
Heavy Sour Crude Shortage Disrupts IMO 2020 Response

Expected discounts narrow.

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Data Sources for This Publication

U.S. Energy Information Administration

CME Group

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Low-Sulfur Premiums Evaporating

Despite expectations to the contrary, the price premium for clean-burning 0.5% sulfur marine fuel oil and high-sulfur 380 CST bunker fuel at the U.S. Gulf Coast declined steadily from nearly \$11/barrel in early January to less than \$2/barrel during the first week of March, according to Platts data. New regulations by the International Maritime Organization mandate the use of 0.5% sulfur fuel oil by marine shipping in 10 months' time, on Jan. 1, 2020. Last year, that impending requirement widened the spread between low- and higher-sulfur marine bunkers as traders bet that demand for high-sulfur fuels would evaporate in the runup to the new regulation. This note looks at how low-sulfur premiums are evaporating this year in response to a Gulf Coast shortage of heavy sour crude, disrupting shipowners scrambling to comply with the new rules.

Regulations

The regulations coming into force in January 2020 are set to dramatically alter demand for high-sulfur fuel oil and in the process upset refinery economics around the globe. As we explained in an October 2016 note (see [Marine Bunker Deadline to Benefit Refiners and Traders](#)), the IMO regulation is the culmination of a series of standards set in motion in October 2008 that have required vessels operating in certain coastal Emission Control Areas to use lower-sulfur fuel, with a maximum sulfur level of 0.1% since January 2015, while permitting the use of 3.5% sulfur fuel oil outside the ECAs. In less than 10 months, all vessels must transition to a new 0.5% global standard. The regulation leaves shippers facing higher fuel costs or installing expensive scrubber technology. U.S. refiners are expected to benefit from the changes, as are shale producers. Last June we pointed to a bearish market view of heavy fuel oil prices after 2020 reflected in lower forward curve prices at that time (see [Fuel Oil Sulfur Spreads Set to Widen Through 2020](#)).

Analyst reports suggest the IMO changes will require as much as 3 million barrels/day of high-sulfur bunker fuel oil to be replaced by low-sulfur alternatives. According to the International Energy Agency's 2018 five-year oil market outlook, about 30% of that demand will switch to marine gasoil, a middle distillate designed for ship engines, and another 30% will be replaced by new 0.5% low-sulfur fuel oil blends created from existing 1% or less low-sulfur fuels and middle distillates such as ultra-low-sulfur diesel. The remaining 40% of the bunker market is expected to continue using existing high-sulfur fuel blends. Some vessels will use specially installed scrubbers that treat emissions to remove sulfur and other toxins from engine exhaust. A very small number of vessels will be fitted or built to use liquefied natural gas fuel. Others will simply not comply, at least initially, taking the risk that policing on the high seas will be difficult.

Picture Last Year

The consensus at the time of our prior analysis in June 2018 was that high-sulfur fuel oil would be increasingly discounted in the runup to IMO 2020 as demand increased for the more expensive low-sulfur fuel needed to blend compliant bunkers. In turn, the low cost of high-sulfur fuel would encourage more vessel owners to invest in scrubbers to allow them to continue using cheaper noncompliant fuel, justifying their investment through the savings.

At the same time, because heavy sour crudes produce higher fuel oil yields, the relative value of these crudes would decline as the IMO regulation comes into force. This is because refiners that do not have secondary processing capacity will favor lighter low-sulfur crudes that yield less fuel oil and avoid heavier high-sulfur crudes. In other words, the spread between low-sulfur "sweet" and high-sulfur "sour" crudes would widen. That would be good news for U.S. producers as it increases the appeal of very-low-sulfur shale grades. Refiners configured to process heavier crudes into lighter products — especially on the Gulf Coast — would also benefit from cheaper feedstock.

Change of Direction

Since then, fundamental and geopolitical circumstances have changed as follows:

- ▶ Production cuts agreed to by OPEC and partners in November 2018 reduced the supply of medium- and high-sulfur crudes. This precipitated a worldwide shortage of such crudes, with the Gulf Coast subject to lower flows of Middle Eastern high-sulfur crude.
- ▶ Lower heavy crude production in Venezuela and reduced exports to the United States as a result of sanctions against the Maduro regime further reduced sour crude supply to the Gulf Coast.
- ▶ Ongoing sanctions against Iran have reduced that nation's exports of heavy crude, despite waivers issued by the U.S. government that have maintained some Iranian flows to Asia.
- ▶ Production cuts mandated in December 2018 by the province of Alberta reduced the supply of Western Canadian heavy crude to the U.S. market (see our December 2018 note [Alberta Intervenes to Protect Producers](#)).
- ▶ Delays announced March 1 in the completion of Enbridge's Line 3 expansion will reduce Canadian heavy crude supplies to the U.S. by as much as 370 thousand barrels/day expected online at the end of 2019, pushing them to the second half of 2020.

