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# U.S. Refiners' Worst Second Quarter in a Decade

## End of shale era signals bleak future.

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**Data Sources for This Publication**
EIA
CME Group

To discover more about the data sources used, click here.

### Stumble Follows Years of Stellar Results

United States refiners experienced their worst second-quarter margins in a decade this year in the wake of the coronavirus pandemic. Margins were squeezed by a combination of lockdown-constrained demand keeping refined product prices low and an OPEC+ production agreement supporting higher crude costs. The stumble follows years of stellar refining results in the shale era, driven by access to discounted crude from domestic and Canadian producers, and a growing market for refined product exports from Gulf Coast refineries. Signs of recovery vary by region and overall processing levels remained 18% below 2019 levels during the first week of July according to the Energy Information Administration. This note reviews second-quarter refinery performance and the challenges ahead in light of shrinking fuel demand and reduced access to discounted crude.

### This Year

Analyst superlatives expended on COVID-19's impact on oil markets are now familiar. Our coverage of U.S. refining this year hasn't disappointed–starting with a March note detailing how an early 2020 boost to margins was abruptly ended by a combination of COVID-19 demand destruction and a surge in crude supply when the OPEC+ agreement collapsed (see Early 2020 Refining Boost Hit by Demand Destruction). An April note looked at plummeting demand for refined products and rising inventories as refiners scrambled to adjust to the double impact of increased supply and lower demand (see 2020 Refining Armageddon!). In May we described how refiners initially responded by increasing diesel production and then reversed that strategy when gasoline demand recovered and distillate inventories swelled (see Gasoline Recovers as Diesel Hits the Ropes). While much attention has rightly been paid to the immediate impact of the crisis and the length of recovery, we touched on the longer-term implications in a June note highlighting changing economics for processing Canadian crude in the Midwest (see Mixed Lockdown Results for Canadian Crude).

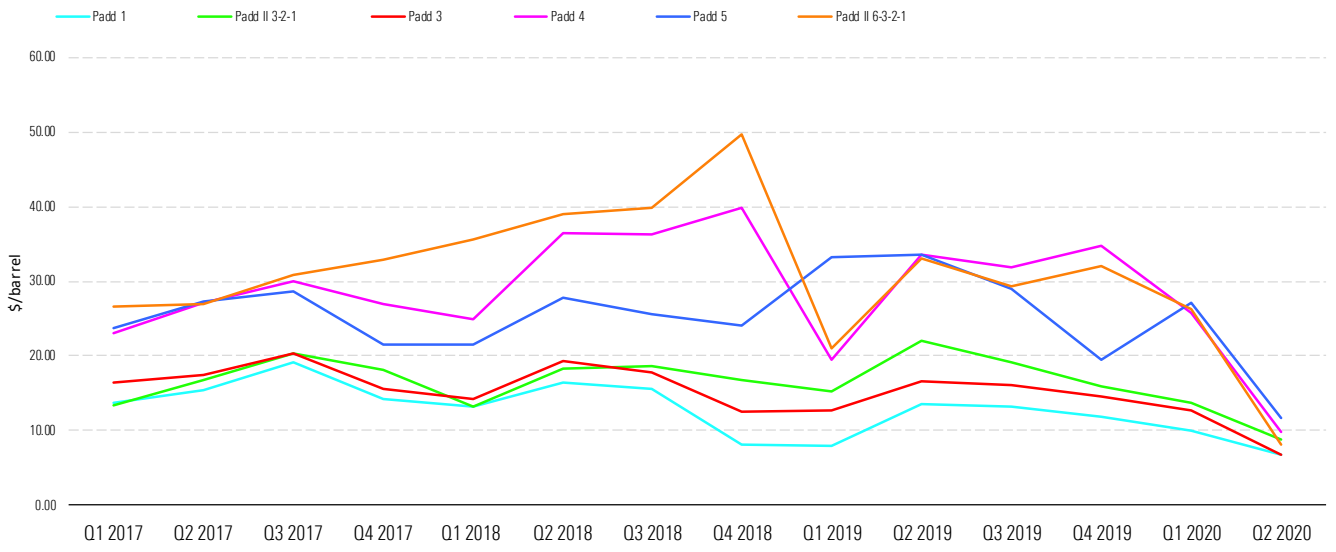
### Margin Analysis

By one popular measure–the CME Nymex futures 3-2-1 crack spread based on a barrel of West Texas Intermediate crude producing two-thirds New York unleaded gasoline and one-third New York ultralow sulfur diesel, average margins of $12.03/barrel represented the worst second-quarter result since 2009.

