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What is the AFPM Webinar Series?

Deliver educational content and knowledge sharing opportunities throughout the year

Previous Summit Webinars are Available on the AFPM Website

February - Safeguarding the FCCU during Transient Operations

March - Shutdown Best Practices for Reactor Systems

April - Reboiler Circuits For Trayed Columns

May – Learning Teams Part 1 & 2

June – Highlights of the Proposed Changes to API RP 751 Rev 5

July - Digital Transformation: Positioning for What's Next

September – FCC Key Equipment Reliability

October – Crude Feedstock - Oilfield Implications on the Refining Processes

November – Mobile Worker, Maintenance Operating Company Panel

December – Getting the Most from your Hydrogen Plant, Part 1

January - Molecular Management in the Gasoline Pool – Looking to the Future

Webinars Are Interactive

Ask questions throughout the presentation, answered at the end

Live polls throughout the presentation

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PLANNING/APC ENGINEERS WORKING TOGETHER FOR REFINERY OPTIMIZATION

Yangdong Pan, Catherine Bohanon and Atique Malik

Phillips 66

February 25th, 2020

Presented at Webinar for OPCAT of AFPM

AGENDA

- Short-term planning process for refinery
- Challenges faced by Planning and APC engineers
- Case study for linking Planning with APC
- Summary
- Q&A

