

Notes at the Margin

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Oil Price War 3.0

Economic collapse often has the character of a cumulative process. Let it go beyond a certain point, and it will tend for a time to gain strength from its own development as its effects spread and return to intensify the process of collapse. Because no great strength would be required to hold back the rock that starts a landslide, it does not follow that the landslide will not be of major proportions.

Milton Friedman and Anna Schwartz, *A Monetary History of the United States*¹

I have used this Milton Friedman/Anna Schwartz quote many times. The first occasion was in 1981 in a piece titled “Markets Poised for a Major Collapse.” The late Halsey Peckworth, editor of Platts’ *Oilgram Price Report*, liked it so much he ran it in the May 6 issue. This marked one of the few times Platts has published a signed article by an outsider.

Of course, my prediction of a price decrease was premature. OPEC cobbled together an agreement to hold prices stable in 1981. It did so again in 1982. Prices then began to slide even though Saudi Arabia, as swing producer, allowed its exports to fall to almost zero. Prices finally took the plunge but it happened five years after I suggested it would. The obvious message for me was to never put a date and a number on the same piece of paper.

Saudi Arabia learned a different lesson: do not accept gradual cuts in output and income and attempt to sustain prices above market-clearing levels without all OPEC

members and other oil-exporting countries cooperating.

Saudi officials also found that compromising on output volumes did little good. Prices did not recover to 1985 ranges until 2000 because the Kingdom kept making concessions over most of that period.

Saudi Arabia’s actions in 1998 and 1999, however, displayed a boldness not seen before. As prices weakened during the Asian debt crisis, the Saudis declined to cut production. Instead, when Venezuela suggested it might produce at a maximum rate, the Kingdom indicated it would do the same. Prices plummeted and were only restored after Mexico, Oman, Norway, and the other OPEC members joined Saudi Arabia in reducing output.

Mexico actually brokered the 1999 deal. A *Wall Street Journal* article by Steve Liesman (now with CNBC) and three others featured this headline: “Crude Cuts: Will Oil

¹ See Milton Friedman and Anna Schwartz, *A Monetary History of the United States: 1867-1960* (Princeton, NJ: National Bureau of Economic Research, Princeton University Press, 1963), p. 419.

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Nations Stick or Stray from Agreement?"²

As the authors noted,

Mexico, not a member of OPEC, doesn't really want to engage in production cuts or cartel agreements. But it was the measure of the government's concern with the low price of oil that Mexico not only came to the table with OPEC but *acted as a broker for the agreement* [emphasis added].

Even Russia agreed to cut production almost two percent, although few observers believed this would happen.³

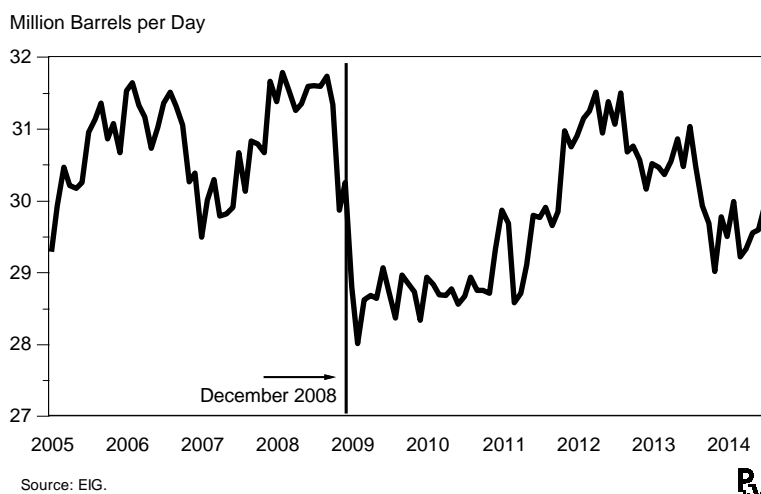
This scenario repeated in December 2008 in the midst of the global financial crisis. An OPEC meeting that month went almost unnoticed despite crude oil prices having dropped from a peak of \$125 per barrel six months earlier to \$30. At its conference, the organization decided to cut output three million barrels per day and tried to get Russia on board for a modest cut. The latter refused to act, though, unless prices remained at \$30.⁴

As the data reveal, these reductions were made. Figure 1 shows that OPEC crude output declined from 30 million barrels per day in December to 28 million barrels per day in February and then began to rise. All members participated in the cuts. Saudi production alone dropped eleven percent from 2008

to 2009 (see Table 1, page 3). Kuwait accepted a larger reduction of sixteen percent, while Venezuela escaped with just a three-percent cutback

Given this background, one can understand why Saudi Arabia would be reluctant to respond to falling prices on its own. Saudi officials may be particularly concerned with the situation in Asia, where they confront

Figure 1
OPEC Monthly Crude Oil Production, 2005 to 2014



heightened competition due to supply increases from West Africa, Russia, and even Alaska in the United States. These new supplies are arriving just as growth in Asian consumption is declining.

