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	GASOLINE PROCESSES
Historical	
1	How do you manage organic fluoride compounds in effluent and recycle streams in an HF alkylation unit? How do you detect upsets and how are the impacts on downstream units mitigated?
2	Iron is one of the most common contaminant metals seen on naphtha reforming catalyst. What is the source, what is the impact to yields and operation, and what can be done to mitigate these effects?
Safety	
3	What is your best practices for unloading solid phosphoric acid (SPA) catalyst from a cat-poly unit and what safety issues do they address?
4	For the Isomerization unit, what is your treatment for the streams containing high concentrations of hydrochloric acid (HCl) in the reactor emergency depressurization system?
5	Is the presence of pyrophoric compounds common in feed / effluent exchangers? What neutralization methods do you employ prior to exposing the equipment to the atmosphere?
Innovation	
6	What are your typical disposal options for solid phosphoric acid (SPA) catalyst from a cat-poly unit? Are you employing any innovative methods?
Alkylation	
7	What are your potential strategies to increase refrigeration system capacity and throughput in sulfuric acid alkylation units?
8	What methods are you using to address the alkylates sulfur contribution to the blend pool for Tier III compliance? Is your focus on feed pre-treatment or alkylate post-treatment?
Cat-Poly Alkylation	
9	What operating conditions in a cat-poly unit are conducive to the formation of esters? What is the main effect that esters have on unit performance?
Isomerization	
10	What impact does silicon have on isomerization catalyst? What are the symptoms that a breakthrough has occurred?
11	In chlorided isomerization units, have you seen evidence of unconverted perchloroethylene (PERC) in the stabilizer bottoms stream?
12	Are you designing or revamping isomerization units radial reactor temperature indicators?
13	In chlorided isomerization units, what procedures are you using to shut down, caustic free, and make the net gas scrubber safe for maintenance?
Naphtha Hydrotreating	
14	For those units that feed hydrocracked naphtha directly to the reforming unit, what is the typical concentration of ***sulfur*** in the feed? How does the concentration change over the hydrocracker catalyst cycle and what are the impacts to the operation of the reformer?
15	For those units that feed hydrocracked naphtha directly to the reforming unit, what is the typical concentration of ***olefins*** in the feed? How does the concentration change over the hydrocracker catalyst cycle and what are the impacts to the operation of the reformer?

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Reforming	
16	HCl concentration in the reformer net off-gas is being actively measured using hand-held detector tubes. Despite routinely measuring near-zero ppm, chloride corrosion occurs downstream. What is the source of this corrosion and what can be done to better measure and manage the source?
17	What is the importance of water content in reformer feed and recycle gas on the performance of the catalyst? What are your desired water concentrations in each of these streams?
18	In a fixed-bed reformer regeneration, caustic is used to neutralize the combustion and chlorination gasses. How do you dispose of caustic after the regeneration is complete?
19	What are your best practices for recovering from high coke on spent catalyst in continuously regenerating reforming units?
Town Hall Discussion Breakout	
A	TOPIC: How are refiners managing Reid Vapor Pressure (RVP) and how isomerization unit economics are changing?
B	TOPIC: How refiners are managing octane pool in Tier III environments?
C	TOPIC: Mechanical strategies for extending turnaround intervals in continuously regenerating reforming units.
D	TOPIC: How refiners are optimizing NHT cycle length.

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	HYDROPROCESSING
NPRA – from 1974	
20	What is your best procedure for handling temperature excursions for hydrocrackers? Is a manual or automatic control system best?
Safety	
21	What are some of your typical examples of Integrity Operating Window (IOW) types specific to hydroprocessing? What technique do you use to determine severity level of IOW alarms? How do you coordinate operator response to IOW alarms?
22	A) What has been your experience with hydrogen leaks to cooling water systems and the resulting impacts? B) What are your findings and recommendations from major associated incidents?
23	When shutting down a reactor what is your current best practice for measuring CO in a mostly hydrogen / nitrogen atmosphere to assess the carbonyl concentration? Is the steel a potential source of zero valence metal necessary for carbonyl formation? If so, does that cause a corrosion concern for equipment that normally operates in the temperature range favorable for carbonyl formation?
24	What are you doing to meet the Euro VI / BS VI / China VI fuel quality specifications for gasoline and diesel product streams?
Hydroprocessing	
25	What is the optimum role for hydrocrackers in refineries that do not utilize or are eliminating their bottom-of-the-barrel processes due to lighter crude blends?
26	How are developments in hydroprocessing catalyst adjusting to changes in feedstock quality? Are the new developments able to cope with and provide high activity with varying feedstock severity?
27	The sulfur block is a crucial downstream component of hydroprocessing operations. What are some of your best practices or new developments to optimize operations and increase reliability?
28	Under what conditions will you strip sulfur from hydrotreating / hydrocracking catalysts?
29	What is the impact of processing unconverted oil (UCO) from a high conversion hydrocracker on the following downstream units? • FCC • Coker • Base Oil Unit • Lubes Hydrocracker
30	What are common mechanical defects that occur to the weld overlay material in Hydroprocessing reactors? What are the most common locations for defects, and does the location play a factor in the mechanical integrity of the equipment? How do you detect and repair the defects? How often do you conduct Remaining Life Analysis (RLA) and/or Fit For Service (FFS) on critical equipment?
Delayed Coking/Heavy Oil	
31	What are the potential impacts to hydrocracking units (i.e. deactivation rate, HPNA formation, etc.) as heavy coker gasoil HCGO rate / end point are increased?

