AFPM 2014 Q&A and Technology Forum

	GASOLINE PROCESSES
Safety	
1	What independent protection layers (IPLs) are you using in cyclic reformers during regeneration to prevent hydrocarbon and oxygen mixing through isolation valves? What IPLs are you employing to prevent improper valve switching?
2	What are the best practices for backflow prevention on naphtha processing units (especially Naphtha Hydrotreating units)?
3	What considerations do you make in determining the need for a safety instrumented system (SIS) in an Isomerization unit? What safety integrity level (SIL) do you use for temperature excursions, liquids fed to the regeneration superheater, or other significant safety events? What typical unit design features do you implement to mitigate these safety events?
4	What are the recent safety improvements in the procedures or equipment for sampling sulfuric acid?
5	What are your experiences with alternatives to gauge glasses in alkylation units? Are there any specific services where you prefer glass gauges?
6	What are the best practices for mitigating and monitoring Corrosion Under Insulation (CUI) in cold services such as Alky/Isom units?
Theme	
7	Comment on your experience with the value generation potential of each of the refinery gasoline processing units - reforming, naphtha hydrotreating, isomerization, alkylation, and FCC-gasoline post-treating. What interplay exists between the units that can be leveraged?
8	What are your typical run lengths between maintenance turnarounds for gasoline units? What evaluations do you make to ensure that a prolonged turnaround interval is the most profitable choice?
9	With a significant portion of the current workforce eligible for retirement, what are you doing to preserve and pass-down the knowledge to the new employees entering the industry?
10	How do you assign process engineers responsibilities: are they divided by technology; operating complex; projects, etc.?
Alkylation	
11	What is your experience with advanced control of sulfuric acid flow and strength?
12	The industry is recently discussing alternative metallurgy specifications for HF alkylation units. What is your experience on this issue?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

Alkylation (Cont.)	
13	What steps are you taking to ensure that the olefin content of the normal butane stream from the alkylation unit being fed to the isomerization unit is being controlled within specification?
14	What are the advantages and challenges associated with alkylating amylenes?
Aromatic Extraction Units	
15	What methods are you employing to improve performance and life of aromatic extraction unit clay treaters?
Blending	
16	In recent years the gasoline blend pool has shifted due to increased ethanol blending, higher volumes of high RVP material from processing lighter crudes, and other specifications changes. How are you taking advantage of these changes to optimize the gasoline processing units?
17	How does alkylate contribute to gasoline blend pool sulfur? With pending Tier III regulations, what steps are you taking to understand and control this contribution?
18	Do you have experience with gasoline corrosivity due to breakdown of organic fluorides from alkylate? Is the issue mitigated by increasing the residence time in tankage prior to blending?
Chloride Beds	
19	What are the common locations and adsorbent types for chloride treating beds in gasoline process units? What practices are you using to best manage this asset?
Project Management	
20	What are your current typical lead times for reforming, isomerization, naphtha, and FCC gasoline post-treating catalysts? What is your outlook for these lead times?
Naphtha Treating	
21	Have you had experience with buildup on pump seals in stabilizer or debutanizer reflux pumps that process material that potentially contains chloride salts? In what circumstances do you use salt dispersants and could they mitigate or aggravate this phenomenon?
Reforming	
22	What is your method to clean a "Texas Tower" type of combined feed/effluent exchanger? Comment on the differences between cleaning in-place, extraction and reinsertion, and online cleaning.
23	What are the sources of platinum loss in precious metals catalysts? What role can your refinery engineers play in minimizing this loss?
24	What is the maximum oxygen content you allow for the platinum redistribution step in a fixed bed reformer? What sets the maximum oxygen concentration?
25	What factors contribute to your decision to place the regeneration section of a CCR in standby mode when the unit is operating in a low-coke mode? Discuss the advantages and disadvantages of the different standby modes (black-catalyst circulation, hot-shutdown, cold-shutdown, etc.).

