

## 2017 Spring Meeting & 13<sup>th</sup> Global Congress on Process Safety

**March 26-30, 2017, San Antonio, TX**



### AIChE Spring Meeting 2017 – San Antonio Not your same old Spring Meeting!

*By Lori McDowell, Matheson, Spring Meeting Program Chair*



As Winston Churchill once said, “To improve is to change, to be perfect is to change often.” Those who have attended the last few Spring Meetings have witnessed changes (most good, some not so good) and many improvements, but perfection is still not attained. So 2017 will issue in a few new things to improve the meeting for attendees and presenters. If you have not been to a Spring Meeting in a few years, please try to attend – I think you will like with you see, and you will gain a lot from the meeting!

First-the location-San Antonio has a brand new Convention Center with many great features. A large exhibit area, improved ballrooms and great meeting rooms are just some of the improvements. There are also some nice food options in the Convention Center, for those who don’t want to venture out into the city. All the technical meetings will be in the Convention Center, surrounding the Exhibit Hall, so it will be easy to go from talk to talk. New and improved signage and maps will also make getting around and finding what you are looking for easier.

## Chair's Corner

by Rick Kolodziej



I hope all of you had a nice and relaxing summer; at least on-purpose and per your timing! There is no doubt that the Fuels and Petrochemicals Industry has been and is still being negatively affected by low crude prices. The Upstream Oil & Gas Production industry affects are obvious, but even downstream, Refining and Petrochemicals companies are more cautious with their planning, as it is difficult to predict project economics. I'm sure we all know of engineers affected by the slowdown and downturn. Employment is a current, top subject priority for F&PD members.

### Job Search within the F&PD Industries

We always like to think of how being a part of F&PD can help keep us current in the Technical aspects of being a chemical engineer in our always advancing industries, and so it will! But, I think we need to also remember that AIChE and our division and network of members in particular, can help us be at the head of the line for new jobs and engineering and consulting assignments for chemical engineers! If you need a job, tell us all! If you have an opportunity, even in the early stages of development, we can get the word out. Of course, AIChE already has CareerEngineer job board, and as I am writing this column, there are over 500 postings on that job board! A number of these postings are from companies with strong F&PD involvement. As our members may seek out these opportunities, other F&PD members associated with the companies involved can help provide information and guidance to best prepare applicants to land these jobs!

The goal would be to find F&PD contacts at companies looking to hire. If you have interest in being part of this effort, please contact me at: [richard.kolodziej@woodgroup.com](mailto:richard.kolodziej@woodgroup.com).

### Consultants List

In the last few Flashpoints, Dennis O'Brien has asked about the interest in establishing a list of members willing to provide a small amount of consulting to other members at no charge. Dr. Mike Schultz at Lanzatech has offered to lead this effort. His email contact information is: [Mike@lanzatech.net](mailto:Mike@lanzatech.net). This effort should continue and is in some way, a corollary expansion of job search guidance and information suggested above.

### Becoming More Involved in F&PD

In addition to the needs noted above, if you're interested in becoming more involved in the division, there are plenty of volunteer opportunities. Please contact me or any of F&PD ExCom to find out more information. The F&PD By-laws (which can be found on the AIChE website) summarize the on-going areas of need in our division, including: programming, student outreach, marketing/membership, communications, etc. The By-laws provide more detail in these areas, including specific positions that need to be filled on a periodic basis. As you read the responsibilities/duties of the positions, you can let Dennis O'Brien know if you are interested in any specific positions. His e-mail is: [dennisobr@gmail.com](mailto:dennisobr@gmail.com)

### AIChE Engage

F&PD is the largest division or forum of AIChE and closely ties: academia, industry, research, and government, most specifically as these relate to Fuels and Petrochemicals. This charter mandates that we stay connected, even more than just at conferences, national meetings, and local sections meetings. As AIChE members, we have the opportunity to keep engaged on daily basis with the new initiative called: AIChE Engaged. Maybe you are already participating? Every day, an email comes with any updated comments for any and all areas of interest to chemical engineers. Sometimes, these are questions requesting responses from members. Other entries are comments and replies for all to see. So, please be engaged and participate as appropriate.