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Hydrogen	
32	A) What are the variations of target efficiency that can be achieved in hydrogen plant operation? B) What are the operational factors that impact efficiency?
Town Hall Discussion Breakout	

A	TOPIC: How can the industry be best positioned for 2020 IMO (marine fuel specs)?
	• What are the processing options for fuel oil streams?
	  • Slurry Oil
	  • Resid
	  • Pitch
	  • Other Tramp streams (HPNA Stripper Purge / Disulfide Oil / ASO / Polymerate)
	• What are some catalytic solutions to meet IMO specifications?
	• What are the implications of processing FCC slurry oil in a hydrocracker to remove it from the fuel oil pool?
	• Are there fuel oil streams that can be used as petrochemical feedstocks as an alternative to further processing in a refinery?
	  • What strategies are being explored for 2020 IMO regulations?

B	TOPIC: What types of hydrotreating / hydrocracking innovations are paving the way of the future? How far out do we anticipate the commercialization of these technologies? • Slurry Hydrocracking • Disruptive Ideas • Paradigm Shifts (Transition to Ebb Bed / Alternative Technologies) • New Technologies • New Uses for existing assets • Refinery of the Future • LCO to xylenes

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	CRUDE/VACUUM DISTILLATION & COKING
Safety	
33	What conditions are tied to fired heater shutdown interlocks? Do these cause an immediate shutdown, or are there any time delays built into the logic? If so, how long a time delay do you use? Are there any operating conditions that would allow interlocks on fired heaters to be bypassed?
34	What are your current protocols, practices, and concerns for using wireless communication between field instruments and the control room? Would wireless communication be acceptable for monitoring only, or is control allowed as well?
Coker Unit	
35	What are your major parameters and mechanisms that affect coker furnace fouling? Are there known effects from some specific crude properties? What are typical fouling rates, and how can they be minimized?
36	What are your primary indicators that a coker furnace spall is complete? What steps do you take to optimize the efficiency of spalling?
37	What programs have you implemented to improve reliability and life of the coke drums including inspection and maintenance?
38	How do you monitor coke drum overhead lines to determine when cleaning is required? What cleaning techniques are effective and which are ineffective?
39	What procedures and techniques are you currently using to monitor and control cyanide corrosion on coker overhead circuit and light ends units?
Crude Quality	
40	What crude properties and process conditions are you monitoring as part of a crude slate change?
Crude Tankage	
41	What are some of your operating practices used to mitigate incursion of water slugs in crude feed from tankage? Are there any early warning devices or procedures used successfully?
Desalting	
42	What water sources are you using for desalter wash water, and what are the advantages and disadvantages of each? What role does desalter wash water source and injection location play in desalter performance?
43	What is your experience with intermittent mud-washing of single stage and two stage desalting? What are the advantages of continuous versus intermittent mud washing?
Fouling	
44	How do you monitor exchanger fouling? How do you use that information to justify additional work scope during unplanned shutdowns?
45	What are your typical consequences and probable sources of fuel gas fouling? What are your respective solutions?
Corrosion Control	
46	What is your design service life of atmospheric tower overhead heat exchangers? How does that compare to actual service life? What do you do to better manage corrosion and improve reliability of these heat exchangers?
Vacuum Tower	
47	What correlations do you use to predict cracked gas make in a vacuum tower from atmospheric tower bottoms based on feedstock properties and heater outlet temperature?

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Fouling	
48	What are your design and operating guidelines for vacuum tower bottoms versus crude heat exchangers such as; minimum velocities, fouling rates, pressure drop, and which process fluid should be on the tube versus shell side?
Advanced Process Control	
49	How do you use today's Advanced Process Control (APC) technology to achieve crude unit operation that supports short and long- term planning goals? How do you achieve alignment between the crude unit APC and those of downstream units?
Town Hall Discussion Breakout	
A	TOPIC: Crude characteristics • Wax (fouling, oil undercarry, etc,) • "Look Alike" crudes
B	TOPIC: Operability impacts/changes for IMO
C	TOPIC: Upstream (production) additives • DRA • Phosphorus
D	TOPIC: Impacts on WWT - "Does This Limit Your Crude Basket?"
E	TOPIC: Metals (Arsenic, Zinc, Mercury, etc.)
F	TOPIC: Amines • Detection, mitigation • Sources (H2S scavenger, internal streams, etc.) • Forms (amines, diathazines, polythiomethylene, etc.)