For more detailed analysis we estimated historic margins for each of five U.S. regions defined by the Department of Energy's Petroleum Administration for Defense Districts. We used average prices paid for crude and received for products as reported monthly by EIA. Since that data lags by two months, we only have April data for second-quarter 2020 and used estimates based on CME Group data for May and

June. Exhibit 1 shows six refining margins representing respectively, 3-2-1 crack spreads for PADD I (Atlantic Coast), PADD II (Midwest), PADD III, (Gulf Coast), PADD IV (Rockies), PADD V (West Coast, Hawaii and Alaska) and a 6-3-2-1 crack spread for PADD II. The 6-3-2-1 crack reflects a complex Midwest refinery processing heavy crude (typically Western Canadian) to produce 50% gasoline, 33% diesel and 17% fuel oil. Note that crack spread margins are rule-of-thumb estimates not individual crude yields or refinery configurations.

**Exhibit 1** Quarterly Regional U.S. Crack Spreads 2017-2020




Source: EIA, CME Group, Morningstar.

Based on these numbers, overall U.S. second-quarter average margins fell 55% to $8.66/barrel versus a first-quarter equivalent of $19.29/barrel. Second-quarter 2020 averages were 66% lower than $25.40/barrel realized in the same period last year. First-quarter one margins were relatively in line with prior years because lockdowns didn't have an impact on refining until mid-March. Refinery margins generally peak in the second quarter after Memorial Day as the summer driving season kicks in. The narrow levels seen this past quarter reflected a squeeze between higher crude costs bolstered by the OPEC+ production agreement in late May and lower prices for products as demand recovered slowly and inventories swelled to record levels.

Breaking the margins down by region reveals bad results across the board. The worst in comparison with second-quarter 2019 were the West Coast that declined 76% from $33.60/barrel to $8.11/barrel year on year and the Rockies down 71% from $33.60/barrel to $9.73/barrel. The Atlantic Coast region came off best compared with last year with a 50% margin decline from $13.71/barrel to $6.75/barrel but PADD I margins were already the lowest in the nation so they just went from bad to worse. The 3-2-1

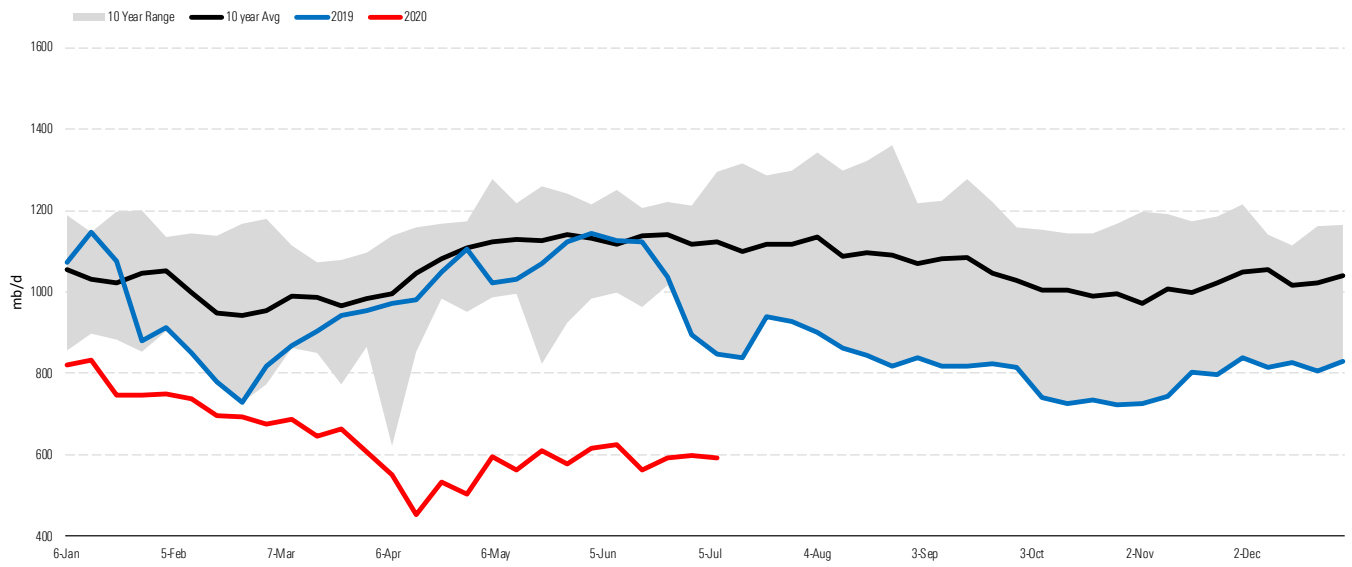
crack spread margins in the Midwest PADD II and on the Gulf Coast PADD III both narrowed by about 60% compared with second-quarter 2019. However, the Midwest 6-3-2-1 crack spread for processing imported heavy Canadian crude in that region fell 76% from $33.11/barrel in second-quarter 2019 to $8.11/barrel this year. As we explained in Mixed Lockdown Results for Canadian Crude, this collapse in Canadian crude margins resulted from lower production in Western Canada freeing up pipeline congestion that has discounted the prices Midwest refiners pay.

