

Louisiana: Refining in a Pandemic

Crude throughput down 23% in April and May.

Morningstar Commodities Research

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Data Sources for This Publication

EIA
 Louisiana Department of Natural Resources
 U.S. Census

Slowly Recovering

Louisiana's fleet of Gulf Coast plants with 3.3 million barrels/day of crude processing capacity found themselves operating at 23% less throughput than 2019 during the two-month period in April and May when the economy was locked down this year. Most refineries are slowly recovering now, along with demand for transport fuels, but the 136 thousand b/d Calcasieu refinery in Lake Charles was shuttered by its owners on Aug. 1, and Shell put its 240 mb/d Norco plant on the block in July. This note looks at data from Louisiana's Department of Natural Resources on how the state's refineries fared between January and May.

The Bayou State has 13 refineries that primarily produce refined products with nameplate capacity of 3.3 mmb/d of crude, according to a January 2020 Energy Information Administration survey (Exhibit 1). According to EIA data, only 28% of the refined products produced by these refineries are consumed in state, with the rest being shipped inland by pipeline or exported to overseas markets primarily in Latin America. As we have noted already this year, the combination of demand destruction due to the lockdown of the economy and crude prices driven down by oversupply had a catastrophic impact on refining (see our April note [2020 Refining Armageddon!](#)) and margins (see July's [U.S. Refiners' Worst Second Quarter in a Decade](#)). As our analysis here shows, refiners adopted different tactics to survive the worst of the lockdown in April and May with greater plant complexity not necessarily providing an advantage.

Exhibit 1 Louisiana Refineries

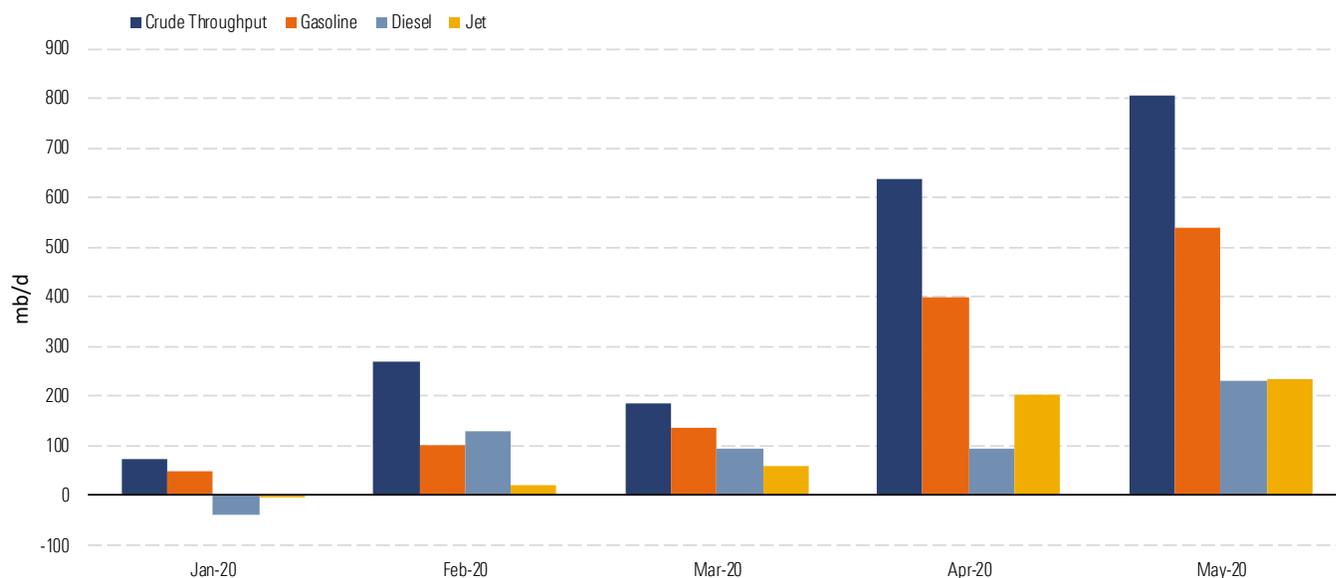
COMPANY	SITE	Operating Capacity Mb/d
Delek Energy	KROTZ SPRINGS	80
CALCASIEU REFINING CO	LAKE CHARLES	136
Chalmette Refining LLC (PBF Energy)	CHALMETTE	190
CITGO PETROLEUM CORP	LAKE CHARLES	418
EXXONMOBIL REFINING & SUPPLY CO	BATON ROUGE	518
MARATHON PETROLEUM CO LP	GARYVILLE	578
PHILLIPS 66 COMPANY	BELLE CHASSE	256
PHILLIPS 66 COMPANY	WESTLAKE	260
PLACID REFINING CO	PORT ALLEN	75
SHELL OIL PRODUCTS US	CONVENT	211
SHELL OIL PRODUCTS US	NORCO	227
VALERO REFINING - MERAUX LLC	MERAUX	125
VALERO REFINING NEW ORLEANS LLC	St. Charles	215
	Total	3288