### Fall 2016 AIChE Conferences

The 8th AIChE Southwest Process Technology Conference will be this fall at the Moody Gardens Hotel in Galveston, TX on October 6 & 7, 2016. AIChE partners with the AIChE South Texas Section in putting on this conference. This conference often has technical sessions and keynote speakers with most topics related to the Fuel and Petrochemicals industries, and this year is no exception. F&PD members take key roles in executing this conference. Please plan to attend if you can. See more information on the AIChE website or contact Ian Glasgow at: [Michael.Glasgow@woodgroup.com](mailto:Michael.Glasgow@woodgroup.com)

The 2016 AIChE Annual Meeting will be on November 13-18, 2016 at the Hilton San Francisco Union Square, San Francisco, CA. F&PD will again be sponsoring a career and

interviewing sessions as part of the Student Conference, as well as, assisting in judging during the student poster session. As part of this event, F&PD picks the top three posters associated in F&PD subject areas as Harry West Award recipients, which include cash awards sponsored by F&PD. There are many excellent student posters participating and AIChE gives out awards too, but the Harry West Awards are the only which include cash awards and will be featured in the Spring Flashpoint edition. Having participated in this event for several years, I can say it's very rewarding, but also very stressful! We need more F&PD volunteers to judge for this event, as we want multiple judges to see and hear the top contending poster presentations for final selections.

Although many AIChE Annual Meeting paper sessions involve presentations from research and academia, F&PD had made a commitment a few years ago to sponsor paper sessions more closely tied to industry. For this Annual Meeting, F&PD are sponsoring 12 such paper sessions. If you would like more information, please contact Saadet Ulas Acikgoz at: [Saadet.Acikgoz@Honeywell.com](mailto:Saadet.Acikgoz@Honeywell.com)

So, please plan on attending the Annual Meeting and at the same time, plan on volunteering to be a judge at the Student Poster Session.

### 2017 Spring Meeting + AFPM International Petrochemical Conference

Finally, it is not too early to start to plan for the 2017 AIChE Spring Meeting which will take place the last week in March in San Antonio. F&PD's Lori McDowell will be the MPC and is already diligently planning for that event. The one unique aspect this year is that the AFPM International Petrochemical Conference will be meeting in San Antonio the same week. F&PD is looking at ways of coordinating some aspects to allow AFPM members (who might not otherwise participate in the AIChE Spring Meeting) to be able to join in some of our events. A petrochemical industry keynote speaker and/or panel session are ideas of using and attracting AFPM attendees, as well as, maybe planning some of our paper sessions for Wednesday, to avoid any conflicts, as the AFPM event will conclude on Tuesday. If you have any ideas or interest, please contact Lori at: [lmcdowell@mathesongas.com](mailto:lmcdowell@mathesongas.com)

# Technical Programming Recap for Houston 2016 and Look Ahead to San Antonio in 2017

by Bill C. Rooney, Honeywell UOP

AIChE and the Fuels and Petrochemicals Division completed another Spring Meeting with a wide variety of technical and industrial programming relevant to the current and future energy industry needs.

The F&PD Keynote address, titled “Driving Innovation and Managing Risk in an Unsure World”, was presented by Larry Ryan, Energy and Water Solutions President, from The Dow Chemical Company”

Immediately following the keynote address, F&PD held a panel session, titled “Effect of Global Economic Trends on U.S. Fuels and Petrochemicals Industries” The panel’s speakers, Ms. Anne-Marie Ainsworth, Mr. Terry Higgins, and Mr. Sanjeev Kapur discussed at length the immense challenges and changes facing the U.S. refining, petrochemicals, and midstream/gas sectors of the energy industry as energy prices fell nearly 70% over a two year period.

As part of the 16th Topical Conference on Gas Utilization, the traditional Gas Utilization Keynote luncheon was changed to complimentary breakfast reception courtesy of AIChE. Mr. Bill Hauhe, consultant and retired general manager from Chevron, presented a talk entitled “Commercial Aspects of the LNG Value Chain” describing the technical, legal, financial, and logistical challenges that need to be addressed to execute world-scale LNG projects.

In the remaining technical sessions, F&PD programming accommodated over 130 technical presentations spanning refining, gas processing and petrochemicals. Several of these sessions were jointly sponsored with other parts of the Institute including the Young Professional group, the Environmental Division, and a joint session with the Global Congress on Process Safety.

