

# Processing Today's Crudes

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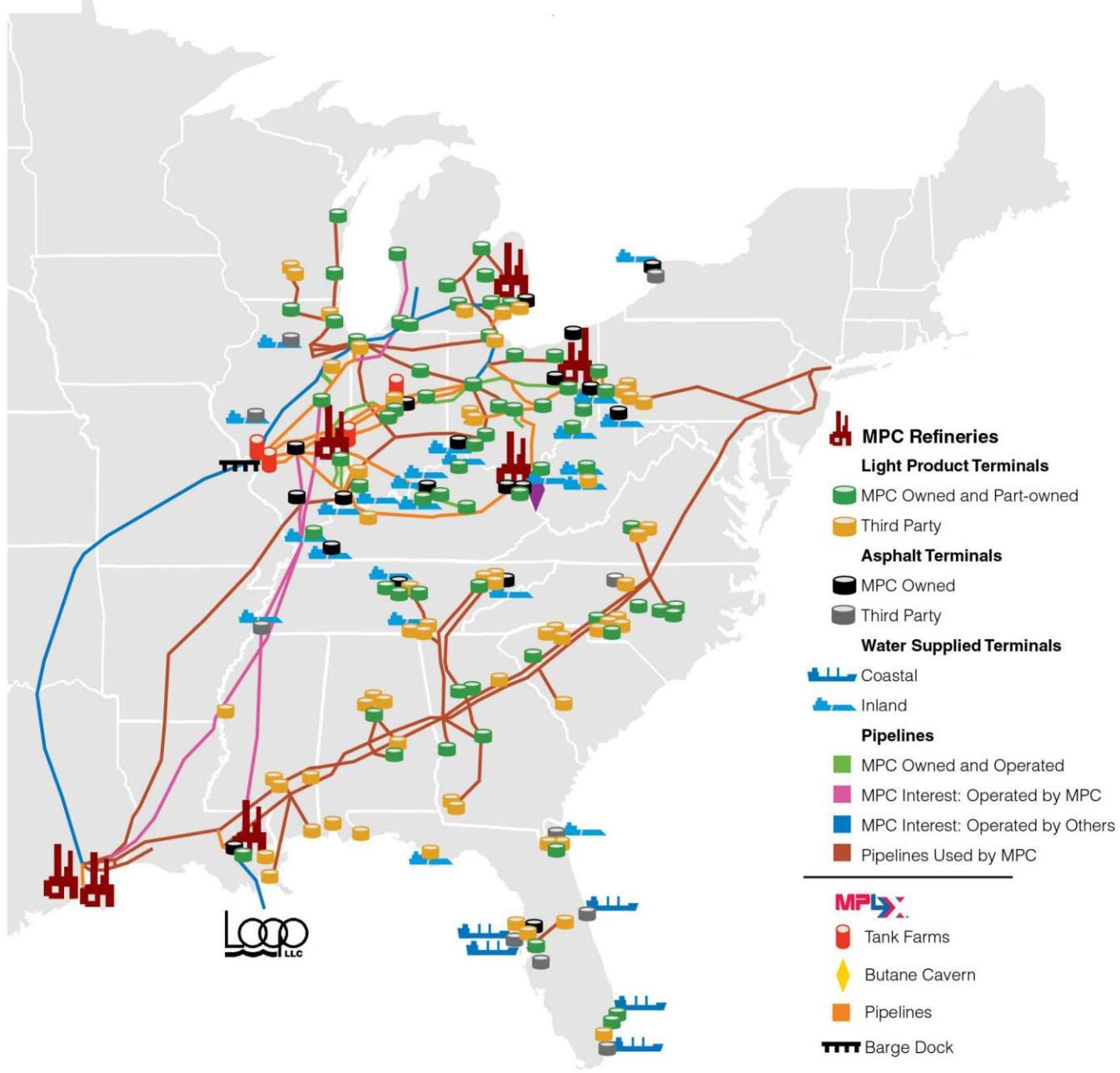
## Marathon Petroleum Company LP



# How MPC is Positioned

- Stand alone company since 6/2012
- Refining and Transportation Network Concentrated in Mid-Continent
- 7 Refineries from Michigan to Texas
- Able to process wide crude slate, with light end processing capability
- Access to Shale Crude/Condensate (Bakken, Eagle-Ford, Utica)
- Access to Canadian Bitumen





# MPC Refinery System

## Published Capacity (MBCD)

<b>Canton</b>	<b>80</b>
<b>Catlettsburg</b>	<b>242</b>
<b>Detroit</b>	<b>123</b>
<b>Galveston Bay</b>	<b>451</b>
<b>Garyville</b>	<b>522</b>
<b>Robinson</b>	<b>212</b>
<b><u>Texas City</u></b>	<b><u>84</u></b>
<b>Total</b>	<b>1,714</b>

- MPC is 3<sup>rd</sup> largest US refiner
  - VLO (1,904 MBCD)
  - XOM (1,856 MBCD)
  - P66 (1,590 MBCD)
- Garyville
  - 3<sup>rd</sup> largest in US
  - 12<sup>th</sup> largest in World
- Galveston Bay
  - 5<sup>th</sup> largest in US
  - 17<sup>th</sup> largest in World



# Positioning for Today's Opportunity

- Detroit Heavy Oil Upgrade Project
  - Completed in 2012, providing ability to process higher concentration of Canadian Crude.
- Commissioning Condensate Splitters for 60,000 bpd of Utica Condensate at Canton/Catlettsburg.
- De-bottlenecking Robinson for additional light crude capacity.
- 65% Light Crude throughput in 2013
  - Canton, Catlettsburg, Texas City can process 100%
  - Robinson 100% in 2016
  - Galveston Bay Refinery (2013 purchase) eliminated Foreign Sweet Crude, replaced with Domestic Sweet and Canadian Crudes





# Today's Crude? (Opportunity)

- Shale Crudes
  - Low Sulfur / Low TAN
  - High Paraffin
  - Variable Quality
  - H<sub>2</sub>S Scavengers
  - Phosphorous
  - Drilling Mud
- Heavy Canadian
  - High solids content
  - High Asphaltenes
  - High Sulfur / High TAN

# Opportunity Crudes

## Problems Experienced

### ■ Shale Oil

- Low Sulfur / Low TAN
  - Sulfur is very low, concern that naphthenic acid attack can still occur. Specific issues noted in resid circuits.
- High Paraffin
  - Heavy Wax fouling in Raw Crude circuits
  - Heavy Paraffins contribute to hot preheat fouling?
- Variable Quality
  - Gravity range noted 30-60 deg
- H<sub>2</sub>S Scavenger Usage
  - Amine Salt Formation in Crude OH
- Phosphorous Fouling
  - Noted in foulants sampled throughout Crude Unit.
    - Fracing fluid / Scale inhibitor?
- Barium Sulfate Fouling





# Opportunity Crudes

## Problems Experienced (cont.)

### ■ Heavy Crude

- High Sulfur / High TAN
- High Solids loading
- Low Gravity / High Viscosity

### ■ Combined

- Asphaltene Destabilization
  - Preheat fouling
- Rapid emulsion builds

# Summary

- Today's Crude is what brings an economic opportunity – Today
- Position refineries for the future while processing Today's crudes
- Recognize that Opportunity Crudes bring other Opportunities
- Strong Support of and Participation in Technical Associations is important