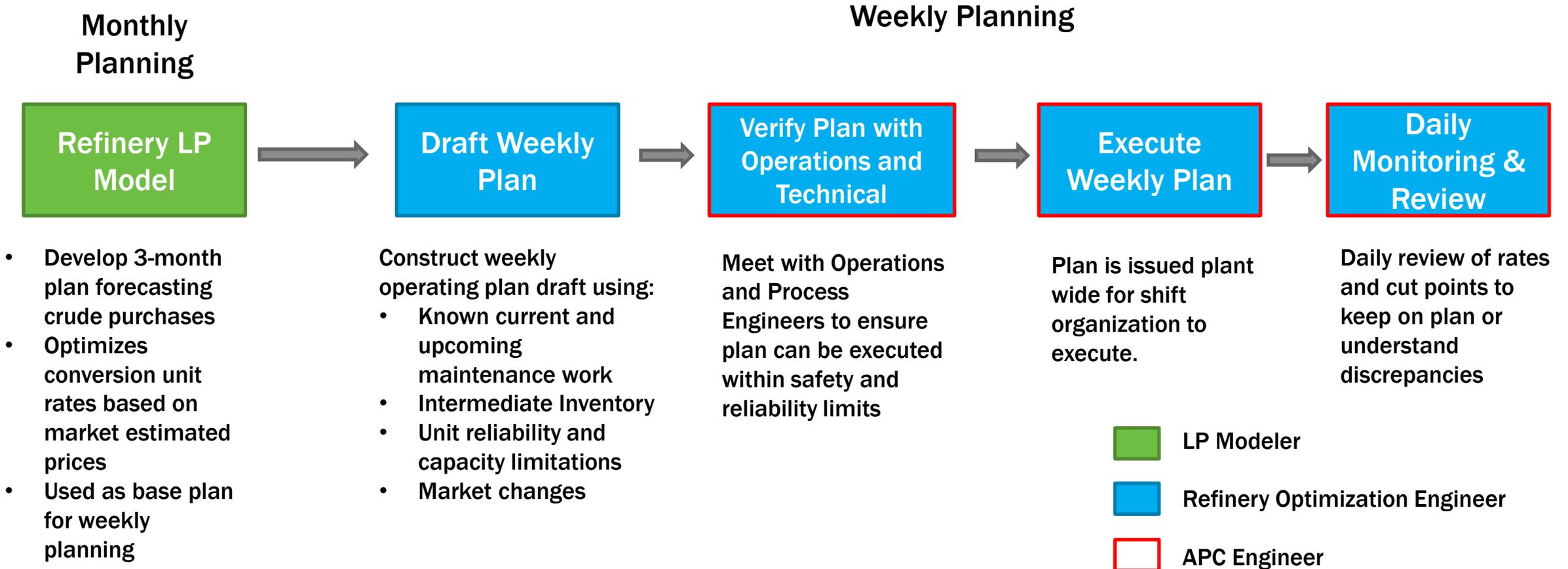
SLIDO QUESTION 1-2

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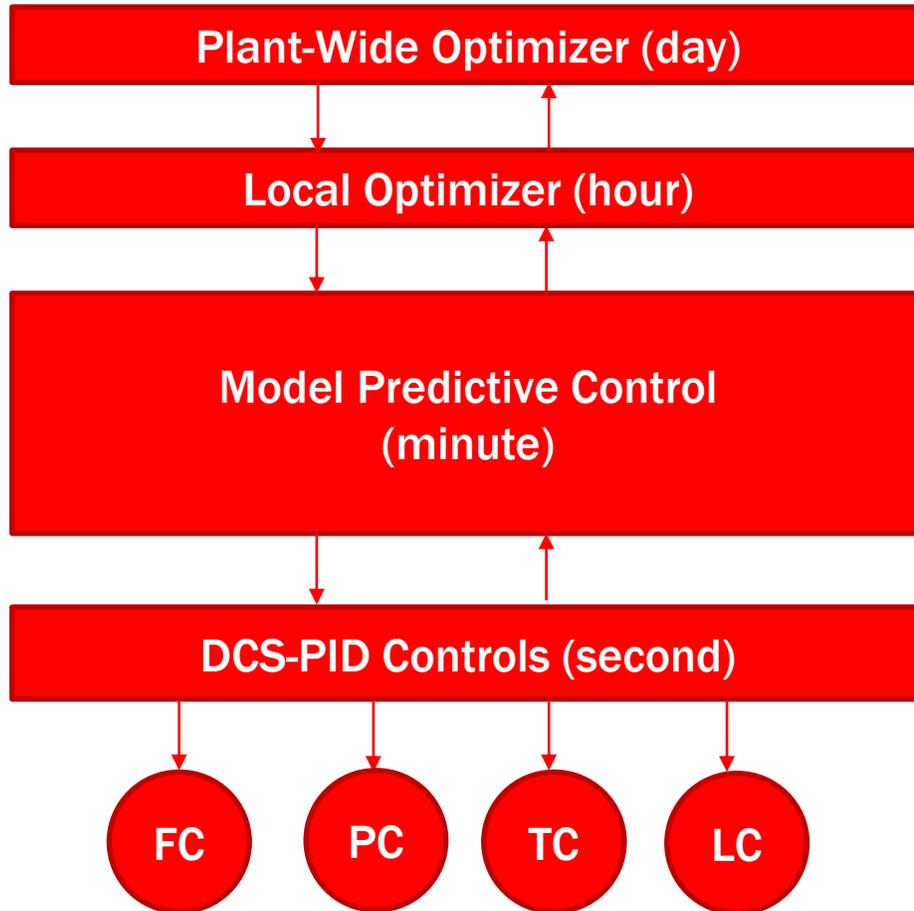
SHORT-TERM PLANNING PROCESS FOR REFINERY



Every step is a feedback loop to the Monthly LP model and Drafting stage

BOTTOM-UP APPROACH

Model Predictive Control Structure (suggested in 1970s)



- **Real Time Optimization (RTO)**
 - Targeted for specific areas, such as FCC, HCU, etc.
- **GDOT by AspenTech**
- **Forge by Honeywell**

TOP-DOWN APPROACH

- **Planning targets for APC to execute**
 - Typical targets: distillation cut points, benzene target, reactor temperature, etc.
 - Questions on how these targets be decided and their optimality
- **Set economic pricing down to APC**
 - Difficult in practice

SLIDO QUESTION 3

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CHALLENGES OF IMPLEMENTATION OF ECONOMICS IN APC

- **Economics**
 - No clear objectives
 - No price tags for intermediate streams
 - What are values of HGO, LVGO, LCGO, CCHGO, and 150- materials, etc.?
- **Implementation**
 - Objective could be nonlinear
- **Status quo**
 - Minimize or maximize some CV/MV with fixed linear coefficients
- **Ideal case study: DIH column optimization in the overall naphtha system**

ATTEMPTS IN THE PUBLIC LITERATURE

- **Cutler & Sorensen (1998)**
 - Write the objective function at the MV level and compute the MV weights
 - Model gains and prices are all that is needed
 - Linear formulation
- **AM (2001) Tech Note**
 - Write the objective function in terms of MV and CV relationship and compute CV weights
 - Linear formulation
- **Work with a dynamic nonlinear function either CV or MV based**

LEARNINGS FROM TESTING

- **Optimization direction depends on both the prices and model gains**
 - Different DIH columns could lead to different solutions for the same prices
- **LP solution behaviors**
 - Tend to be in one direction per fixed prices
 - Can lead to flip-flop of the steady state solution, but dynamic behavior seems to be steady
- **Set reasonable bounds on component CVs is helpful**