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

Caustic Treating	
26	What are options for disposition of the caustic regeneration outgas stream associated with an LPG or gasoline caustic treater? What measures have you successfully used to prevent fouling, pluggage, and corrosion in this line?
Shale Crudes	
27	What impacts are you seeing in naphtha processing units from contaminants suspected to come from shale crudes (e.g. tramp amines, chlorides, fouling)? What are you doing to mitigate these impacts?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

	HYDROPROCESSING
Safety	
28	What is your best practice for determining the maximum allowable temperature rise in hydrotreating beds? What solutions do you have for managing temperature rise?
29	What are your current best practices for protecting the charge heater from backflow?
30	What is your minimum charge heater firing limit, especially when highly heat integrated or when processing cracked stocks? Do you have any hydroprocessing units run without firing the charge heater?
31	As more and more refiners consider installing zeolite catalyst in their hydrotreating units, what are your recommendations for a depressuring system?
Optimization	
32	How does catalyst activity, run length, H2 uptake , volume swell, reactor temperatures, price of the catalyst and product quality impact optimizing the business case for a catalyst selection? Compare a regen catalyst, moderate activity and next generation catalysts in a cheap H2 available market.
33	What solutions do you have for extending cycle length in distillate hydrotreating units limited by product color?
Mechanical Integrity	
34	What are your experiences related to sulfidation detection and prevention?
35	What is your criteria for retiring a hydroprocessing reactor? What kind of failures have you seen? What are the inspection techniques you use and your frequency of inspection?
36	Can you provide insight to best practices for prevention and repair as it relates to chloride stress cracking and polythionic acid stress cracking of stainless steel equipment in hydroprocessing units?
Equipment Design	
37	What are your typical design criteria for injection quills (i.e. slotted vs. nozzle, direction, spray pattern, filter mesh, metallurgy, etc)?
Hydrogen Generation	
38	What design modifications, such as pre-reforming and ATR (Autothermal Reforming), do you considered for greater feedstock flexibility, higher efficiency and capacity debottlenecking?
39	How can we improve temperature control in steam methane reformer tubes? What monitoring practices do you recommend to avoid overheating the furnace tubes?
40	What are your best practices when crimping pigtails on a hydrogen plant? Are there any metallurgical limitations?
41	Can you comment on the use of liquid and/or vaporized naphtha as feed and/or fuel to a hydrogen generation unit?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

Hydrocracking	
42	How do you optimize operating strategies in a hydrocracking unit that does not have an intermediate sample point between the treating and cracking catalyst?
43	How has the increased processing of synthetic and other opportunity crudes in a refinery impacted the buildup of HPNA's (Heavy Poly Nuclear Aromatics) in the hydrocracker and affected conversion? What are your strategies to address this?
44	**Driving Profitability** What strategies have you utilized to balance available catalyst life in hydroprocessing units with scheduled turnaround times, and how can this be optimized to increase profitability?
Hydrocracking	
45	Has bromide been reported in your hydroprocessing unit feeds or discovered as ammonium bromide in the reactor effluent exchangers? If bromide is present, do you use the same wash water practices for ammonium chloride deposition sufficient to avoid exchanger fouling? What are the possible sources of bromides?
46	Silicon uptake on hydrotreating catalysts is an increasing problem. (1) What operating conditions favor maximum silicon pickup by the catalyst? (2) Are there differences between silicon from coker antifoams and other sources? (3) Does the presence of other contaminants such as nickel and vanadium affect the silicon pick-up by the catalyst? and (4) What best practices are you using to monitoring silicon pick-up by the catalyst?
Future Growth	
47	How will an abundance of low cost hydrogen impact growth/expansion plans for your refineries?
Feed Composition	
48	Can DAO (Deasphalted Oil) be processed in a full conversion hydrocracker and if so what concerns would need to be considered?
49	What experience have you had in identifying the incompatibility of feeds to a Hydroprocessing Unit? Can these feeds create pressure drop issues? What kind of feeds/compounds are typically incompatible? What test(s) do you suggest? Are there any solutions such as catalyst loading modifications to eliminate typical issues?
50	What strategies have you used for maintaining the ratio of cracked/SR (Straight Run) feed for hydrotreating units as the coker cycles through coke drums?
Dewaxing	
51	What is your minimum Cloud Point Improvement that makes economical sense to apply catalytic dewaxing vs. traditional (i.e. additives and kero blending) Cold Flow Improvement methods?
Biofuels	
52	Explain the differences with renewable and Biodiesel. Can renewable feedstocks be co processed with traditional diesels in an existing ULSD (Ultra Low Sulfur Diesel) unit and how does this impact RIN's (Renewable Identification Number)?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

Tier III	
53	How are you planning to meet Tier III gasoline specifications? Please share your strategies for post-treat and pre-treat options, feedstock selection and catalyst technology? Can renewable feedstocks be co processed with traditional diesels in an existing ULSD (Ultra Low Sulfur Diesel) unit and how does this impact RIN's (Renewable Identification Number)?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