Consequences

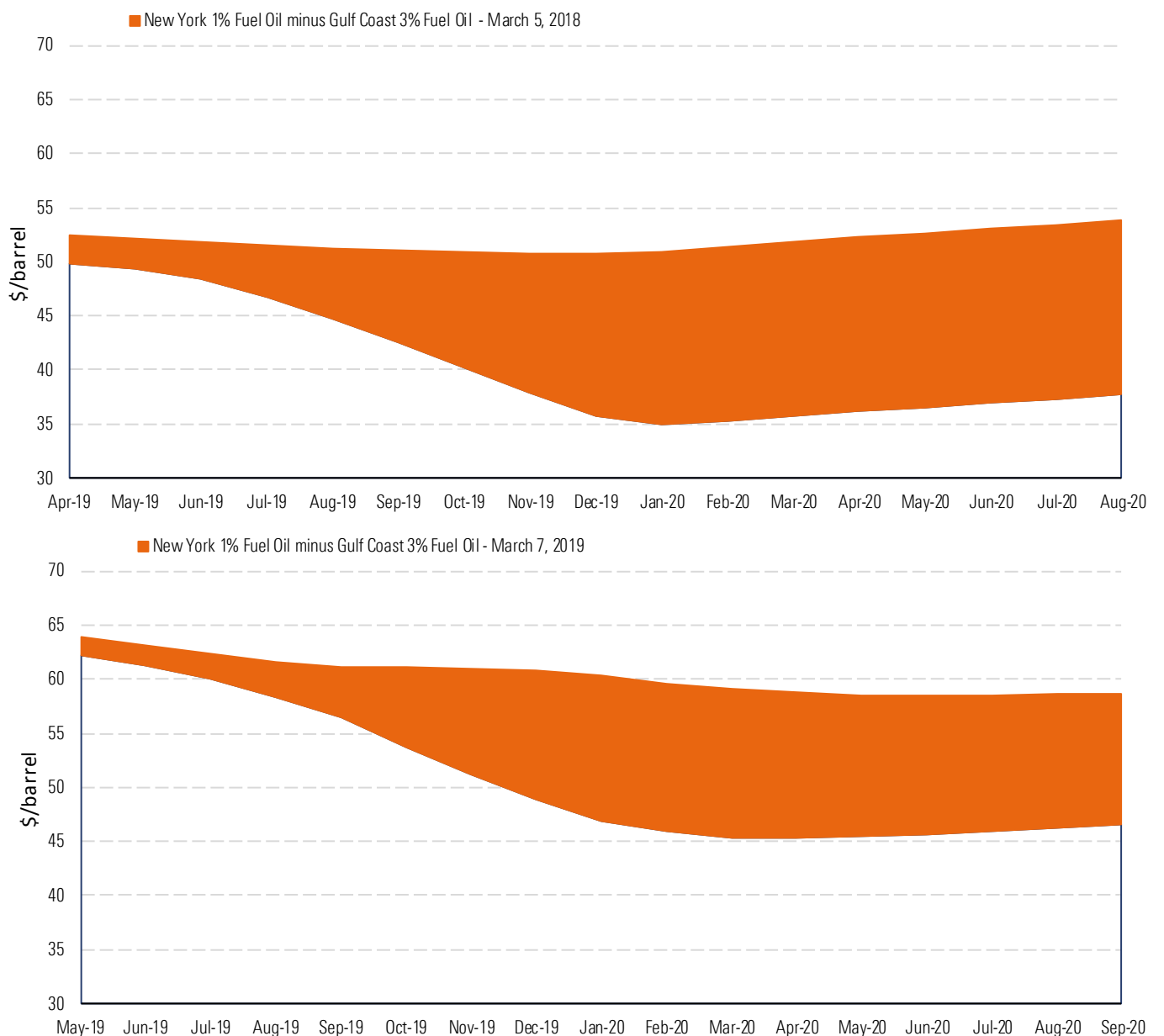
All these factors have combined to push up the value of high-sulfur marine fuel oil relative to low-sulfur fuel and to narrow the premium of light sweet crudes over heavy sour grades at the Gulf Coast. We look next at two examples showing how these changes are affecting the IMO transition.

Fuel Oil Sulfur Spreads

Exhibit 1 shows the change during the past year in U.S. fuel oil sulfur spreads. In the top chart are forward curves for New York 1% fuel oil (top of shaded area) and Gulf Coast 3.5% fuel oil (bottom of shaded area) between April 2019 and August 2020 as of March 5, 2018. The bottom chart shows the same forward curves for the same delivery periods using data for March 7, 2019. The shaded area represents the high-sulfur fuel oil discount during the runup to the IMO change in January 2020 and the

first eight months after the regulations are implemented. A year ago, the forward curve indicated a rapidly widening high-sulfur discount (vertical height of the shaded area) reaching \$15/barrel between April and December 2019, then moving to \$16/barrel in February 2020 and remaining there through August 2020. This year the curves paint a less dramatic picture. The spread stays under \$5/barrel between April and September 2019, widens to \$12.0 in December 2019, widens again to \$13.73 in March 2020, and then narrows to \$12.34/barrel in August 2020. So, the high-sulfur discount now kicks in later than expected and is about \$4/barrel narrower than anticipated a year ago.

