
East Coast Refiners Lose Canadian Heavy Card

Oil sands crude by rail no longer economic.

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Data Sources for This Publication
CME Group
EIA
To discover more about the data sources used, [click here](#).

PBF Advantage Lost in 1Q

East Coast refineries have suffered lower returns than their U.S. peers during the shale era primarily because of their lack of access to advantaged domestic crudes. That leaves them reliant on imported crudes, which are more expensive than U.S. equivalents. The largest and most vulnerable plant, Philadelphia Energy Solutions, went through bankruptcy last year and a Reuters report in February indicated the Delta Air Lines-owned Monroe Energy plant is up for sale. Until this year, the two East Coast refineries owned by PBF Energy were believed to be more stable because they can process discounted heavy sour crudes from Canada. This note describes how that advantage disappeared in the first quarter in the wake of Alberta production cuts implemented at the end of 2018.

PADD 1 Fleet

We've tracked the plight of refiners in the Petroleum Administration for Defense District 1 region over the past three years beginning with a comprehensive outlook on refining in the region in October 2016 (East Coast Refining: Winners and Losers After the Shale Boom). PADD 1 refineries have about 1.3 million barrels/day of throughput capacity with 1.2 mmb/d belonging to five large plants in New Jersey, Delaware, and Pennsylvania. Two of those five, the 350 thousand barrel/day Philadelphia Energy Solutions plant outside Philadelphia and the 200 mb/d Monroe Energy plant in Trainer, Pennsylvania, are independently owned and have struggled to survive in recent years. Philadelphia Energy Solutions emerged from Chapter 11 bankruptcy in April 2018 after writing off heavy debts. Monroe is owned by Delta Air Lines and is being operated primarily as a hedge against jet fuel prices, but according to a February Reuters report, it is up for sale because of poor returns. The other three large PADD 1 refineries have fared better as part of larger networks. The 265 mb/d Bayway plant close to Newark, New Jersey, is part of the international network of refineries owned by Phillips 66. The 166 mb/d Paulsboro, New Jersey, and 190 mb/d Delaware City, Delaware, plants are owned by PBF Energy, which has three other U.S. refineries. Unlike the other large East Coast plants, the two PBF plants have coking capacity to process heavy sour crudes, giving them greater crude slate flexibility.

Feedstock Alternatives

These refineries had mixed fortunes in the shale era because their access to domestic crude is restricted by a lack of pipelines. That means they rely on relatively expensive waterborne imports for feedstock even as domestic shale crude was discounted by pipeline congestion and a ban on crude exports through the end of 2015. Before the export ban was lifted, East Coast refiners enjoyed a renaissance processing discounted Bakken crude delivered by rail from North Dakota that undercut waterborne imports. But Bakken discounts narrowed as pipelines were built out and the lifting of the export ban

narrowed differentials between domestic and international crudes, making crude by rail uneconomic. The opening of the Dakota Access Pipeline taking Bakken crude direct from North Dakota to Gulf Coast refineries also undermined crude-by-rail economics (see our July 2017 note [East Coast Refineries Recover From Shale Loss](#)). After DAPL came on line in June 2017, premiums for international crudes priced against Brent increased over domestic benchmark West Texas Intermediate after OPEC imposed production cuts. That made rail deliveries of Bakken crude to the East Coast viable again, but as we detailed in February 2018 (see [Should DAPL Producers Have Stayed on the Rails?](#)), the railroads were reluctant to ship crude without term contracts and producers had made take-or-pay commitments to the pipeline.

An alternative to railing domestic crude to East Coast refineries widely used before 2016 was shipping crude from Texas and Louisiana ports up the Eastern Seaboard from the Gulf Coast by tanker or barge. Such shipments must be made using Jones Act vessels that are American owned, manned, and regulated and therefore more expensive to operate than foreign-flagged ships. The fleet of Jones Act vessels is limited by the requirement to build them in U.S. docks, and their cost of charter varies with demand from other sectors such as refined product shipments. Before the export ban was lifted, a buildup of shale production at the Texas Gulf Coast led to crude price discounts that justified shipping barrels to Philadelphia and New Jersey refineries. More recently, since crude exports have taken off and domestic grades are once again trading at a discount to Brent, Jones Act shipments up the East Coast have increased again, as detailed below.