In Houston, F&PD awarded a number of “Outstanding Presentation Submissions” given to recognize authors for the high quality of their presentation materials. The award winners for 2016 were:

- Exploring Options for Mercury Removal with an Existing Stabilizer Unit
  - M. Nouri, S. Oduyungbo, E. Lucke, CH2MHill & Chevron
- Manage Rise and Improve Production Start-up or Capital Projects
  - S. Obermann, Metso ExperTune
- Optimization of Refrigeration and Storage Systems for Propane and Butane Export
  - S. Ronczy, J. Deneault, Burns & McDonnell
- Divided Wall Column – Design for a Retrofit
  - S. Schon, Arkema
- Vacuum Distillation
  - A. Slolly, Advisian (WorleyParsons Group)

- Computation Fluid Dynamic Modelling Improves FCC Technology and Profitability
  - A. Ahmadzadah, M. Sandacz, P. Palmas, UOP
- Steam System Control and Optimization
  - D. White, Emerson
- Dynamic Simulation for APC Projects: A Case Study on a Reformate Splitter with Sidedraw
  - S. Osta, J. Ferrer, TOTAL & Inprocess Technology & Consulting Group

Planning is underway for another full technical program for San Antonio from March 26-30, 2017. We ask that all F&PD members consider presenting in one of the many technical sessions or reach out to their contacts and colleagues for abstraction submissions. The quality and variety of the papers presented in Houston was very good with submissions from academia, industry, and regulatory agencies.

Abstracts for the 2017 Spring Meeting may be submitted through the following link:

<http://www.aidhe.org/conferences/aidhe-spring-meeting-and-global-congress-on-process-safety/2017>

Additional F&PD sessions and topics beyond those found in the initial schedule in the link above can be accommodated if there is sufficient interest. There are currently a few openings let for members to serve as co-chairs on several the technical sessions. This is a great way for F&PD members to become more active in the division. If you are interested in being a session Chair or Co-Chair for 2017 or in the future, please contact one of the following members of the F&PD programming team.

Sincerely,

## Fuel and Petrochemicals Programming Team for 2017

### Chairs

- Kirtan Trivedi [Kirtan.k.Trivedi@exxonmobil.com](mailto:Kirtan.k.Trivedi@exxonmobil.com)
- Frank Del Nogal [Frank.DelNogal@bp.com](mailto:Frank.DelNogal@bp.com)

### Refining

- Ian Glasgow [Michael.Glasgow@woodgroup.com](mailto:Michael.Glasgow@woodgroup.com)
- Virginia Sommer [Virginia.Sommer@fluor.com](mailto:Virginia.Sommer@fluor.com)

### Petrochemicals

- Laura Leonard [Laura.Leonard2@honeywell.com](mailto:Laura.Leonard2@honeywell.com)

### Gas Processing

- Bill Rooney [William.Rooney@honeywell.com](mailto:William.Rooney@honeywell.com)
- Jeffery Gaspard [Jeffery.Gaspard@kbr.com](mailto:Jeffery.Gaspard@kbr.com)



## AIChE Spring Meeting 2017 – San Antonio

### Not your same old Spring Meeting! *(continued from cover)*

This year, the AFPM International Petrochemical Conference will be in San Antonio during the same time period, so AIChE will be using some new hotels. Committee Meetings will be at the Hyatt Regency, on the Riverwalk, right near the Alamo and a 10 minute walk to the Convention Center. A few other Hotels, including the Menger, an elegant old, hotel, will also be available for Spring Meeting attendees. Make your hotel and dinner reservations early, because the city will be hopping. So much technical knowledge in a city at one time will be great for Networking – we are working on some joint events with AFPM IPC, so stay tuned.

In the area of programming, we plan to keep what is great, but improve what is missing. Ethylene Producers Conference, CCPS,

Refining, Gas Processing, Distillation and Big Data will all be back. We will have a new Topical on Soft Skills, with one track aimed at Young Professionals and Grad Students and another Track aimed at mid-career professionals. We will also improve the poster session, including an opportunity for Grad Students interested in Industry jobs to present to Companies, and Companies to present to potential employees.

And there is a lot more planned, but you will just have to attend to see what is available! Don't miss this opportunity to learn and network – experience the New and Improved AIChE Spring meeting, to quote Albert Einstein. "The only source of knowledge is experience".

## Common Overpressure Inadequacies

The industry standard for overpressure protection has become more stringent as disasters have occurred and the scopes of API-520, API-521, and other regulations have increased. As refineries age and safety regulations tighten, the relief systems for certain parts of refineries may become out of date.

One of the several reasons that relief systems have become more conservative is that the interpretation of ASME Section VIII has expanded to encompass more pieces of equipment, including both the shell and tube side of heat exchangers. ASME Section VIII UG-125 states, "All pressure vessels within the Scope of this Division, irrespective of size or pressure shall be provided with pressure relief devices."

