
Quality and Location Count for WTI Contracts

Houston futures specifications differ.

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Data Sources for This Publication

U.S. Energy Information Administration

CME Group

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Battle of the Exchanges

A month ago, we detailed the array of new light sweet domestic crude assessments popping up from price reporting agencies and futures exchanges for deliveries at the Gulf Coast due to growing shale deliveries to Houston and export markets (see our October note "[Houston, We Need A Contract](#)"). In that analysis, we touched on the importance of crude quality to refinery buyers. That quality issue is coming to the fore in the battle for contract supremacy between CME Group and ICE in Houston. This note takes a closer look at quality issues in the domestic light sweet crude market and how they influence pricing and delivery.

Unexpected Contaminants

Complaints about crude quality generally come from refiners purchasing feedstock that damages their refinery because it turned out different from what they expected. Crude is a naturally occurring raw material made up of hydrocarbon components, so variety is the rule rather than the exception. No two crudes are alike, and the output from each well varies in quality over time. Geological strata produce similar grades of crude that are gathered together and marketed as one stream with a common range of quality specifications. Refiners understand this and expect to have to handle quality variations between deliveries. However, they justifiably get upset when the quality of the delivered crude changes significantly from previous purchases or contains unexpected contaminants that damage equipment. And because unprocessed crude has no value except to refiners, producers and shippers ignore buyer needs at their peril.

Dumbbell Crude

Generally, the quality of delivered crude from a basin is more consistent if it travels from the wellhead to the refinery without being mixed with other grades. Problems arise when crudes from different regions are comingled in a pipeline or when they are stored en route at trading hubs where the storage is not segregated, leading to a deterioration in quality. Potentially worse consequences ensue when shippers blend two or more crudes in storage to meet a higher-value specification. A classic example of this type of blending is when a shipper with storage at Cushing, Oklahoma, blends light shale with heavy Canadian crude to make a West Texas Intermediate crude lookalike. Traditionally, such a blend could be delivered to a customer in Cushing as WTI (often in fulfillment of a short futures position) because it met the CME Nymex WTI futures contract specifications. Those specifications used to only require testing the sulfur and API gravity characteristics of the crude. In this case, a refiner processing the crude it thought was WTI, which normally produces a high yield of transport fuels, would instead get a limited distillate fraction as well as large yields of very light fractions (propane, butane) and residual fuel oil,

known as a dumbbell crude. The refined product value of such a blend is lower than expected, and contaminants from the heavy components could damage refinery equipment.

Stringent Tests

Quality concerns such as these have increased in the domestic market since 2011 as larger volumes of heavy Canadian crude made their way south to Cushing from Western Canada and shale output began to flood Midwestern inventories due to a lack of pipelines to the Gulf Coast. After much discussion and complaints from refiners, CME Group and the Crude Oil Quality Association created a Domestic Sweet Monitoring Program Subcommittee to analyze and publish data on the current quality of WTI in 2016. The committee recommended—and CME and Cushing terminal operators Enterprise and Enbridge agreed to—a new set of tests that tighten the specification for domestic sweet crude deliverable against the Nymex futures contract in Cushing. These new specifications, announced in December 2017, will come into force for deliveries from January 2019 onward and regulate the level of contaminants like vanadium, nickel, carbon residue, and total acid number as well as the balance of light and heavy components to middle distillates. These new tests go a long way toward improving the quality of domestic light sweet crude at Cushing.

Houston Needs

However, the new Nymex specifications don't meet the needs of WTI buyers in Houston, who prefer to purchase unblended crude delivered straight from production fields in West Texas rather than potentially tarnished barrels delivered via Cushing. We know this because the delivery specifications set up in the new CME Houston WTI contract that began trading Nov. 5 are tighter than for the new Cushing WTI. Exhibit 1 shows the specifications for CME Nymex alongside CME Houston as well as the competing new ICE Permian Houston contract launched Oct. 22. The CME Houston spec requires lower maximum sulfur levels as well as lower vanadium and nickel levels compared with Cushing. That means barrels that pass muster for Cushing delivery won't always be welcome at the Enterprise ECHO terminal in Houston, which is the default delivery point for CME Houston WTI.

