

# AFPM 2019 Operations & Process Technology Summit

<b>GASOLINE PROCESSES</b>	
<b>General</b>	
<b>1</b>	What is your best practice for safe and quick decontamination of solid media beds?
<b>Alkylation</b>	
<b>2</b>	We have a Selective Hydrogenation Units (SHU) unit that removes butadiene from the olefin feed to the alkylation unit. What is the typical concentration of hydrogen and light ends in the olefin product leaving the SHU? How do hydrogen and light ends affect alky operations?
<b>Isomerization</b>	
<b>3</b>	What is your experience with ball valves in feed and make-up gas drier circuits in ISOM Units? What strategies have you adopted for monitoring leaks, regular maintenance and achieving longer run length?
<b>4</b>	What are your best practices for controlling caustic strength in an isomerization unit scrubber? How frequently is the caustic refreshed?
<b>General</b>	
<b>5</b>	How will Tier 3 rules impact gasoline-producing units at your facility?
<b>6</b>	What is your main blending limit for gasoline for both summer and winter specs?
<b>Reforming</b>	
<b>7</b>	What are your typical precious metal recoveries from reforming catalysts? What factors impact this?
<b>8</b>	How do you track chloride in liquid/gas/LPG? What are your criteria for replacing adsorbent in chloride treaters?
<b>9</b>	What causes metal-catalyzed coking (MCC) that obstructs catalyst circulation in CCR reformers? What actions do you take to mitigate MCC formation?
<b>10</b>	Where are your liquid-phase chloride treaters installed for reforming units? What are the advantages of each location?
<b>General</b>	
<b>11</b>	Some reforming and isom units are 40+ years in operation. What are your preventative and reactive maintenance strategies on these units? When would you consider replacing a unit?
<b>Reforming</b>	
<b>12</b>	How do you monitor water content in reformer recycle gas?

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<b>General</b>	
<b>13</b>	How are you managing the risk of an LPG pump loss of containment?
<b>Alkylation</b>	
<b>14</b>	What are your strategies to reduce alky acid consumption?

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HYDROPROCESSING	
<b>Safety</b>	
15	What practices and modifications have you implemented in response to the new High Temperature Hydrogen Attack (HTHA) guidelines and updated Nelson curves?
16	What is required to achieve Safety Integrity Level 2 (SIL-2) rating on the hydrocracker depressuring system? For a hydrotreater that does not require SIL-2, what position should the depressurization valve fail to?
<b>Performance</b>	
17	What testing frequency and additional feed characterization (apart from bulk properties) should be used to accurately monitor catalyst performance on heavy feeds?
<b>Operability</b>	
18	What are your methods to mitigate bed 1 pressure drop without a unit skim? How would your approach be different if the pressure drop developed in a different bed, say bed 3?
19	In a hydrocracking unit, what methods do you use to determine the pretreat reactor operating temperature for optimum nitrogen slip to cracking catalyst?
20	What are the allowable limits/guidelines for water in feed to hydroprocessing units? Does the guidance change for activation vs normal operation? If so, how? What effective test methods do you use to measure water in feed? Do the limits change for different hydroprocessing units?
21	We are observing fouling of our feed/effluent exchangers that has impacted heat transfer and restricted feed. What are potential contributing causes and how can we mitigate?
<b>Feed Quality</b>	
22	What sets the endpoint limit for feed to an Ultra-Low Sulfur Diesel unit? Should 90%, 95%, 98% or Final Boiling Point be monitored and what is an acceptable tail for amount of feed greater than the cutpoint spec? Is the answer different for straight-run diesel vs coker diesel vs Light Cycle Oil feed components?
<b>Design</b>	
23	When do you recommend a static mixer upstream of a Reactor Effluent Air Cooler (REAC)?
<b>Amine</b>	

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24	What is your engineering design practice for selecting metallurgy for hydroprocessing unit's amine systems? How does chloride level impact the metallurgy selection?
25	What are your key factors around amine contactor operation in hydrotreating units?
<b>Operability</b>	
26	What do you do to predict Silicon breakthrough in a naphtha hydrotreater? What are the consequences to the downstream units if breakthrough occurs?
<b>IMO</b>	
27	What impact do International Maritime Organization (IMO) specifications have on hydroprocessing units at your facilities?