Source: EIA, Morningstar.

Down but Not Out?

Data from the state's DNR shows that during April and May 2019, Louisiana's 13 major refineries processed an average 3.1 mmb/d of crude, or 94% of nameplate capacity. In April and May this year, throughput fell 23% to 2.4 mmb/d. Overall gasoline production in April and May 2020 was down 30% compared with 2019, or about 0.5 mmb/d, diesel output was down 16%, and jet kerosene production was down 69%. Exhibit 2 shows the monthly decline in crude throughput between 2019 and 2020 (blue bars) as well as gasoline production (orange), diesel production (gray) and jet kero production (yellow). Data from the U.S. Census Bureau shows that exports of gasoline and diesel out of the New Orleans customs district fell by two thirds in May 2020 over May 2019 in light of lower demand in Latin America. Jet kero exports dropped to 25% of 2019 levels in April 2020 and stopped altogether in May 2020.

Exhibit 2 Louisiana Refinery Cutbacks in April/May 2020 vs. 2019



Source: DNR, Morningstar.

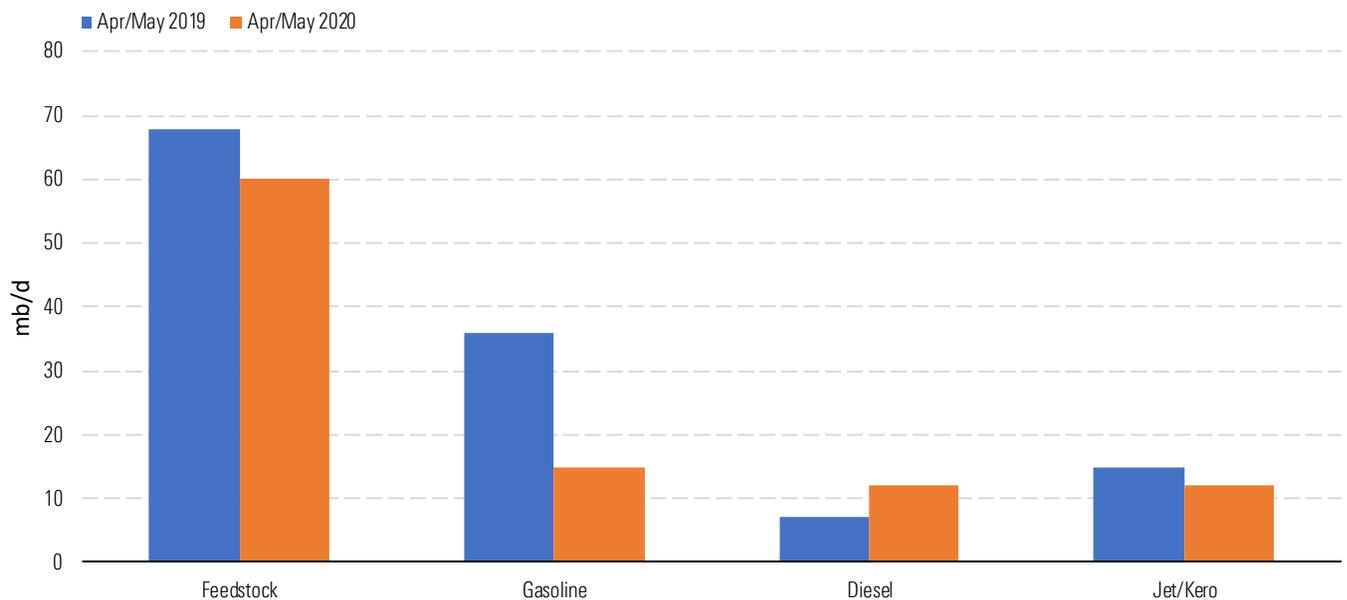
In addition to the big picture statewide, we looked at DNR data for two Louisiana refineries with different configurations to understand their approach to the demand collapse in April and May 2020.