Part U-1 of the same document defines pressure vessels as, "containers for the containment of pressure, either internal or external." The regulation provides some exceptions, mainly, "vessels having an internal or external pressure not exceeding 15 psi" and "vessels having an inside diameter, width, height, or cross section diagonal not exceeding 6 in." Essentially, any piece of equipment that has a diameter greater than 6" and a design pressure greater than atmospheric pressure must be ASME certified, and therefore must have overpressure protection.

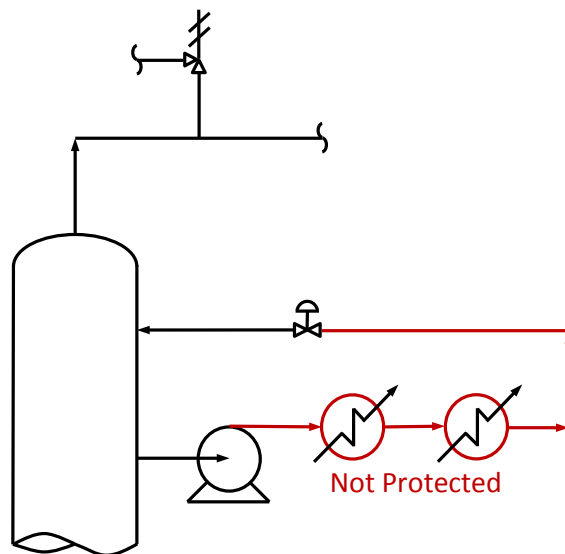
OSHA 29 CFR 1910.119 states that "the employer shall complete a compilation of written process safety information before conducting any process hazard analysis required by the standard." The document then lists "Relief system design and design basis" as part of the information that must be compiled. Therefore, per OSHA 29 CFR 1910.119, the overpressure protection system must be documented before a PHA can proceed.

The trend toward more stringent overpressure protection is not due to just one landmark regulation but to a gradual change in

industry standards and more rigorous auditing. The interpretations of these regulations suggest that the overpressure protection of some previously designed refineries is not sufficient. A systematic review of the relief system can improve safety and demonstrate to auditors that the refinery is within the regulations. WG Mustang identified several common process systems that are frequently not in accordance with regulations and require additional analysis.

### Hot Side of Pumparound Heat Exchangers

Previously, the hot side of pumparound heat exchangers was often designed without overpressure protection. However, the exchangers in the pumparound are usually not open to the tower because there is a pump upstream of the exchangers and a control valve downstream. In this case, a dedicated relief valve is usually required for each pumparound system.



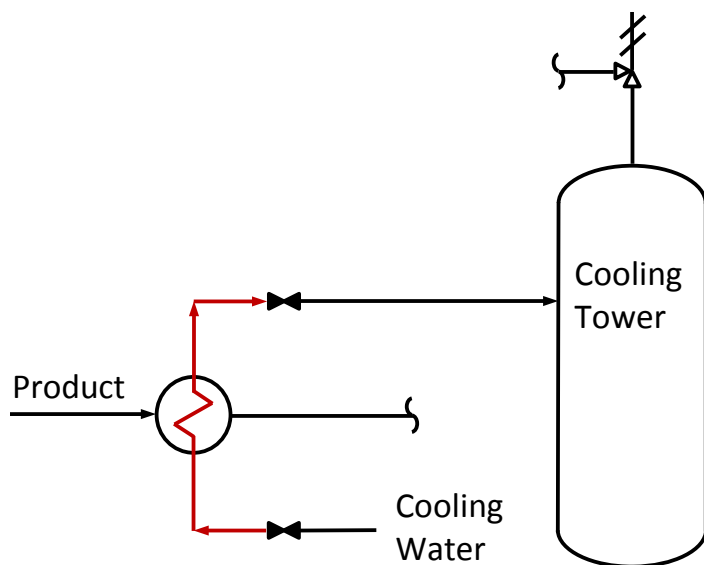
*Common Overpressure Inadequacies continued*

Even though these systems are on the hot side of the exchangers, a relief valve is still required if the heat exchanger is in a fire zone (a location where hydrocarbons can pool that is also less than 25 feet in elevation). Pumparound exchangers are usually installed near grade in a cluster arrangement where they could be subject to an external fire. If the fire case is credible, then the shell-side and the tube-side of the exchanger both require separate overpressure protection.