The Saudis may also be worried about the rise in Canadian exports. A special analysis published by Platts Friday indicated that Canadian heavy crudes are beginning to

² Steve Liesman, Daniel Perl, Joel Millman and Thomas T. Vogel, Jr., "Crude Cuts: Will Oil Nations Stick or Stray from Agreement?," *The Wall Street Journal*, March 26, 1999 [<http://goo.gl/kXa9co>].

³ Youssef M. Ibrahim, "Oil Countries Approve World Cutback of 3%," *The New York Times*, March 24, 1999.

⁴ "OPEC Offers Record Cut, But Few Details," *Petroleum Intelligence Weekly*, December 22, 2008 [<http://goo.gl/Zcr5ju>].

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push Saudi oil from US Gulf Coast refineries. The completion of a new Enbridge pipeline along with other changes have resulted in some refiners buying less Saudi crude. In some cases, they can acquire Canadian oil at discounts as high as \$25 per barrel.⁵

Under these circumstances, it appears the Saudis need to take steps if they do not want to lose market share. Their usual approach has been to offer refiners competitive prices. The problem with this method, of course, is that African crudes, especially Bonny Light, have moved into the Asian market, forcing the Saudis to offer larger and large discounts.

Whether these price cuts will be sufficient remains to be seen. The gross product worth calculated by the Energy Intelligence Group for Bonny Light and Arab Light at Singapore refineries suggests the African crude is worth between \$6 and \$8 per barrel more to refiners there depending on their facility's configuration.⁶ This difference is more than enough to offset the higher cost of transporting African crude to Asia as well as the slightly higher price. The variance, shown in Figure 2 (page 4), likely explains the \$3 per barrel decrease in the Saudi price for Arab Light.

Recent actions by Saudi Arabia and other Middle Eastern countries suggest they will maintain their efforts to beat off attempts by Africans, Americans, and Canadians to capture their market. The only way they can do this is to let prices fall. Crude prices may have to drop below \$50 per barrel for a sustained time to force other producers to shut in output. For example, prices

Table 1. Production Cutbacks Made by Individual OPEC Members from 2008 to 2009 (Million Barrels per Day)

	2008 Output	2009 Output	% Change
Saudi Arabia	8,931	7,948	(11.0)
Iran	3,798	3,557	(6.3)
Iraq	2,278	2,335	2.5
Kuwait	2,410	2,026	(16.0)
UAE	2,326	2,238	(3.8)
Qatar	843	733	(13.0)
Neutral Zone	533	472	(11.5)
Venezuela	2,742	2,672	(2.6)
Nigeria	1,946	1,770	(9.0)
Libya	1,727	1,474	(14.6)
Algeria	1,356	1,219	(10.1)
Angola	1,881	1,774	(5.7)
Ecuador	501	430	(14.2)
Total OPEC	31,271	28,648	

Source: EIG.

might need to remain at or below such levels for months or even a year or two to convince investors to abandon projects in Canada.

However, the efforts to preserve market share have a cost. A lead article in *Petroleum Intelligence Weekly* asserts that OPEC will lose the price war with US shale:

While shale economics are rapidly improving, OPEC's budgetary requirements are only getting more onerous. On paper, the 12 member states need an average of more than \$100/bbl to balance their budgets, a major change from just a few years ago, when only the most profligate spenders needed a triple-digit oil price. Almost all OPEC members need an oil price of \$90/bbl or more, according to Mideast investment bank APICORP, while 60% of the budgets require well over \$110/bbl, thanks to a mix of war, sanctions and financial mismanagement. Back in 2010, the average breakeven price was

⁵ Josh Brown and Philippe Casey, "Rising Canadian Volumes to US Threaten Saudi Imports," *Platts Global Alert*, October 10, 2014.

⁶ Gross product worth (GPW) reflects the value of products produced from a crude less the refining costs.

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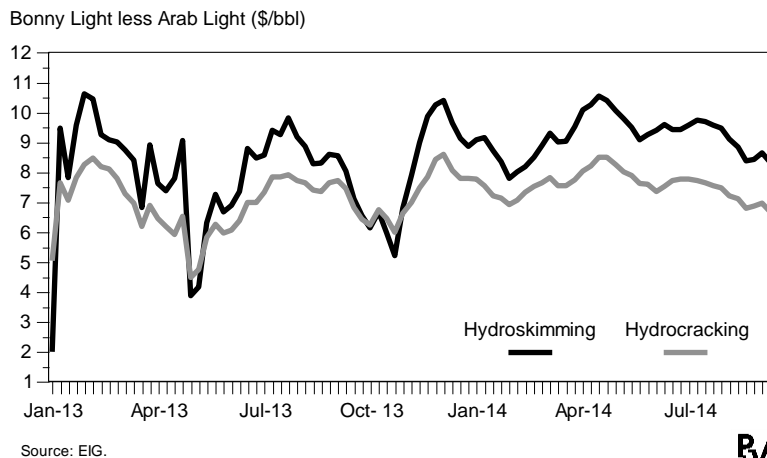
\$77/bbl, and none of the 12 members needed a price even near \$100/bbl.⁷

The authors add that a price below \$85 would start to hurt OPEC producers. They also note that the members are used to running deficits or tapping foreign exchange reserves but fail to discuss the implications.

