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Argus White Paper:

WCS at Cushing: The emerging US trading center for Canada's heavy sour crude

Spot trade of Canada's Western Canadian Select (WCS) crude at Cushing, Oklahoma, has grown rapidly, reflecting both increased production in Canada and expanding pathways for getting Canadian heavy to Cushing. Spot values for WCS at Cushing have become the most transparent and accessible indicator of value for heavy Canadian crude in the US Padd III/Gulf coast region. This is due to extensive storage at Cushing, which allows for both the segregation of WCS as a discrete crude stream and the accumulation of surplus WCS needed for an active spot market to work.

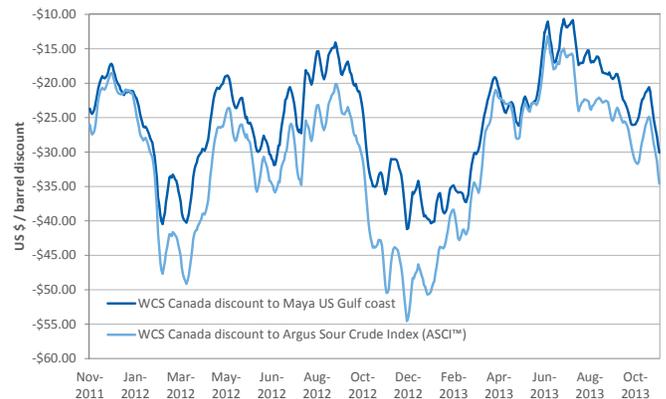
Since beginning to assess the Cushing spot market for WCS in June 2012, Argus has seen the volume of reported WCS spot trade at Cushing expand dramatically. Companies are actively using the spot WCS price assessment in supply contracts. And in November 2013 ICE launched the Argus WCS (Cushing) Crude Oil Future to allow for hedging of this important new market.

WCS at Cushing is trading side-by-side with US financial benchmark WTI. In the US markets, Argus is the primary index for domestic crude spot market, term contract and derivative market transactions. Argus LLS is the largest swap market for US crude and the Argus Sour Crude Index (ASCI™) is the sour benchmark for coastal imports. Argus WTI Midland swaps have become a key reference and hedging tool for sweet crude in Texas markets. Argus WCS at Cushing joins this group as an important indexation tool. The growth of WCS at Cushing means that Cushing is now the one of the few locations where the industry can see the heavy/light spread clearly represented with differences of timing and location removed. As with all Argus physical crude assessments in North America, the Argus WCS Cushing price will reflect the entire day of trade and therefore align with the Argus methodology that has been accepted by industry for many years.

Western Canada's price disadvantage

Canadian heavy crude has historically cleared the market at prices significantly lower than crudes of similar quality in the US Gulf Coast market. Limited pipeline connections to the Pacific Coast or beyond Padd II to the east and south have reduced the value Canadian crude can achieve (see chart). WCS at 3.5pc sulphur and 20°API is nearly identical in quality to Mexico's Maya crude, but its inability to reach the US Gulf coast has often forced WCS at Hardisty to sell at discounts

WCS FOB CANADA DISCOUNT TO GULF COAST SOUR CRUDE (5 DAY MOVING AVERAGE)



of up to \$40/bl to Maya. Its discount to the Argus Sour Crude Index™ (ASCI™), which represents a lighter blend of coastal sour crudes, has reached nearly \$55/bl.

As a result, moving crude to the US Gulf has been a long-term goal of western Canadian producers. Cushing is now the first stop for WCS, and the next stop will no doubt be another spot market soon to emerge in the Houston area.

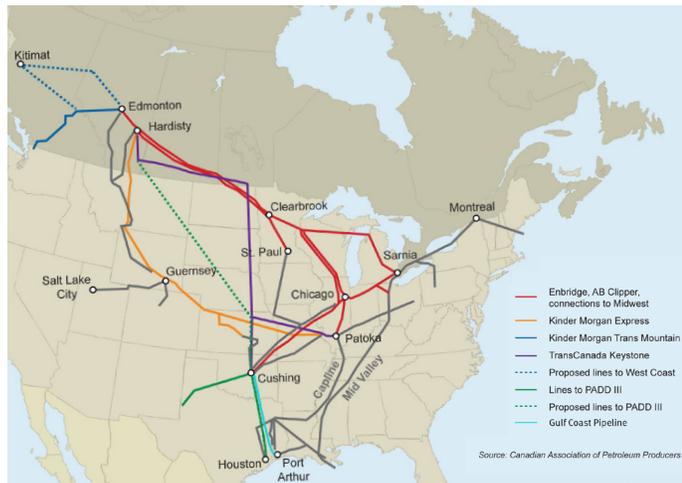
Why is a spot market for WCS at Cushing significant?