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<b>CRUDE/VACUUM DISTILLATION &amp; COKING</b>	
<b>Safety</b>	
<b>28</b>	In light of IMO (International Maritime Organization) 2020 and the potential for shipping intermediate streams from refinery to refinery, what are your plans to ensure H <sub>2</sub> S specification in the vapor space is met, either at the shipping or receiving point?
<b>29</b>	Refiners have adopted programs to eliminate the use of anhydrous NH <sub>3</sub> and/or gaseous chlorine. What factors did you consider in this decision?
<b>Crude Quality</b>	
<b>30</b>	What progress have you made in crude analysis in a timely manner, establishing stability criteria, scheduling blends, and mitigating processing constraints when blending multiple crude unit feedstocks?
<b>Desalting</b>	
<b>31</b>	Is intermittent or continuous mud washing considered your best practice and why?
<b>Crude Coking</b>	
<b>32</b>	Where are ammonium chloride and amine hydrochloride salt found in your crude unit? What is your best practice to monitor and mitigate the resulting corrosion and fouling?
<b>Crude Vacuum</b>	
<b>33</b>	What downstream processing issues have been associated with the overfeed of NaOH at the crude unit?
<b>Coker</b>	
<b>34</b>	What strategies (operational, technological, logistical) do you consider for slurry streams that will not meet the IMO specifications?
<b>35</b>	What is the importance of sodium to reliability in the coker? What are some of the potential sources of the sodium in coker feed? In light of IMO how should sodium be managed in purchased coker feed?
<b>Delayed Coking</b>	
<b>36</b>	With higher anticipated charge rates at the coker due to IMO, what are your best practices around defoamer application to minimize impact on hydrotreater catalyst life?

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Distillation	
<b>37</b>	Once inspection has determined "end of life" on fractionation equipment, what criteria have you used to justify upgrading a tower versus replacement in kind?
Answer Book Only	
Crude Fouling	
<b>CRUDE 1</b>	We would be interested to hear whether you have any experience with fouling anywhere in the crude unit preheat train in facilities where reprocessing bio diesel (FAME, HVGO, NEXBTL) through a crude unit. Additionally, is there a concern of methyl ester hydrolysis to form methanol and carboxylic acids, which may be corrosive, similar to naphthenic acids?

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	<b>FCC</b>
<b>Safety</b>	
<b>38</b>	What are your guidelines for cleanliness of reactor vessel and overhead lines during Turnaround? Do you have limits on reactor temperatures during dry-out to prevent the ignition of coke in the reactor? What actions do you take if coke starts to burn?
<b>39</b>	What are your best practices for transferring FCC catalyst into/from pneumatic trailers and rail cars to ensure personnel safety and catalyst containment?
<b>Mechanical</b>	
<b>40</b>	What rationale have you used to justify replacing the FCCU regenerator or reactor vessel?
<b>41</b>	How reliable are main air blower check valves? What are some improved designs or some things to avoid? Are there any alternatives? If multiple branches, is there one check valve in the main branch or one check valve per branch, where is it located? What is your maintenance or inspection best practices?
<b>Process Operations</b>	
<b>42</b>	What are your best practices to minimize catalyst carry over to the main column on start up?
<b>Safety</b>	
<b>43</b>	What are your best practices when shipping ecat, fines, feed, and slurry to suppliers for testing? Please also comment on some best practices for sampling equilibrium catalyst.
<b>44</b>	What is your recommended back up options for slide valve / plug valve Hydraulic Power Units? Are electric actuators an option? What are the response times?
<b>Process Operations</b>	
<b>45</b>	What are your options to maximize light cycle oil from the FCCU (e.g. operating conditions, feedstock, recycle, equipment, catalyst, etc.)? What are the typical unit constraints? What projects have been considered at your facility to capture the increased value of diesel?

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<b>46</b>	How often do you perform steam optimization in the FCC reactor? What process response and benefits do you typically see from performing "step tests" to feed nozzle, lift, and stripping steam flow rates?
<b>47</b>	For units not challenged by standpipe fluidization, are there benefits to reducing fresh catalyst 0-40 um particle content?
<b>48</b>	What is your experience with carbon on regenerated catalyst levels in partial burn operations? How do you confirm an optimal level of carbon to ensure desired product yields? How do metal amounts or feedstock play a role in controlling carbon on regenerated catalyst?
<b>Mechanical</b>	
<b>49</b>	What are your reliable methods to monitor expansion joint temperature? Are some joints more critical than others? What temperature range is acceptable? How do you increase or decrease temperatures if they are out of the desired range?
<b>Process Operations</b>	
<b>50</b>	What methods or operating parameters do you use to monitor/diagnose FCCU regenerator air and catalyst maldistribution? What can be done operationally to mitigate air and catalyst maldistribution? What mechanical changes have been successful at improving air and catalyst distribution?
<b>Mechanical</b>	
<b>51</b>	What are some parameters that affect performance and reliability of FCC feed nozzles? Can you describe any experiences with nozzle erosion inside the riser? What about an external leak in the nozzle sleeve?
<b>Catalyst</b>	
<b>52</b>	What strategies have you employed to profitably manage Tier III regulations (i.e. crude purchasing strategy, pre/post treating, FCC operational changes, sulfur reducing additives, etc.)?
<b>Mechanical</b>	
<b>53</b>	What are some of your industry practices for upgrading gas plant piping to post weld heat treat to manage carbonate cracking risk? Please comment on methods such as requirement for new piping, systematic replacement of existing piping, risk-based replacement, or inspection based?