Krotz Springs

The first is the 80 mb/d Delek Energy refinery on the Atchafalaya River in Krotz Springs, central Louisiana. This is a small medium-complexity refinery configured to produce a high gasoline yield from light sweet crude. Krotz Springs is one of four Delek refineries in the United States with total fleet capacity of 302 mb/d. The refinery typically runs domestic crude only, with West Texas Intermediate making up 72% of the slate in 2019, according to Delek. The plant serves markets in the Mississippi hinterland as well as the Colonial pipeline delivering to Northeastern states.

During April and May this year, Delek responded to the lockdown at Krotz Springs in two ways. First, it reduced crude throughput by 12%, from an average 68 mb/d in April and May 2019 to an average 60 mb/d this year (Exhibit 3). Second, it kept the refinery's 33 mb/d fluid cat cracking unit shut down to reduce gasoline production. The FCC is a secondary unit that produces gasoline from the vacuum gasoil output by the refinery's vacuum distillation unit. Delek had already idled the FCC unit at the start of 2020 in anticipation of greater market demand for marine fuel oil made from distillate because of the International Maritime Organization's adoption of tighter sulfur standards (see our February note [IMO 2020 Scrubber Payout Less Than One Year](#)). As a result of the FCC shutdown, gasoline production in April and May 2020 averaged 15 mb/d, or just 42% of output during the same period in 2019. In contrast, during April and May, refinery diesel production exceeded 2019 levels by 5 mb/d (Exhibit 3). The increase in diesel production reflected better demand for commercial transportation during the lockdown as well as jet fuel being diverted to the diesel pool because of the collapse in air travel demand.

Exhibit 3 Delek Krotz Springs Refinery April/May 2020 vs. 2019



Source: DNR, Morningstar.

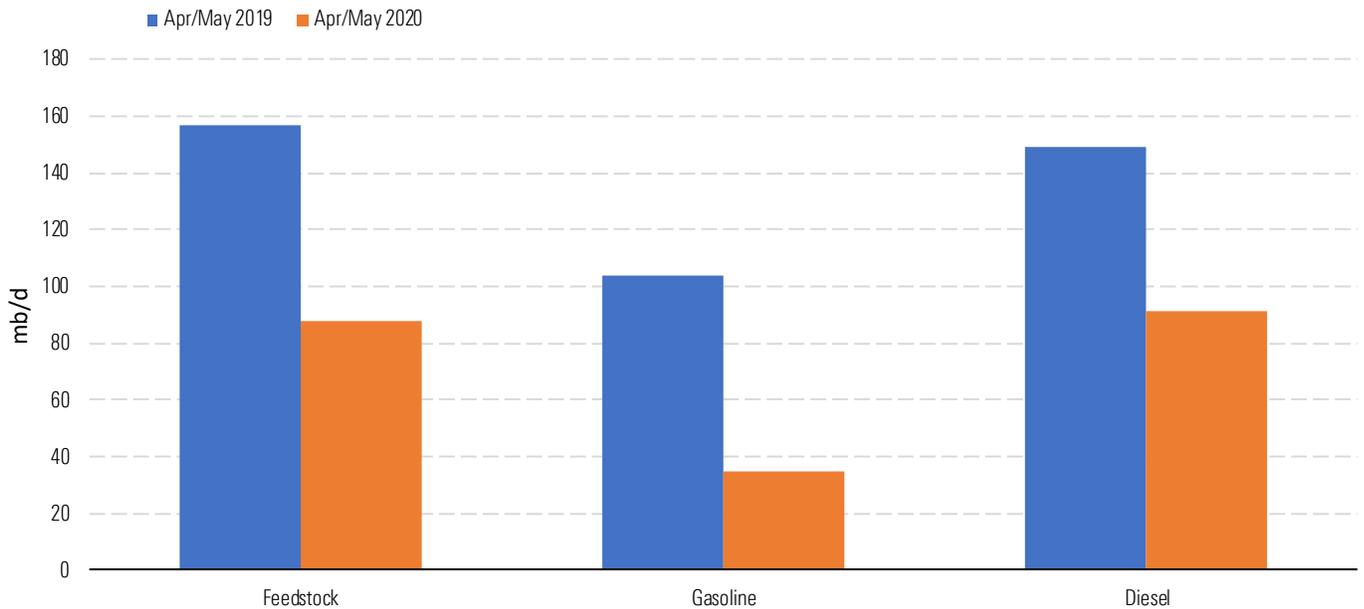
Krotz Springs appears to have weathered the pandemic well compared with the rest of the state's refineries. It kept crude run cuts versus 2019 to 12% compared with the 23% statewide average. In this it was helped by its less complex light sweet crude processing configuration because of the collapse in WTI prices during April due to a storage squeeze (see our April note [Crushing Cushing: Wider Impact of Negative Crude](#)). Lower crude prices helped offset lower product prices while switching to higher diesel output and shutting the FCC emphasized slightly better diesel margins.