Exhibit 1 Light Sweet Crude Futures Delivery Quality Specifications

	ICE Permian WTI	CME Houston WTI	CME Cushing WTI
API gravity	36-44	40-44	37-42
Sulfur %	0.45	0.275	0.42
RVP	9.5	9.5	9.5
BS&W	<1%	<1%	<1%
Viscosity	N/A	Max 60	N/A
Pour Point	N/A	Max 50	Max 50
Carbon Residue %	N/A	Max 2.4%	Max 2.4%
TAN Acid	N/A	Max 0.28	Max 0.28
Nickel	N/A	Max 4 ppm	Max 8 ppm
Vanadium	N/A	Max 4 ppm	Max 15 ppm
Distillation			
Light End distillation (by mass)	N/A	N/A	19% MAX
50% volume distillation (temp reached)	N/A	N/A	470F-570F
Vacuum Resid (by mass)	N/A	N/A	16%

Source: CME Group, ICE, Morningstar

Segregation

To meet the tighter CME Houston specification, Enterprise will provide segregated tanks in Cushing and Houston and ship crude from Cushing to Houston in segregated batches to prevent WTI field-quality crude (as well as crude from other basins such as the Bakken, Niobrara, and Anadarko) from mixing with other crude streams en route to Houston. Enterprise also delivers direct from the Permian to Houston via its Midland to Sealy pipeline, meaning it can deliver barrels that haven't been through Cushing tanks. This effort is underway in part to meet refiner demand but also to match the competing ICE Permian WTI futures contract that requires delivery into the Magellan East Houston terminal. The ICE contract is linked to Magellan's pipeline tariff specification for its Longhorn and BridgeTex pipelines from the Permian to its East Houston terminal. So, although the ICE specifications are less detailed than those of CME Houston or Cushing, the only crude deliverable comes from the Permian direct, ensuring consistent quality.

Contract Performance

Because these quality specifications are important to buyers not just in the domestic market but also overseas, they will influence how well the new Houston exchange contracts perform. Exhibit 2 summarizes price, volume, and open interest for these exchange contracts since the end of October. The comparison includes the CME Group WTI Houston Argus financial swap (symbol HTT), as this is the current preferred forward instrument that both ICE and CME seek to replace with their new futures contracts. The ICE Permian contract has been trading since Oct. 22 and seen reasonable volumes so far—an average of 317 contracts/day between Oct. 22 and Nov. 5 and total open interest of 809

contracts on Nov. 5. These volumes are small compared with the CME WTI Houston Argus swap — also based on deliveries to Magellan East Houston — which had volume of 1,605 contracts and 132,365 open interest on Nov. 5. Both these contracts are dwarfed by CME Nymex Cushing volume that regularly tops 1 million contracts/day volume and 2 million contracts open interest. The CME Houston contract has only been trading for a week but has started slower than ICE Permian, with volume of 26 contracts and open interest of 21 on Nov. 5, falling to a volume of 3 contracts and open interest of 21 contracts on Nov. 8.

Exhibit 2 Houston WTI Futures Performance

Date	CME Argus HTT (absolute)			ICE Permian HOU			CME Houston HCL		
	Settle (Dec 18)	Total Volume	Open Interest	Settle (Dec 18)	Total Volume	Open Interest	Settle (Jan 19)	Total Volume	Open Interest
Oct 22 2018	76.09	240	143,438	76.08	466	347			
Nov 5 2018	69.61	1605	132,365	69.84	43	803	69.62	26	21
Nov 8 2018	67.26	2205		67.42	291	895	67.32	3	21

Source: CME Group, ICE, Morningstar

Implications

Based on limited data so far, the ICE Permian WTI futures contract has been more successful than its CME rival, although it doesn't appear to have made a dent in existing CME Argus Houston WTI swap volumes. The implication is that the market prefers crude delivered direct from the Permian to Magellan's East Houston terminal. In this context, the CME effort to make specifications for its Houston WTI contract more stringent than its Cushing contract has apparently failed to satisfy refiners. This conclusion is tentative at best because futures contracts usually take months or even years to gain market acceptance before they succeed.

Meantime, the build-out of pipeline infrastructure connecting terminals, refineries, and export docks in Houston continues as midstream companies anticipate a flood of new crude pipelines headed to the Gulf Coast in 2019 and 2020. The increased connectivity of these distribution systems adds to the chances of crude contamination and quality degradation. Added to the list of projects last week was Magellan and Navigator Energy Services' joint venture Voyager pipeline between Houston and Magellan's East Houston terminal. If built, Voyager would carry upward of 250 thousand barrels/day of light sweet crude from Cushing that likely originates in the Rockies and Anadarko basins into Magellan's East Houston terminal, requiring segregation to prevent degradation of Permian barrels. Expect to hear more about the crude quality issue as the Houston and export crude markets evolve. ■■

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