**Refinery Input**

Margin analysis measures profitability per barrel but typically doesn't include plant overheads. These impact per-barrel returns when throughput slows. Lower product demand during the COVID-19 lockdowns caused refiners to cut back throughput to avoid stockpiles of the finished product. Analysis of weekly refining data from the EIA shows utilization averaged 88% of overall capacity of 19 million barrels/day during the first quarter, which was level with 89% in first-quarter 2019. Average weekly utilization fell to 71.5% in the second quarter because of COVID-19 or 20% below 2019 levels in the same period.

By region, PADD I weekly crude inputs averaged 567 mb/d during the second quarter, down 46% year on year versus 2019. Reduced runs this year have added to PADD 1 refining woes that saw capacity reduced by 335 mb/d after the closure of Philadelphia Energy Solution's Philadelphia, Pennsylvania refinery after a fire in June 2019. Seasonal analysis shows PADD I crude throughputs were already low coming into 2020 and haven't recovered since, remaining 30% below 2019 levels in the first week of July (Exhibit 2).

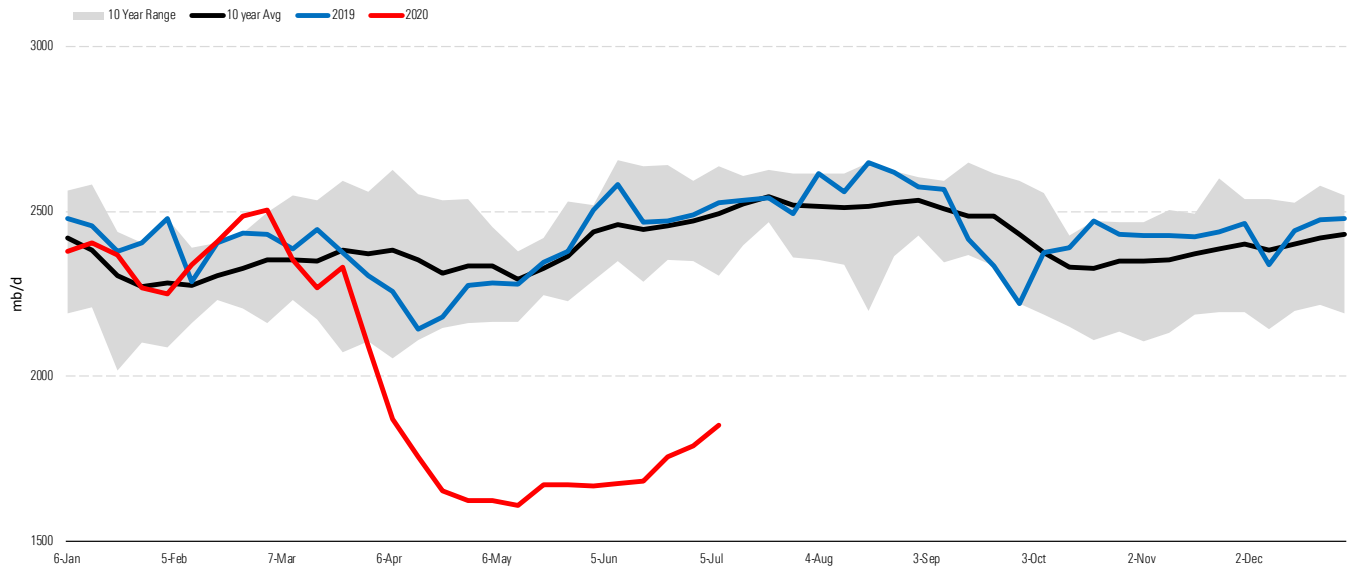
**Exhibit 2** Seasonal Refinery Crude Inputs PADD I