Exhibit 1 Fuel Oil Sulfur Spreads 2018 and 2019



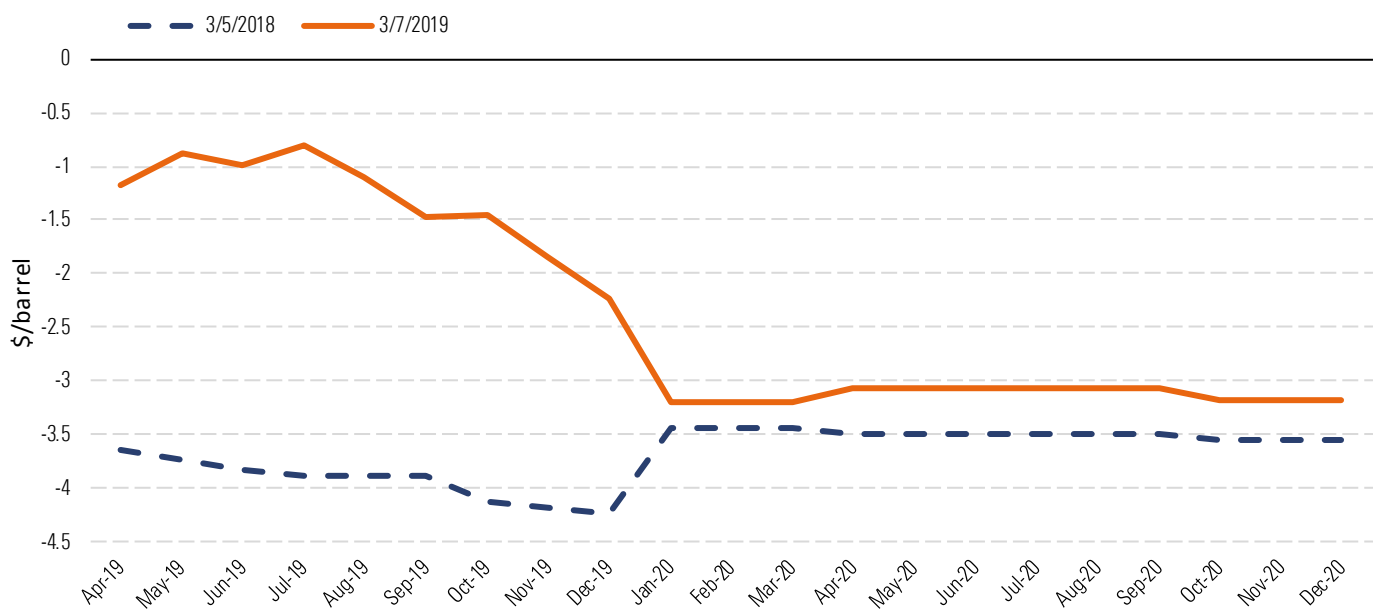
Source: CME Group, Morningstar.

Sweet/Sour Crude Spread

Our second example is forward curves for the spread between Gulf of Mexico Mars crude (a medium-sulfur grade) and Light Louisiana Sweet (a lower-sulfur light sweet grade). This spread is indicative of sweet/sour crude relationships at the Gulf Coast. Historically, Mars traded at an annual average discount to LLS of \$4.95/barrel in 2016 and \$3.30/barrel in 2017 and 2018, according to CME Group data. The normal expectation would be a Mars discount to LLS of about \$3.30/barrel. This year, the average Mars discount to LLS narrowed to \$1.54/barrel between January 2 and March 7 because of the shortage of high-sulfur crude at the Gulf Coast.

Exhibit 2 shows the spread curves as of March 7, 2019 (orange line), and a year ago on March 5, 2018 (dashed blue line). Both curves cover delivery periods April 2019 to December 2020 during the IMO transition. The curve in March 2018, before the heavy crude shortage emerged, indicates the Mars discount to LLS widening from \$3.64/barrel in April to \$4.24/barrel in December 2019, then narrowing to about \$3.50/barrel in January, where it remains for the balance of 2020. The recent March 2019 curve is far more volatile. The Mars discount is \$1.18/barrel in April, narrowing further to \$0.80/barrel in July before widening out to \$2.23/barrel in December 2019. In January 2020, the discount widens again to \$3.20/barrel and then stays fairly level, averaging \$3.13/barrel for the balance of 2020. The pattern of the March 2019 curve shows the high-sulfur crude shortage disrupting the previously expected widening discount for Mars but that the two curves merge in 2020 at levels close to the historical \$3.30/barrel Mars discount to LLS.

Exhibit 2 Mars Discount to LLS Forward Curve 2018 and 2019



Source: CME Group, Morningstar.

Ongoing Disruption

Our analysis indicates that the Gulf Coast shortage of high-sulfur crude is narrowing traditional discounts for heavy sour material and overturning market expectations that high-sulfur fuel oil values would be experiencing heavy discounts during the runup to IMO. The forward curves do show the market trying to revert to the expected case—where sulfur spreads are wide and sour crudes less valuable than light sweet alternatives. However, the current heavy crude shortage has damped the impact of the runup to IMO and could well continue to upset expectations during the remainder of 2019. In an upcoming analysis, we will review the implications of these changes for shipowners. ■■

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