START OF Q&A SESSION

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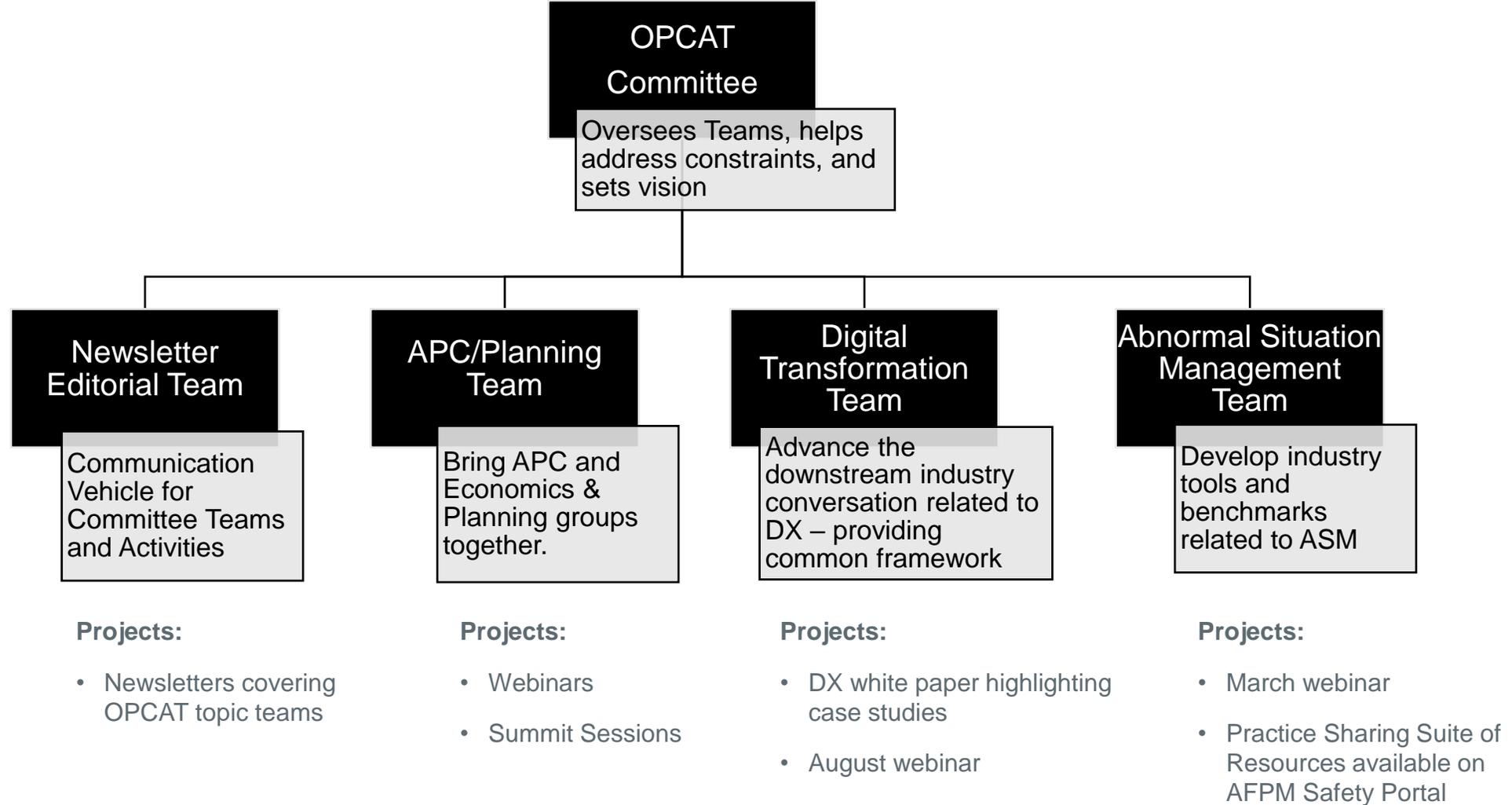
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OPCAT Committee Overview



UPCOMING WEBINARS –

SEE AFPM EVENTS PAGE FOR MORE DETAILS

“Alarm Management Programs – Leveraging Knowledge for Operational Excellence”

March 16, 2021
2:00 PM Eastern

[Register Here](#)

Expected Takeaways:

- Importance of engaging with multidisciplinary team
- Topic of continual improvement
- Ideas on how to leverage the Alarm Resources (AFPM Safety Portal)

Intended Audience

Operations, Process Controls, Process Safety

Participants:

- Levi Merkel, CHS
- Ben Mossman, CHS
- Patrick Robinson, Phillips 66

“FCC co-processing – a means to a sustainable future”

March 25, 2021
2:00 PM Eastern

[Register Here](#)

Description

Leveraging flexibility of the FCC for processing biogenic feedstocks.

Intended Audience

Process Engineers, Strategic Planners, Refiners and Midstream, Investors

Participants:

- Cliff Avery, Albemarle
- Steve Gim, BASF
- Derrick Froehle, Honeywell UOP
- Rama Marri, Lummus Technology

“Decarbonizing Hydrogen Production”

April 28, 2021
2:00 PM Eastern

[Register Here](#)

Overview:

- Differences in hydrogen
- CO2 recovery with SMR
- Advanced Reforming Approaches

Intended Audience

Process Engineers, Strategic Planners, Refiners and Midstream, Investors

Participants:

- Robert Jolly, Johnson Matthey
- Marco A. Márquez, Matheson
- Thor Gallardo, Haldor Topsoe