The emergence of a spot market for WCS at Cushing allows producers to realize value in Padd III, within a short pipeline transit to US Gulf refineries. The reversed Seaway pipeline and the TransCanada Gulf Coast Pipeline project are removing impediments in transporting WCS at Cushing to the US Gulf coast, and more Canadian crude is pouring into Cushing. The startup of Enbridge's 585,000 b/d Flanagan South, the addition of 105,000 b/d of capacity to Enbridge Spearhead, and other pipe and rail projects will further increase the access of WCS to Cushing by mid-2014.

From Cushing, WCS crude has ready access to the Houston and Texas City refining complex via the 400,000 b/d Seaway pipeline, jointly owned by Enterprise Products and Enbridge. The Seaway pipeline, which is to be expanded to more than 800,000 b/d in mid-2014, has

connections to Enterprise's 750,000 bl ECHO terminal. The 700,000 b/d Gulf Coast Project pipeline by TransCanada, scheduled for early 2014, will allow WCS from Cushing to move into the 22mn bl Sunoco Logistics terminal at Nederland, Texas.

Cushing is a logical location for a spot market to emerge due to its storage infrastructure and its status of the WTI benchmark hub. The ease of in-tank transfers at Cushing support repeated spot trade, and



US Gulf refiners no longer worry about access to pipeline space for moving their spot purchased crude quickly to their refinery gates.

How does the market trade?

The way in which WCS at Cushing currently trades may change as it adapts to the US trading conventions used by the crudes with which it competes. At present, most WCS at Cushing trades are done at a differential to the Calendar Month Average (CMA) of CME's light sweet crude contract. The grade trades most heavily during the informally recognized Canadian trade month, which runs from the first day of the calendar month through the day prior to Enbridge's "notice of shipment" nomination deadline. This informal harmonization with the trade of WCS at its blending center of Hardisty, Alberta, appears to be driven by the fact that most early participation in the Cushing WCS market has been by Canadian producers and marketers.

Increasing participation in the new WCS Cushing market by US-based refiners and traders may shift the timing and other market practices. Eventually WCS at Cushing should align with a US pipeline scheduling month and trade at a differential to the concurrent WTI month not a calculated CMA. Argus remains committed to reflect markets as they trade, and we will be monitoring this fast-emerging market as it adapts.

Will WCS continue to be the Canadian heavy benchmark?

WCS is a blend produced by just four companies, and the prospects for adding new producers are complicated by the internal rules set in place to compensate each producer for its contributions to the blend. WCS has enjoyed success as a benchmark because the producers — Cenovus, Suncor, Canadian Natural Resources and Talisman — have committed to keeping the quality of the blend tightly controlled. The grade is a blend of 19 existing Canadian heavy conventional and bitumen crude oils blended with sweet synthetic and condensate diluents. It was launched in December 2004 with volumes of approximately 250,000 b/d. It is blended at the Husky Hardisty terminal.

Refiners, especially in Padd II, have long experience running the WCS blend, and are familiar with its yield in their facilities. The deep participation in the WCS market has led to significant forward trade at Hardisty and to the development of swaps and futures contracts. Bilateral over-the-counter WCS swaps can be cleared on CME's ClearPort or by NGX. Futures contracts for WCS are available on both CME and ICE. The growth of these contracts has been somewhat limited by the fact that they are settled on broker indices that represent subsets of the spot market. But these nascent paper markets are more developed than for any other heavy Canadian grade. And since WCS is the alternative barrel to the emerging heavy, high TAN (acidic) crudes, these grades have tended to trade at a differential to WCS.

All of these factors seem to support the continued benchmark role for WCS in western Canada, and by extension in all markets where western Canadian crude is sold. WCS has a good chance of becoming a heavy sour benchmark across North America: in Canada, the US midcontinent and in time the US Gulf coast.



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