**Non-Process Side of Heat Exchangers**

It is sometimes assumed that the non-process side of water coolers, glycol coolers, and other non-process heat exchangers will not be blocked-in during a fire. Therefore, the non-process side of the exchanger will be open to the original source (a cooling tower, a glycol drum, a hot oil drum, ect.), and the fire case is not credible.

However, if there are valves between the source and the exchanger, then accidental closure of the valve must be considered even if the fire case is not credible. If the non-process side is the cold-side of the exchanger, then thermal expansion is usually credible, and a  $\frac{3}{4}$ " x 1" PSV is usually required. Also, if the bubble temperature of the cold-side fluid at relief pressure is less than the normal operating temperature of the hot-side fluid then vaporization can occur, and a larger relief valve may be required. In this case, if an existing relief valve is undersized, then the required relief load can be decreased when taking credit for heat exchanger pinch and decreased fluid velocity.



Tube rupture should also be considered when the corrected hydrotest pressure of the low-pressure side is less than the maximum system pressure of the high-pressure side.

**Air Coolers**

Relief valves are often not included on air coolers, providing that they are not in a fire zone and are designed for the pump shut-in pressure or open to another vessel. However, there are some air coolers, such as start-up air coolers or product air coolers that require relief valves. Usually, start-up and product air coolers can be isolated by block valves and are elevated less than 25 feet. If the fire case is applicable, then a large relief valve may be required due to the considerable surface area of the tubes.

Also, piping around intermittently-used air coolers is sometimes heat traced. If administrative controls are not in place ensuring the piping is adequately drained and isolated, the air cooler is likely subject to hydraulic thermal expansion.

**Packaged Equipment**

Packaged equipment (compressor interstage coolers and KO Drums, electrical heaters, positive displacement pumps, ect.) sometimes include relief valves provided by the vendor. However, specific overpressure analysis and relief calculations are not always provided, and some companies do not take credit for internal, vendor-supplied relief valves. If no relief valve is provided, it may be difficult to obtain the data required to size the relief valve.

**General Issues**

The accuracy of relief calculations relies on operating data that is subject to change over time. Relief calculations should be revisited after there are adjustments to the process such as: pump capacity, control valve size, equipment size, operating conditions, or crude slate. As additional relief valves are incorporated, further issues can arise with the flare header and existing relief valves. Instead of costly replacements, these problems can sometimes be solved by more rigorous relief calculations, high integrity protection systems (HIPS), or dynamic modeling.

In conclusion, industry standards are changing to require overpressure protection for more and more types of equipment. The issues listed above may be common to any refineries that were built several years ago or that recently expanded. A comprehensive review and update of the relief system can save time and money if it precludes an audit that would show an out-of-date relief system.

## Southwest Process Technology Conference (SPTC) in Galveston, TX

by Ian M. Glasgow, PE



This upcoming October 6 & 7, the Southwest Process Technology Conference (SPTC) will once again occur at the Moody Gardens in Galveston, TX. This conference is jointly sponsored by the South Texas (STS) local section and AIChE national, with several members of the organizing and technical committee being F&PD members. The conference will have sessions that include the areas of petroleum refining, chemical processing, distillation, thermodynamics and energy efficiency, and process control and process safety.

SPTC also always provides valuable networking opportunities which will include a Thursday evening Dinner Meeting, a Friday afternoon post-conference mixer, and Career Fair for those who are seeking opportunities in this current difficult market.

The conference will have two keynote speakers:

Ramanan Krishnamoorti who is the Chief Energy Officer, Interim Vice Chancellor for Research and Technology Transfer for the University of Houston System and Interim Vice President for Research and Technology Transfer will speak on “The Future of Energy” to kick-off the conference on Thursday morning.

On Friday, Dr. Andy Boyd, who is an adjunct professor at the University of Houston and contributor to the NPR program “The Engines of Our Ingenuity” will discuss cognitive limits in math and science in his talk titled, “In Search of the Limits of Human Creativity”.



The conference also looks to prepare our future chemical engineers by having a Student Program on Friday, October 7 that is focused to provide networking opportunities and targeted programming for the area university undergraduate and graduate students.

Those that attend the SPTC leave each year with new contacts, fresh ideas and increased technical knowledge, and PDHs (including the Ethics course) that help support professionals continue to meet their PE requirements. With such benefits, at a relatively low registration costs, we believe this conference is a great opportunity for all F&PD members.

We look forward to seeing you in Galveston!