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	FCC
Poll Question	
50	Poll question: What are your primary bottlenecks in the FCC gas concentration unit?
Safety/Environmental	
51	Can you comment on the safety aspects of placing catalyst in a standpipe to help isolate one vessel from the other? Does catalyst in a standpipe create a "seal"?
52	What challenges do you face for implementing safety instrumented systems that results in closure of the FCC Slide Valves?
53	What factors contribute to stack opacity? What options do you use for reducing stack opacity?
Innovation	
54	What recent innovations have you made to instrumentation that have application in FCC Units?
55	Given the expansion of the Industrial Internet of Things (IIoT), “Big Data”, cloud based technologies, and advanced analytics, how are you applying these cutting-edge aspects into their work processes and toolkit to optimize FCC yield, reliability, and safety performance?
56	1973, FCC Process Question 13: When an older cat cracker is modified to incorporate riser cracking, has anyone encountered a limitation on the amount of conversion that could be obtained? In order to achieve maximum conversion, has anyone found it necessary to return to limited level of bed cracking?
57	Advanced (closed) Riser Termination Systems have been around since the 1990's. Explain any technology improvements you have seen based on experience and learnings.
58	What are your best practices for reliably measuring level in the bottom of the main fractionator?
Catalyst	
59	We are reformulating our FCCU catalyst. What are your best practices to post-audit the catalyst change?
60	With today’s current variety of new crudes, synthetic crudes, tight oils, bio based streams, opportunity feeds, etc., that find their way to the FCCU; what new metal contaminants (excluding Nickel Vanadium, Iron, and Sodium) do you see that impact catalyst and FCC performance?
61	When performing catalyst evaluations and considering catalyst resistance to attrition with regard to particulate matter (PM) emission requirements, what new or advanced attrition testing methods are you using to predict the performance of the new catalyst system? Are there third parties who can conduct a standard testing regime to multiple catalyst systems?
Mechanical/Reliability	
62	Do you know of factors that are likely to lead to deposit formation on power recovery turbine blades? Is there anything that can be done to avoid these deposits from laying down on the blades? Once the deposits have been formed, what are the consequences and is there any way to remove the deposits online?
63	Please explain the phenomenon known as “coke ratcheting” in the FCC reactor where equipment exposed to coking services elongates over time and heat cycles? Please provide details of actual examples of where this occurred and the impact to equipment operations and reliability.

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Operations	
64	What are the risks and negative factors that you see associated with processing slurry oil, either as slurry separator backwash or recycle, in the FCC reactor?
65	What variables impact feedstock atomization in the FCC Riser? What steps do you take to optimize the feed and catalyst mixing for proper vaporization and catalytic reaction?
66	In order to meet the pending MARPOL/IMO 0.5% sulfur fuel oil standards in 2020, what options do you have available to FCC units to improve slurry quality, adjust yield, or find alternate dispositions, both within the overall facility and as a saleable product?
67	What strategies do you employ to optimize FCC plus hydrocracker operations? Do you process hydrocracker unconverted oil (UCO) in the FCC, or FCC LCO/HCO in the hydrocracker?
68	What process and catalyst changes would you recommend for a refinery that is planning on processing a percentage of resid in an FCC that typically runs gas oil?
69	What operational or other changes prompt evaluation and optimization of standpipe aeration? What do you monitor to ensure the standpipes remain fluidized across a range of conditions?
70	Electrostatic Precipitator (ESP) fines handling is often complicated by fluidization and mechanical integrity issues. How often do you experience these types of fines handling issues and what are some of your best practices to successfully mitigate these issues? What are your best practices for safe fines withdrawal from the ESP?
71	What are your recommended configurations for main fractionator flash zone thermocouples to measure the flash zone temperature under the slurry bed?
72	Current economics drive unit operation to minimum slurry production limits, as defined by physical properties and rundown velocities / flow rates. What are your typical slurry limits and what are your options to overcome those limits to further reduce slurry?
73	Gasoline octanes continue to have high value for many refineries. What fractionation strategies do you apply to increase gasoline octane? What rules of thumb do you apply for estimating changes in octane with gasoline end-point adjustments?
74	How do you mitigate aqueous corrosion in the main fractionator overhead and gas concentration unit? What contaminants do you test for in the sour water and what limits do you impose? What are your concerns with using stripped sour water as wash water?
75	What are your best practices in design and operation to achieve positive isolation of Slurry / HCO equipment?

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