Bright Spot

One bright spot in the East Coast refining saga is the ability of PBF to process heavy crude shipped by rail from Western Canada. The Delaware City and Paulsboro refineries have coking capacity that breaks down heavy, high-sulfur crudes into valuable transport fuels. More or less continuous pipeline congestion getting oil sands crude from Western Canada to market in the U.S. has caused persistent discounts for these grades over the past five years, justifying higher freight costs for shipping by rail (see our January 2018 note [Can Rail Handle Canadian Crude?](#)). Even though rail freight from Canada to the East Coast costs \$15-\$20/barrel depending on the route, discounts for heavy benchmark Western Canadian Select crude reached as high as \$43/barrel in October 2018, making it economic for PBF to process as much as 70 mb/d of crude railed from Alberta last year. However, this advantage has now disappeared in light of the imposition of production cuts by Alberta province at the end of 2018 (see [Alberta Intervenes to Protect Producers](#)). The Canadian cuts combined with scarce supplies of heavy crude due to OPEC cuts and sanctions on Venezuela and Iran caused WCS discounts to narrow sharply to an average \$10/barrel in January 2019. PBF stated on its fourth-quarter 2018 earnings call in February that it will reduce shipments to 30 mb/d in March due to the poor economics.

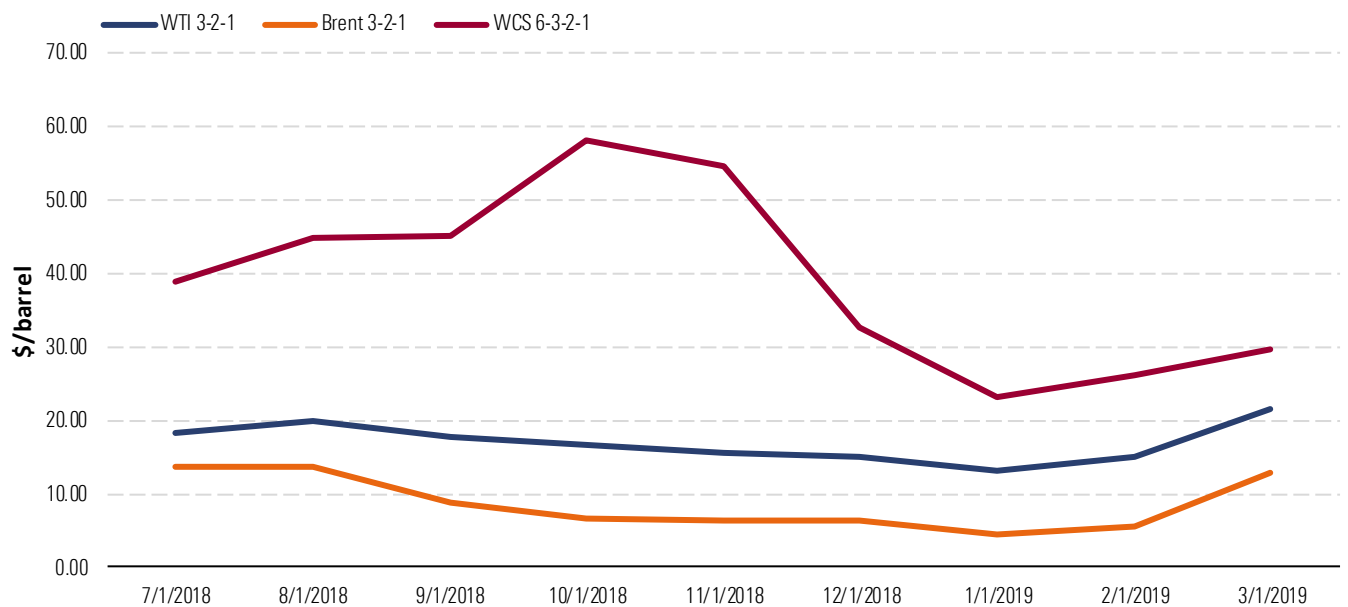
Margins

Exhibit 1 shows month average crack spread margins for three crudes in PADD 1. Two of the margins are 3-2-1 cracks for less sophisticated refineries like Philadelphia Energy Solutions, Monroe, and Bayway, with primary and secondary processing units that typically produce gasoline and diesel in a 2-to-1 ratio from light sweet crudes. These two represent gross returns for processing domestic WTI (blue line) and

international Brent crude (orange line) in the Northeast. The third margin (red line) is a 6-3-2-1 crack spread based on processing WCS crude in a sophisticated coker-equipped refinery like Delaware City or Paulsboro to produce 50% gasoline, 33% diesel, and 16% fuel oil.

The WTI and Brent cracks follow a similar pattern since the only difference in their calculation is crude price. That difference represents the premium refiners pay for imported Brent over domestic equivalent WTI at Cushing, Oklahoma. The 3-2-1 margins for WTI were higher than Brent by those premiums at \$17.17/barrel in the second half of 2018 and \$16.58/barrel in the first quarter of 2019. The Canadian WCS crack spread was considerably higher than Brent or WTI, averaging \$45.71/barrel in the second half of 2018 but narrowing to an average \$26.38/barrel in the first quarter.

Exhibit 1 PADD 1 Crack Spread Margins



Source: CME Group, Morningstar.