Valero St. Charles

The second Louisiana refinery we took a closer look at is the Valero Energy 215 mb/d St. Charles refinery on the Mississippi River in Norco, Louisiana, close to New Orleans. The refinery is a modern complex plant with delayed coker, vacuum distillation, FCC, hydro cracking, and reformer units, designed to process heavy sour crude to produce an 80% yield of light products. In 2019, the refinery processing slate consisted of 70% Louisiana light and heavy crudes and 30% imports of heavy crude from Saudi Arabia, Brazil, Colombia, and Western Canada. Refined products are distributed along the Mississippi corridor as well as into the Colonial pipeline, which delivers gasoline and diesel to Northeastern states.

Although the St. Charles refinery is more sophisticated than Krotz Springs with about 3 times the crude throughput capacity, it proved less flexible in responding to the collapse in demand and margins that hit refiners this April and May. Valero cut crude processing at the plant in April and May by an average of 69 mb/d, or 56% compared with the same period in 2019 (Exhibit 4). Like Krotz Springs, the St. Charles refinery was already operating without its FCC unit, which had been closed for a turnaround in the first quarter of 2020. The refinery didn't bring the 100 mb/d FCC unit back up in April and May, reducing gasoline production by 66% to 35 mb/d compared with the same period in 2019. The DNR data doesn't record any jet kero production from St. Charles, and we assume its output is minimal. Diesel output this April and May was 91 mb/d, or 61% of the 149 mb/d average output last year.

Exhibit 4 Valero St. Charles Refinery April/May 2020 vs. 2019



Source: DNR, Morningstar.

The 56% lower crude throughput in April and May at the Valero St. Charles refinery compared with Krotz Springs' 12% cut indicates that the former fared worse during the pandemic. Both plants reduced gasoline output by shutting FCC units, and St. Charles cut diesel production as well. However, St. Charles' margins likely suffered from narrower crude price spreads between heavy sour and light crudes during the second quarter. Because St. Charles is configured to run heavy sour crude that was relatively more expensive, its refining margins were squeezed harder than Krotz Springs.

Lessons Learned?

Although the U.S. refining industry appears to have weathered the COVID-19 pandemic storm, it is emerging battered and bruised from the experience. There have been numerous announcements of plant closures and plans to sell or convert to renewable diesel production. These reflect the fragile state of the industry in light of lower domestic and export demand for refined products and the erosion of cheaper crude prices that U.S. crude plants have enjoyed in the shale era. Our analysis of Louisiana refiners' experience suggests that more-sophisticated refineries don't necessarily have an advantage in these circumstances. That evidence may give pause to investment decisions going forward. ■■

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