Source: EIA, Morningstar.

In contrast both PADD II and PADD III weekly refinery throughput rates recovered in May and June as lockdowns were rolled back so that both are now inside 10-year ranges albeit still below 2019 levels. During the second quarter PADD II runs were down 16% over 2019 at an average 3.1 mmb/d while PADD III runs averaged 7.3 mmb/d, down 19% compared with 9.0 mmb/d in the second quarter of 2019. PADD IV throughput has also recovered to 97% of 10-year average levels after being 22% down on second-quarter 2019. PADD V runs have experienced a U-shaped recovery since May (Exhibit 3) and remained 27% below 2019 levels as of the first week of July. Continued low demand in California could continue as a second wave of COVID-19 cases hit the Golden State.

**Exhibit 3** Seasonal Refinery Crude Inputs PADD V



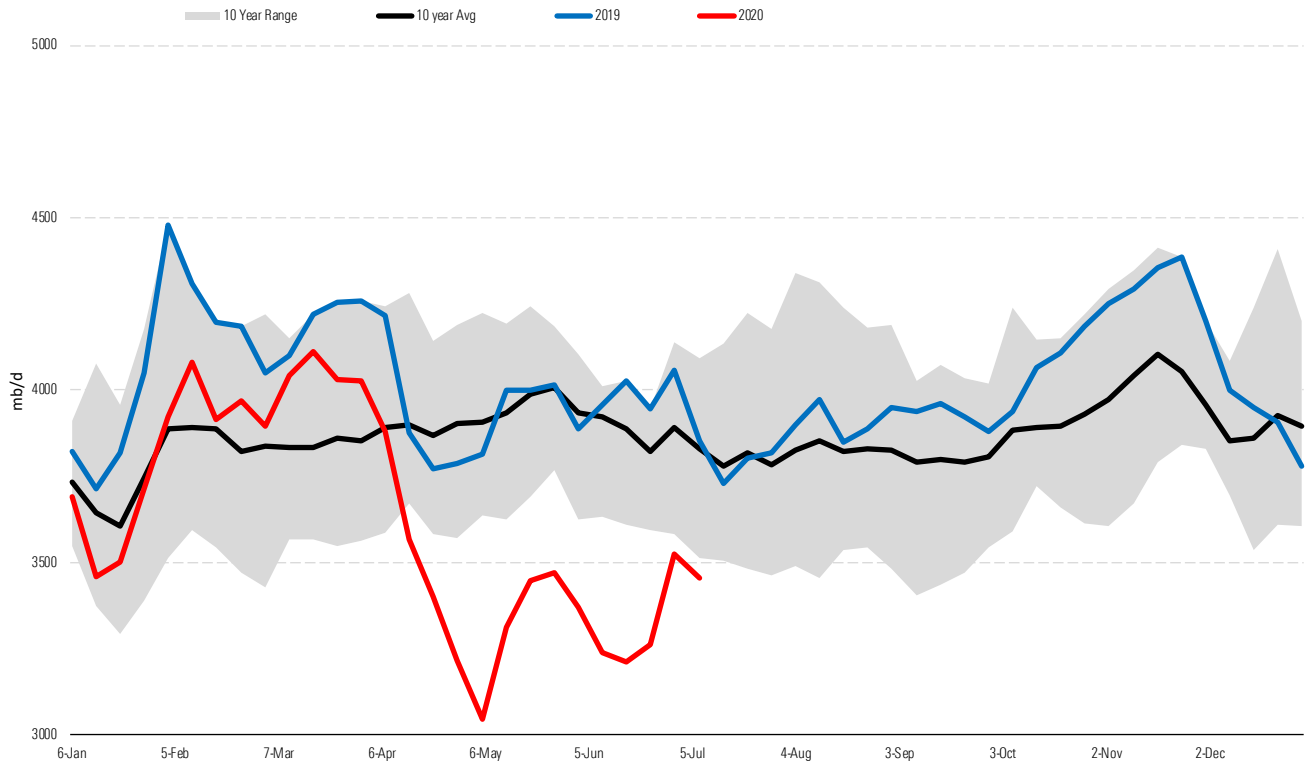

Source: EIA, Morningstar.

## Demand

The acid test of an oil market recovery is demand returning to normal levels. Actual demand data takes a few months to show up, but EIA estimates weekly apparent demand based on balancing production, inventories, imports and exports. Looking at that data for the two main refined products, gasoline and diesel, shows that while gasoline has experienced a rapid V-shaped recovery and is now within 5% of the low end of its 10-year range, diesel recovery resembles a W-shape and turned down again last week (Exhibit 4). Low demand for diesel and gasoline lie behind refineries cutting their crude runs although the complexities of crude quality and refinery processes make matching supply to demand difficult. Since refiners struggled to cut run rates much below 70%, they have inevitably produced too much gasoline and diesel leading to seasonably high inventories of both. Gasoline stocks remained level in May and June but dipped slightly last week. Distillate inventories (mainly diesel) remained stubbornly high during the second half of May and June, and ticked up again last week. High gasoline and diesel

inventory levels pressure product prices lower, helping to squeeze refining margins. Elevated inventory levels haven't been helped by net exports of gasoline falling below 10-year lows.

**Exhibit 4** Seasonal U.S. Distillate Demand




Source: EIA, Morningstar.