# Keynote Speaker at AICHe South Texas Section Meeting, Tim Olsen



Tim Olsen is a Refining Consultant for Emerson and has been very active in F&PD and other areas of AICHe for many years. Tim was recently the keynote speaker at the AICHe South Texas Section meeting and presented on *The Growth of Tight Oil to Refining Crude Blends and the Design and Operating Challenges as a Result*.

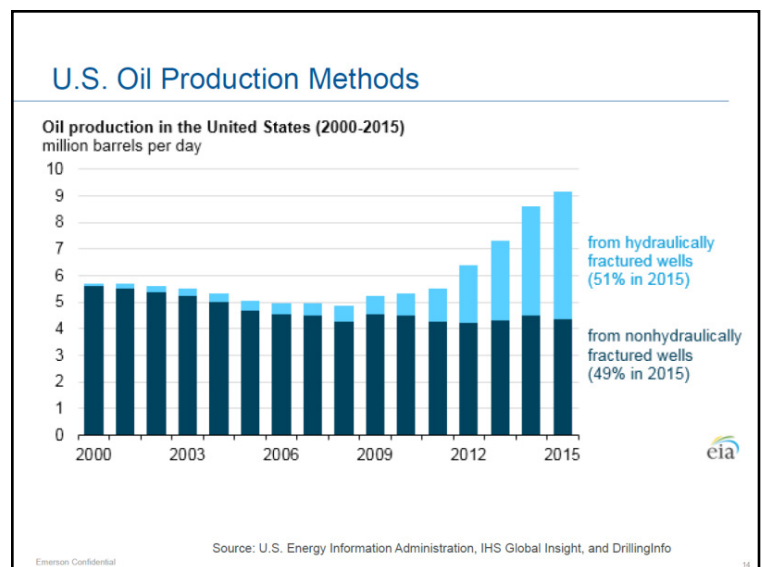
To summarize the topic and Tim’s presentation, the refining industry has changed noticeably over the past several years with an ample supply of opportunity crude oils available, which include light tight oils and heavy sour crudes, and sometimes high TAN crudes. Opportunity crudes have been around for years, but only until recently has the abundance of these discounted crudes shifted the behavior of refiners.

With the use of opportunity crude oils comes new processing challenges; Automation technology is advancing to meet these challenges to ensure refiners are successfully alleviating these new issues. Advances in real time crude analysis and crude unit monitoring and control allow refiners to maximize opportunity crude processing while mitigating issues like accelerated fouling and corrosion.

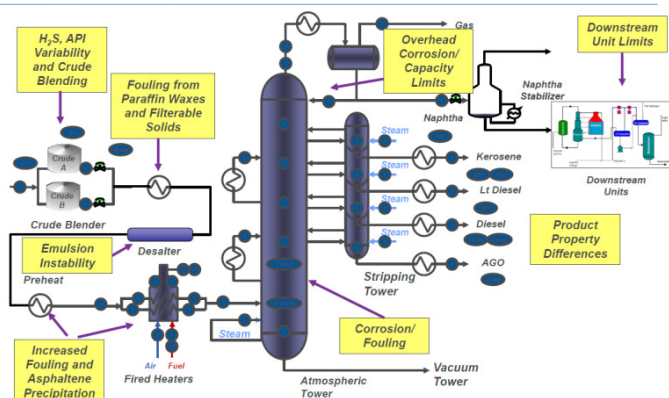
Refiners on the coast will typically have access to more opportunity crudes than those landlocked. Because crude oils can be very different in properties, refiners try to match the required crude oil composition for their refinery configuration; usually by blending two or more crude oils. To make matters more challenging, sometimes crude oils purchased to process are crudes that the refiner has no experience processing.

Crude blending operation has become more important with the ability to establish consistent crude feed properties. Steady operation enables better optimization of the crude unit by pushing against the appropriate constraints which often includes maximizing the quantity of discounted opportunity crude oils blended.

Tim’s presentation first highlighted on the market condition changes, then addressed new operating challenges because of tight oil additions, and finally showed a couple examples where refiners have made modifications in both technology and behavior to adapt to the new world of opportunity crudes.



## ‘Opportunity’ Crude Oil Problem Areas



If Flashpoint readers would like to see Tim’s presentation, all South Texas Section (STS) meetings are taped and Tim’s presentation is included in the following (just fast-forward about 47 minutes in for beginning of the presentation):

<https://www.youtube.com/watch?v=B9pGmY9fToE>

## EXECUTIVE COMMITTEE

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