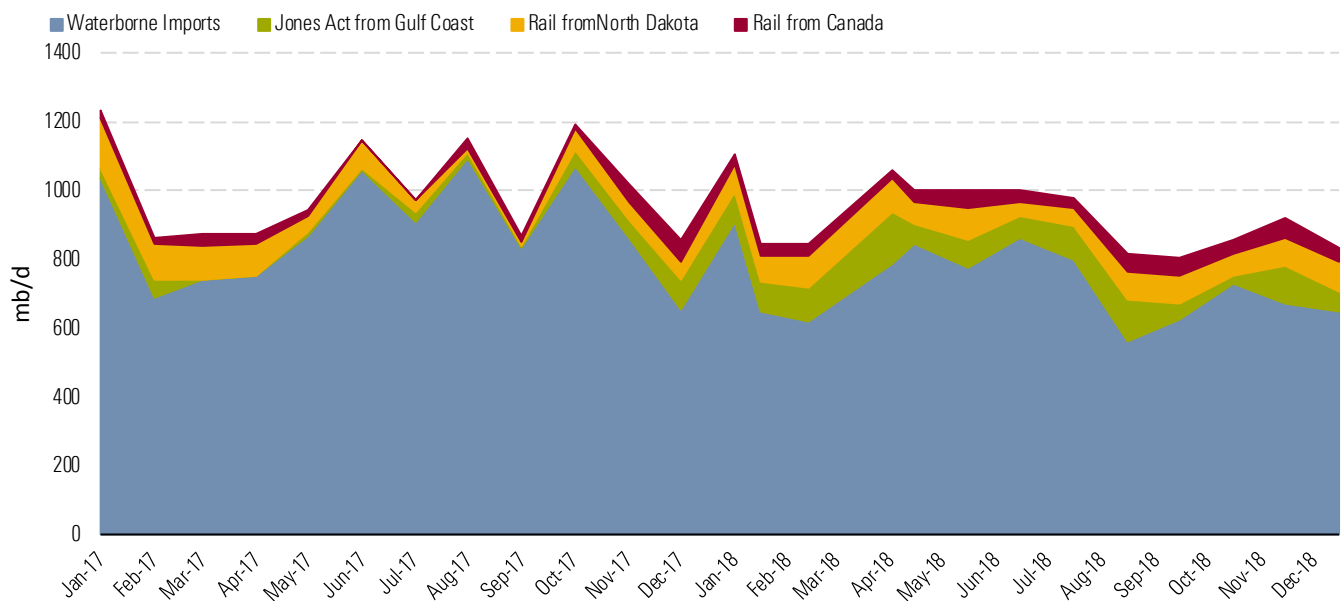
To get closer to actual plant profitability, the gross crack spread margins shown in Exhibit 1 must be offset by crude transportation costs. That calculation puts Canadian crude-by-rail economics to the East Coast underwater in the first quarter of 2019 once the \$20/barrel shipping cost is subtracted to produce an average delivered margin of \$6.38/barrel, which is lower than the Brent 3-2-1 average \$7.58/barrel. However, the economics of delivering Bakken crude by rail just about made sense in the first quarter as long as rail freight was below \$9/barrel and the Brent premium also justified Jones Act tanker shipments from the Gulf Coast.

Waterborne Imports Dominate

Despite the possibilities that the crack spreads indicate on paper, transport data from the Energy Information Administration shows PADD 1 refineries taking only limited advantage of alternatives to

waterborne imports over the past two years. Exhibit 2 shows deliveries by transport method between January 2017 and January 2019. Waterborne imports delivered from Eastern Canada, Europe, South America, and West Africa represented an average 88% of the total during 2017 and 78% during 2018. Smaller volumes of imports were delivered from Western Canada by rail, representing 3% and 4%, respectively, during 2017 and 2018. Domestic crude delivered by tanker from the Gulf Coast represented 3% of shipments in 2017, increasing to 9% in 2018. Rail deliveries from North Dakota represented 7% of the total in 2017 and 8% in 2018.

Exhibit 2 PADD 1 Crude Supply



Source: EIA, Morningstar.

New Threat to PADD 1 Economics

The data shows how heavily East Coast refineries still rely on waterborne imports that offer the lowest margins even when alternative transport offers better economics. Although refiners have taken advantage of rail and Jones Act shipments when the economics made sense, these transport alternatives have proved costly for refiners to make long-term commitments to when crude price economics change. The resulting overreliance on imports has consistently made the big three light sweet crude refineries vulnerable to poor margins and meant they underperform compared with rivals elsewhere in the U.S. The collapse of Canadian crude discounts this year has similarly affected PBF's more sophisticated East Coast refineries, presenting a new threat to PADD 1 refinery economics.

In an upcoming note, we'll delve deeper into PADD 1 refining during the first quarter and prospects for the region during the remainder of 2019. ■■■

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