	CRUDE/VACUUM DISTILLATION & COKING
Safety	
54	What methods and technologies are you using to monitor vapor pressure and H2S levels in the vapor space in crude railcars and trucks? What engineering controls are being used by the rail and trucking companies to insure that the vapor pressure and H2S are being met?
55	What operating procedures and designs are you using to increase the safety of drilling coke drums?
Coker	
56	How will the recently announced EPA requirement to depressure coke drums to below 2 Psig prior to venting to atmosphere regulations impact your coker operation and design?
57	If vacuum tower bottom feed to the Coker unit drops below unit minimum charge rate, what are your operating options available?
58	What are you using for velocity medium in coker heaters? Are you using boiler feed water?
Crude Handling	
59	What is your experience processing a crude oil that has been treated with a pour point depressant and/or wax dispersant agent?
60	How does the mercury in crude distribute in your refinery (e.g., what units are affected)? What operating procedures or technology are you using to mitigate this issue?
61	What measurement and/or predictive methods are you using to determine crude oil blend compatibility?
Crude Units	
62	What are the advantages and disadvantages to constructing “modular" refining process units versus traditional "stick built" units? What are the issues with each construction approach?
Unit Ops	
63	For the operating company panel members, what are your crude unit typical run lengths between shut downs? What factors do you consider when setting this run cycle?
Desalting	
64	Some crudes appear to have chlorides that are not readily removed in the desalter. What are sources for these undesalted chlorides? How are the various undesalted chlorides detected and mitigated?
65	What are the advantages and issues with different desalter wash water sources in a refinery? What issues do you experience by combining wash water from multiple sources?
66	What desalter instrumentation issues do you experience when switching from a light gravity feed to a heavy gravity feed?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

Waste Water	
67	What is your experience with toxicity issues at the Water Treatment Plant as related to naphthenic acid content in desalter brine water? What strategies are you employing employed to mitigate this issue?
Fouling	
68	Processing tight oils can generate increased fouling in the preheat train. What are the top couple of causes and how are you mitigating them?
Furnace	
69	What is your experience with using thermal scans or other methods to monitor tube wall temperature furnaces?
Atmosphere Tower	
70	Please discuss the merits and detriments of using low-base strength or high-base strength neutralizers for corrosion control in atmospheric column overhead.
71	What is your best practice for responding to a ruptured heater tube in the crude unit?
72	What discrepancies do you see between simulation predictions and actual crude and vacuum operational data?
73	There is increasing economic incentive to operate crude units to yield maximum middle distillate volume. What targets are you using to quantify the degree of separation between naphtha and kerosene and between diesel and gas oil? What amount of distillation curve overlap do you consider good practice? What guidance are you given to achieve the target separation?
Vacuum Tower	
74	What are the main causes of vacuum jet ejector poor performance? What methods have you used to mitigate these issues?
75	Do you draw liquid hydrocarbon from the overhead system in the vacuum tower after the pre-condenser? What is the operating temperature of the tower overhead? What issues do you observe?
76	What is considered industry Best Practices with respect to the control of thermal cracking in vacuum tower bottoms? If quench is not available, what other parameters do you monitor and control? How do you establish the target control points?
77	What operating procedures are do you use to mitigate/prevent coking issues in the vacuum tower from loss of wash oil pumps?
78	What economic issues do you consider when deciding how deep to cut heavy vacuum gas oil?
79	What is your experience with respect to the use of trough distributors in vacuum wash zone service? Please address installation, reliability and performance.

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

Answer Book Only	On your CDU's that employ 300 series stainless steel metallurgy in the vacuum transfer line, do you experience any issue with PTASCC (polythionic acid stress corrosion cracking)? This area is very difficult to passivate with say soda ash per recommended NACE procedures, and we would like to know of any such PTASCC experience.
Answer Book Only	SRU sulfur production is being changed significantly as some plants operate in batch operations between heavy and tight oil crude runs. What modifications do you make to accommodate the SRU turndown to ensure high reliability?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

