Addressing “Man-Down” Situation in a Plant Environment”**

**AM-11-40 ~ Kevin Bogard, Marathon Petroleum Company; Ken Johnson, Accenture**

In line with its commitment to providing a safe work environment, Marathon Oil teamed with Accenture to deploy the Accenture life safety solution, a patent pending, wireless enabled gas detection system that helps protect workers in hazardous environments.

#### **“Using a Novel Chemistry for Hydrogen Sulfide Abatement in Asphalt”**

**AM-11-41 ~ Jennifer Draper, Baker Hughes; Joseph Stark, Baker Hughes**

The reduction of hydrogen sulfide in asphalt is an important consideration that presents unique challenges. This presentation discusses a novel chemical solution for the removal of hydrogen sulfide from asphalt in vapor and liquid phases.

### **“Modularizing Emergency Procedures for Increased Ease of Use and Updating”**

**AM-11-44 ~David Strobhar, Beville Engineering, Inc**

The Center for Operator Performance commissioned a study to examine new options to improve emergency procedures. Heuristics were developed to enable automatic chunking and grouping of emergency procedures into a modular format. The procedure modules or elements can be recombined in various arrangements to match user needs. Since the modules are used in multiple procedures, one update results in automatic compliance of all associated procedures.

### **CRUDE OIL SUPPLY**

#### **“Shifting Supply Trends Impact on USGC Crude Trade”**

**AM-11-45 ~ Geoff Houlton, Purvin & Gertz, Inc**

New sources of crude oil supply are expected to come on-stream rapidly in the near-term as production from traditional producing regions continues to decline. This shift in crude oil supply will have a significant impact on the quality and volume of the crude availability to USGC refineries. The paper will discuss and quantify the impact of new crude oil supply on refineries.

#### **“Low CO2 Oil Decontamination and Upgrading Process”**

**AM-11-47 ~ Eric Burnett, Auterra, Inc.; Dr. Kyle Litz, Auterra, Inc.**

Auterra has developed a new oil treatment process, FlexDS, for the decontamination and upgrading of crude oil and heavy oil distillates. With both upstream and downstream configurations, FlexDS removes sulfur, nitrogen, trace metals, increases API and decreases TAN in a single, efficient process.

#### **“Bitumen Processing: A Guide to Crude Unit Revamps”**

**AM-11-48 ~ Mike Armstrong, Jacobs Consultancy; Rob Henderson, Jacobs Consultancy; Jon Price, Jacobs Engineering**

US refiners have increasingly recognized the need to process heavy bitumen and bitumen blends to stay competitive. Having performed multiple scoping studies for bitumen processing in US refineries, Jacobs Consultancy has found the Crude Distillation Unit (CDU) to be the area with the greatest reliability risk and revamp cost requirements. This paper will seek to help refineries mitigate CDU reliability risks and minimize revamp scope when processing bitumen.

#### **“Worldwide Crude Oil Developments and Their Implications on Refining”**

**AM-11-49 ~ Lynn Westfall, Turner, Mason & Company; John Auers, Turner, Mason & Company; David Knapp, Turner, Mason & Company**

In this presentation we will provide the highlights of an analysis which determines the impacts that changing volumes and qualities of crude oil production will have on the refining industry, the effects of changes in the geographical distribution of crude oil streams will also be considered.

### **RENEWABLE FUELS**

#### **“Advanced Biofuels: How Many Barrels Will U.S. Refineries See?”**

**AM-11-50 ~ Uday Turaga, ADI Analytics LLC**

We will provide a perspective on actual volumes of biofuels from advanced processing technologies that US Refineries will actually see. This will include a supply curve for advanced biofuels, likely refinery ingestion points, and impacts on product and processing issues.

### **“Examining the Value Chain in Production of Renewable Diesel”**

**AM-11-51~ Robert Riley, Grace Davison**

This paper will examine the technical and economic issues associated with production of diesel range material from renewable feedstocks (animal or plant sources). In addition, we will focus on the processes employed to remove contaminants from the feedstock, and the economic impacts of producing renewable diesel with different pretreatment schemes.

### **GASOLINE**

#### **“Ultra-Clean Gasoline Using Solid Acid Catalysts”**

**AM-11-55 ~ James Nehlsen, Exelus Inc; John Young, Exelus Inc; Mitrajit Mukherjee, Exelus Inc.**

Alkylate is a high-value, high-octane gasoline blendstock. However, it is produced conventionally using problematic liquid acids such as HF or sulfuric acid. After years of development, a new solid-acid catalyst technology has reached the point of outperforming these liquid acids. The ExSact alkylation process applies this new technology to produce alkylate from any olefin, including ethylene, propylene, and butenes, in a simple fixed-bed process with low operating and capital costs. This presentation will describe the technical and economic performance of the process under a variety of commercial conditions and feedstocks.

