

# W | C | H

## Producer Hedging the Production of Heavy Crude Oil

An oil producer sells its future production of heavy crude oil to a customer at an agreed-upon price today. The producer seeks to lock-in this price to protect against an adverse price movement between the time the price is agreed upon (today) and the time the heavy crude oil will be produced and delivered in three weeks. The price of one barrel of heavy crude oil (specifically, Western Canadian Select or WCS) is quoted in the market at US\$10.00 below the price of West Texas Intermediate (WTI).

Since Canadian crude oil is priced at a differential to WTI, the producer is exposed to the risk of large fluctuations in the price differential between heavy crude oil and light crude oil. Specifically, if the price differential widens, the producer's profitability and cash flow will be adversely impacted. So, the producer is looking to lock-in the price differential between WCS heavy crude oil and WTI light crude oil to hedge the production of heavy crude oil.

The producer can use Canadian Heavy Crude Oil Differential Price futures (or WCH DIFF futures) and WTI Light Crude Oil futures (or WTI futures) to hedge efficiently the production of heavy crude oil.

### Backdrop Scenario

	TODAY	IN THREE WEEKS
Price of the WTI futures	US\$70.00	US\$66.00
WCS WTI differential price (the NGX WCS WTI Crude Oil Index represents the price differential between WCS and WTI)	-US\$10.00  Note: WCS is priced US\$10.00 per barrel lower than WTI.	-US\$16.00  Note: WCS is priced US\$16.00 per barrel lower than WTI.
Implied price of one barrel of WCS	US\$60.00	US\$50.00

### Strategy

ACTION	TODAY	IN THREE WEEKS	REMARKS
<b>Step 1 – Hedge the price of one barrel of WCS</b>	Sell WTI futures @ US\$70.00	Buy WTI futures @ US\$66.00	Producer closes out the position in WTI futures.  Note: there is no delivery of WTI crude oil as the position is closed before the expiration of the WTI futures.  <b>Profit = +US\$4.00</b>
Implied price of one barrel of WCS (producer's inventory of heavy crude oil resulting from future production)	US\$60.00	US\$50.00	Loss as a result of the price drop of one barrel of WCS heavy crude oil.  <b>Loss = -US\$10.00</b>

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ACTION	TODAY	IN THREE WEEKS	REMARKS
<p><b>Step 2 – Hedge the basis risk between heavy crude oil and light crude oil</b></p> <p>Producer sells WCH DIFF futures @ -US\$10.00 or US\$90.00 as per the quotation method of 100 + the NGX WCS WTI Crude Oil Index for the WCH futures contract</p> <p>Note: the NGX WCS WTI Crude Oil Index is the underlying index of the WCH DIFF futures</p>	Sell WCH DIFF futures @ US\$90.00	Buy WCH DIFF futures @ US\$84.00	<p>Producer closes out the position in WCS DIFF futures.</p> <p>Note: The producer sells WCH DIFF futures to hedge the basis risk between heavy crude oil and WTI light crude oil.</p> <p><b>Profit = +US\$6.00</b></p>
<b>Net profit/loss</b>			<p><b>Net profit/loss = US\$0.00</b></p> <p>(resulting in a fully hedged position)</p>

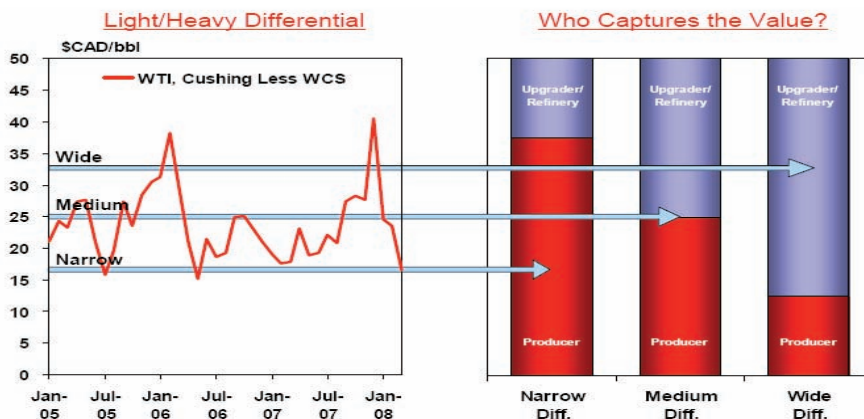
Therefore, the producer’s strategy to sell the WTI futures contract (to hedge the price of one barrel of WCS) combined with the sale of the WCH DIFF futures contract to hedge the basis risk (specifically, to hedge against a widening of the price differential between one barrel of WTI and one barrel of WCS) results in an efficiently hedged position.

Had the producer not used the WCH DIFF futures contract, he would have suffered a loss of US\$6.00 per barrel. The loss is explained by the fact that the WTI futures contract does not account for the basis risk between heavy crude oil and WTI light crude oil. Therefore, the producer is faced with an additional risk that is not covered by using only WTI futures contracts. To hedge the basis risk (price differential), a producer must sell WCH DIFF futures contracts as well.

In this scenario, regardless whether the price of WTI or WCS rises or drops, the producer’s motivation for initiating the transaction is to hedge against the risk of a widening of the price differential between WTI and WCS.

As shown in the following figure, a widening of the differential generally leads to poorer profitability for Canadian heavy oil producers and a narrowing of the differential generally leads to poorer profitability for oil refiners. Therefore, both producers and end users have a price risk to manage that would be mitigated using the Canadian Heavy Crude Oil Differential Price futures contract (WCH).

**FIGURE 1: FINANCIAL IMPACT OF THE PRICE DIFFERENTIAL BETWEEN LIGHT AND HEAVY CRUDE OIL FOR PARTICIPANTS**



Source: Petro Canada