	FCC
Reliability	
80	What is your reliability experience of multiloader and continuous additive/catalyst loaders? What maintenance do you require?
81	Have you installed reactor vapor line isolation systems? What has been your experience with their reliability since they are used infrequently? Are there any best practices to share in regards to installation and operability?
82	Units operating with low main fractionator bottoms yield encounter a number of problems including coking and fouling in the slurry system and increased catalyst loading in the circulating slurry. What problems have you encountered and what practices have you done to manage these problems?
83	As the time between FCC unit turnaround events are continuously being extended, what areas have you identified as having a high likelihood of failure due to erosion and what preventive measures can be taken to avoid such failures?
84	Discuss your considerations for improvement of power recovery train reliability.
Sulfur	
85	What FCC gasoline sulfur reduction technologies are you using to control sulfur during cat feed hydrotreater or gasoline product hydrotreater outages? Will these products be a viable option for Tier III gasoline sulfur specs?
Profitability	
86	What are the most profitable dispositions for slurry oil and what issues do you consider for each option?
87	The increase in light tight oil as a percentage of North American crude slate has resulted in lower FCC feed production, and consequently a reduced FCC feed rate at several refineries. To address these issues, what strategies have you implemented operationally and catalytically? Are you looking at sending new streams to the FCC or increasing the proportion of existing streams such as resid? If so, what steps do you take to evaluate these potential new feedstocks and what steps do you take to minimize uncertainty and reduce risk?
88	During a turnaround, how long does it take from oil out to vessel entry? How do you minimize this time? Please specify the unit capacity.
89	What are the best practices in the industry for profitable LCO maximization? Please elaborate on (a) FCC catalyst/additive technologies, (b) Cetane maximization, (c) process design and operations strategies and (d) any impact on naphtha octane and how you mitigate it?
90	What is the most profitable way to schedule the FCC and associated catalytic naphtha hydrotreater turnarounds? Are there benefits in synchronizing the shutdown of these units?
Catalyst	
91	What are the characteristics of FCC catalyst to minimize particulate emissions at the stack?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

92	What is the impact of high iron you have seen in some tight oil feeds? What level of Fe on the equilibrium catalyst causes problems, and what are the typical symptoms? What changes to FCC units hardware, catalyst and operation have you implemented to manage Fe poisoning? What is the impact of other uncommon contaminants such as K, Ca and Mg?
Safety	
93	What are your process safety concerns in withdrawing equilibrium catalyst from the FCC regenerator? How do you manage catalyst transfer piping and spent catalyst hopper temperatures? What materials of construction are appropriate (or inappropriate) for these services?
94	To reduce the risk of igniting the gas mixture in the electrostatic precipitator (ESP), we are considering safety interlocks for de-energizing the ESP when carbon monoxide content gets too high. Please share your experience regarding (a) setting an appropriate trip point, (b) other interlocks to consider, and (c) advantages over operating procedures.
95	What are your the key wash nozzle design criteria for an effective FCC main column overhead water wash system? Please discuss the effectiveness of using hollow-cone versus full-cone and the spray angle direction - upflow versus co-current flow?
Process	
96	What are the different methods you employ to increase C3 recovery? What are your typical C3 recovery improvements for these various methods?
97	What is your optimal pH for wet gas scrubber water and how is this maintained? What are the implications of too high or too low pH?
98	What are the options for removing catalyst fines from the main fractionator bottoms product? Which, if any, can reduce the ash content to 50 ppm or less?
99	We are struggling with high afterburn in the regenerator. What hardware changes (spent catalyst distributor, air distributor, etc.) have you implemented to improve afterburn? What commercial experience exists using computational fluid dynamics (CFD) to resolve such issues?
100	How do Nitrogen compounds distribute in the product streams of FCC Units? What effect does riser severity and feed properties have on this distribution?
101	What factors influence butylene selectivity in the FCC LPG? What is the relative role of feedstocks, catalysts, additives, and operating conditions?
102	What benefits have you realized by installing packing in their FCC strippers? How did this equipment impact your catalyst circulation and unit pressure balance?
103	We increased reactor severity and noticed an increase in oxygenates in LPG and sour water. Can you explain the mechanism by which phenols and other oxygenates form in the riser?
104	How are radioactive surveys and/or gamma scans utilized to optimize FCC operation?
105	Thermal cracking within the riser negatively impacts product properties, unit capacity and overall performance. Which process parameters should be monitored to estimate the extent of thermal cracking? What are your typical ranges for these parameters and what shifts would trigger concern?

*Order of Questions is subject to change.

AFPM 2014 Q&A and Technology Forum

*Order of Questions is subject to change.