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<b>Answer Book Only</b>	
<b>Process Operations</b>	
<b>FCC 1</b>	What practices have you implemented around Slide Valve inspection, maintenance work, internals installation, and final clearance / position checks?
<b>FCC 2</b>	What strategies have you used to manage FCC flue gas emissions while optimizing the unit?
<b>FCC 3</b>	What strategies have you used to monitor O2 on startup / shut down in the main fractionator overhead receiver? Including laboratory, extractive, and in situ analysis.
<b>Mechanical</b>	
<b>FCC 4</b>	What advances have been made in recent years to help improve plug valve reliability?
<b>FCC 5</b>	What corrosion/erosion trends have you witnessed in Reactor Stripper sections? Including stripper internals, steam distributors, supports, and vessel wall.

<b>FCC POLL QUESTIONS</b>	
<p>The following polling questions will be presented at the summit in October. The polling will open in the AFPM summit APP about a week before the summit and will only be available through the APP. We will use live polling during the sessions at the summit to gain more real-time responses and use the responses for open discussion.</p>	
<b>SAFEGUARDING PHILOSOPHIES AND PRACTICES</b>	
<ul style="list-style-type: none"> <li>• Do you use nitrogen to back up your instrument air systems?               <ul style="list-style-type: none"> <li>a) Yes</li> <li>b) No</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• What methods are you using to monitor direct fired air heater loss of flame?               <ul style="list-style-type: none"> <li>a) Stationing an operator only</li> <li>b) Fire eye only</li> <li>c) Both Stationed Operator and Fire Eye</li> <li>d) Other</li> </ul> </li> </ul> <p>Two part question if possible</p> <ul style="list-style-type: none"> <li>• Would you be in favor of a future SIS standard recommendation or best practice?               <ul style="list-style-type: none"> <li>e) Yes</li> <li>f) No</li> </ul> </li> </ul>	

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<ul style="list-style-type: none"><li>• If yes, then who would you prefer develop it?<ul style="list-style-type: none"><li>g) API</li><li>h) AFPM</li><li>i) Licensor</li><li>j) In-house</li><li>k) Other</li></ul></li></ul>
<ul style="list-style-type: none"><li>• What barrier prevents installing a Reactor Overhead Isolation Valve?<ul style="list-style-type: none"><li>a) Money</li><li>b) Management</li><li>c) Not feasible</li><li>d) Lack of industry experience</li><li>e) Other</li></ul></li></ul>
<ul style="list-style-type: none"><li>• In what FCC service do you use Tunable Diode Analyzers?<ul style="list-style-type: none"><li>a) Waste Heat Recovery Outlet</li><li>b) Flue Gas Stack</li><li>c) Regenerator Outlet</li><li>d) Feed Preheater Flue Gas</li><li>e) Other</li></ul></li></ul>
<ul style="list-style-type: none"><li>• What challenges do you experience with Tunable Diode Laser Analyzers?<ul style="list-style-type: none"><li>a) Alignment</li><li>b) Opacity / Interference</li><li>c) Temperature</li><li>d) None</li><li>e) Other</li></ul></li></ul>
<ul style="list-style-type: none"><li>• Standby Mode Duration in days<ul style="list-style-type: none"><li>a) 1-2,</li><li>b) 3-4,</li><li>c) 5-7,</li><li>d) more than 7,</li><li>e) never</li></ul></li></ul>
<ul style="list-style-type: none"><li>• How do you deal with low flash point slurry oil on start up?<ul style="list-style-type: none"><li>a) Steam to main column bottoms,</li><li>b) External stripper,</li><li>c) Tank nitrogen/vapor recovery,</li><li>d) Other</li></ul></li></ul>
<ul style="list-style-type: none"><li>• Who is using simulator technology to train personnel?<ul style="list-style-type: none"><li>a) Yes</li><li>b) No</li></ul></li></ul>
<ul style="list-style-type: none"><li>• How do you train operator staff for emergency situations?<ul style="list-style-type: none"><li>a) Systematic review of emergency procedures</li><li>b) Drills or mock scenarios</li><li>c) Simulated DCS environment</li><li>d) CBTs or classroom training</li><li>e) Other</li></ul></li></ul>

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## GENERAL FCC

- What are you using for slurry flow measurement?
  - a) Standard Orifice Meter
  - b) Orifice with diaphragm taps
  - c) Wedge Orifice Meter
  - d) Venturi
  - e) Ultrasonic
  - f) Coriolis
  - g) Differential pressure
  - h) Vortex
  - i) Other
- What is your units Torch Oil Nozzle Design?
  - a) Open pipe
  - b) Simple oil and steam mixing Tee with flat spray nozzle
  - c) Steam Lance / open baffle
  - d) Atomizing nozzle
  - e) Retractable
  - f) Other
- Lab testing for catalyst selection
  - a) Paper / Vendor Data
  - b) Lab Scale Circulating Pilot Plant
  - c) Ace Testing
  - d) Industrial Trials Only
  - e) Laboratory Micro Downer Reactor
  - f) Other

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