## Shale Advantage

Terrible margins in the second quarter marked the end of a decade of strong results for U.S. refiners. The good times came with advantages bestowed during the oil shale era starting in 2011. An abundance of new domestic production (doubling between 2010 and 2018) created congestion in the crude distribution system causing producers to discount prices. A legacy of 1970s-era legislation to ban crude exports led to a buildup of landlocked crude that also depressed prices. At the same time abundant shale gas made refinery fuel cheap. Although not shale-related, a parallel increase in Canadian crude output also caused congestion, making discounted crude available to Midwest refiners. With U.S. refiners blessed with lower fuel and material costs, they competed strongly in product export markets–especially at the Gulf Coast. Export markets provided growth opportunities at a time when domestic product demand was static, allowing refiners to increase throughputs.

**Bleak Future**

These advantages protected the U.S. refining sector against wider international trends in the past decade that saw oil demand in Western markets in retreat due to government policy and remaining growth centered on middle class demand in Asia. These trends hastened overcapacity and closures in European refineries. Now demand destruction during the COVID-19 pandemic has slashed crude oil prices to $40/barrel, rendering much of shale production uneconomic. At the same time Canadian crude prices increased as transport congestion eased. Cheap U.S. natural gas prices–once the envy of refiners worldwide–are now matched in Europe and Asia following a glut of international supply. Gulf Coast exports of refined products face greater competition from Europe and Asia as U.S. refiner cost advantages have disappeared.

If this environment is the new normal for U.S. refining, then low margins seen in the second quarter may become commonplace. The cure requires a return to domestic and Canadian production levels that renew the advantage of cheap crude. In addition, demand for refined products has to return to pre-COVID-19 levels with expansion possibilities in export markets. These outcomes aren't certain today as the COVID-19 pandemic runs its course. The likelihood is that U.S. refining won't be the same once it has.

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