#### **“The Challenges & Opportunities of 10 ppm Sulfur Gasoline: Lessons Learned from FCC Pre-treat v. Post-treat Projects”**

**AM-11-57~ Delphine Largeteau, Axens; Michael Craig, Axens; Jay Ross, Axens**

This paper will discuss the European experience to meet ULSG regulations through high severity FCC Gasoline post-treating technology (Prime-G1) and examine the applications of this experience to the North American market and revamp of existing Prime-G1 units. Another option open to refineries will be severe. FCC feed pre-treatment (FHT) as a way to avoid post-treatment or in concert with post-treatment. The paper will address these issues, challenges and opportunities around the FHT option in terms of increasing severity and cost.

#### **“RT-235: Commercial Performance of Next Generation SCANfining™ Catalyst”**

**AM-11-58 ~ Steve Mayo, Albemarle; John Greeley, ExxonMobil Research & Engineering Company; Michael Wellons, ExxonMobil Research & Engineering Company**

In this presentation we will discuss the commercial performance of RT-235, a next generation catalyst developed by ExxonMobil and Albemarle for production of low sulfur mogas with minimum octane loss.

### **HYDROGEN**

#### **“Hydrogen Management in a GHG Constrained Refinery”**

**AM-11-60 ~ William Fairleigh, KBC Advanced Technologies, Inc.; Joris Mertens, KBC Advanced Technologies, Inc.; Richard Manner, KBC Advanced Technologies, Inc.; Scott Sayles, KBC Advanced Technologies, Inc.**

This paper will discuss an over-all game plan and various options for reducing refinery CO<sub>2</sub> emissions, with emphasis on optimizing hydrogen production to reduce a refinery's carbon footprint. Guidelines for monitoring and reducing refinery CO<sub>2</sub> emissions, contained in this paper, are needed in light of the recent EPA announcement that it will start regulating these starting this year.

### **“Refinery Off Gas Management ”**

**AM-11-63 ~ Regina Koehler, Linde Engineering; Frank Naupay, Selas Fluid; Wolfgang Schoerner, Linde Engineering**

Technical and economic aspects of different refinery off gas integration schemes in hydrogen production plants.

### **“Improved Hydrogen Plant Design and Operations to Meet Today's Refining Challenges”**

**AM-11-64 ~Dennis Vauk, Air Liquide**

In this paper, we will review case studies from recent projects Lurgi has executed for Air Liquide to demonstrate hydrogen plant improvements in the following areas: reducing capital cost through top-fired design and modularization of equipment; impact of preheat and pre-reformer design on H2 plant efficiency and CO2 emissions; and improvement of safety and reliability of operation.

## **WORKFORCE EFFECTIVENESS**

### **UTILITIES& OFFSITES**

#### **“Refinery Influent Water Supply Contamination Recovery”**

**AM-11-71 ~ Walker Garrison, Valero Energy Corporation; Loraine Huchler, ManTech Systems, Inc.; Jim Schaaf, Valero Energy Corporation**

Fresh water supply is critical to refinery operations and the centralized design makes it a potential single-point source of failure. Consequently, contamination or loss of the water supply will result in production losses and potential equipment damage. This paper will discuss specific incidents that compromised the influent water supply to a major Gulf Coast Refinery and the subsequent recovery efforts.

#### **“A Standardized Approach to Address Common Boiler BMS Deficiencies”**

**AM-11-73 ~ Stephen Russell, Valero; Donald Lyons, Valero; Walker Garrison, Valero**

Many boiler and associated safety systems have a common set of deficiencies that can result in potentially unsafe conditions. This presentation will address those issues in a standardized approach that results in the fastest and most efficient roll-out of safe and effective safety system implementations.

#### **“Cost Effective Organic Sulfur Removal from Refinery Fuel Gas”**

**AM-11-74 ~ Vasilis Papavassiliou, Praxair; Ray Drnevich, Praxair; John Scalise, Praxair; Ramchandra Watwe, Praxair**

Refinery gas streams, especially those derived from cokers contain other sulfur compounds such as mercaptans, thiophenes and sulfides which are not effectively removed by an amine system. Additional processing steps are needed to take out sulfur compounds other than H<sub>2</sub>S. Praxair has developed a low capital cost hydrotreating technology that is effective at lower temperature and pressures when compared to conventional hydrotreating. This can allow streams like coker off gas to be treated without additional compression and minimal additional heat input. The key to this concept is the development of an extremely short contact time reactor. Praxair has operated a demonstration unit for 3 years processing actual refinery off gas. The unit demonstrated >95% conversion of organic sulfur to H<sub>2</sub>S for reactor inlet temperatures in the 400° F range. It has operated successfully with olefin levels as high as 17% in the feed.