Examining the available data suggests their conclusion that OPEC would lose the price war is probably incorrect, especially if it allows prices to sink as it did in the past four price cycles. Specifically, the organization's leading members have foreign exchange reserves sufficient to withstand a prolonged price decline of as much as seventy-five percent, which would take prices to \$25 per barrel.

Table 2 (page 5) presents data to support this conclusion. There we show the OPEC members and other leading exporters in the first column. In Column 2, we show the most recent estimates of foreign exchange reserves for each country (in millions of dollars). Columns 3 and 4 show the volume and dollar value of exports. We calculated the volumes from recent production and consumption data and the export value comes from OPEC's statistical annual. For non-OPEC countries such as Russia, we estimate

Figure 2
Difference in GPW between Bonny Light and Arab Light at Singapore Refineries, Weekly Data, 2013 to 2014



the volumes of oil and natural gas exports (the latter in oil equivalents).

Column 5 is the critical column. Here we present estimates of the oil price each country needs to balance its budget. Our source for this is an October 10 *Wall Street Journal* article.⁸ For the non-OPEC exporters we insert our own estimate. For Russia, for example, we relied on our work earlier this year on the implications of lower oil prices on the Russian economy.⁹ In the case of Mexico, we noted that oil plays a vastly diminished role in the nation's economy. Oil now accounts for sixteen percent of the nation's exports, whereas it accounted for sixty percent in 1998. For the other countries, we made rough calculations.

The final three table columns show the days of coverage from foreign reserves that

⁷ Why OPEC Will Lose Price War with US Shale," *Petroleum Intelligence Weekly*, October 13, 2014.

⁸ Benoit Faucon, Sarah Kent, and Summer Said, "Oil Price Slump Strains Budgets of Some OPEC Members," *The Wall Street Journal*, October 10, 2014 [<http://goo.gl/Cq2pxm>].

⁹ "A Meaningful Response to Russian Aggression," *Notes at the Margin*, March 3, 2014.

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Table 2. Estimated Coverage of Government Budget Deficits from Foreign Exchange Reserves for OPEC Countries and Certain Key Non-OPEC Nations

	Foreign Exchange Reserves (\$ Million)	Oil Exports (000 Barrels per Day)	Estimated Oil Export Revenue (\$ Million)	Breakeven Price (Dollars per Barrel)	Coverage Days at \$75 per Barrel	Coverage Days at \$50 per Barrel	Coverage Days at \$25 per Barrel
Saudi Arabia	745,851	6,575	377,013	93	6,302	2,638	1,668
Iran	68,060	598	98,870	140	1,751	1,265	990
Iraq	71,240	2,450	89,765	106	938	519	359
Kuwait	34,350	2,356	115,015	75		583	292
UAE	58,040	2,127	379,490	70		1,364	606
Qatar	43,486	433	136,840	65		6,695	2,511
Venezuela	21,150	1,623	89,175	121	283	184	136
Nigeria	39,581	1,430	95,118	119	629	401	294
Libya	120,900	430	40,723	90	18,744	7,029	4,326
Algeria	192,500	814	65,644	121	5,141	3,331	2,463
Angola	37,940	1,600	68,191	98	1,031	494	325
Ecuador	2,400	348	25,700	117	164	103	75
Saudis w/Higher Exports	745,851	7,575	377,013	93	17,205	10,912	7,990
Russia	454,240	11,165	407,526	100	1,627	814	542
Mexico	193,374	480	17,520	10			
Norway	62,237	1,359	118,904	50			1,832
Kazakhstan	27,790	1,150	41,975	100	967	483	322
Oman	17,700	850	38,615	70		1,041	463

Note: Russian exports include natural gas volumes converted to million barrels per day.

Sources: Reserves – IMF; Export Volumes – OPEC, BP *Statistical Review of World Energy*, US EIA; Export Revenues – OPEC, PKVerleger LLC; Breakeven Price – *WSJ* (see text).

countries can use to meet budgets assuming prices fall to \$75, \$50, and \$25 per barrel. For example, Saudi Arabia's reserves could cover the deficit for six thousand three hundred days if prices fell to \$75 assuming the country does not boost output. We also show in the table how many days of coverage Saudi Arabia would have if it boosted exports one million barrels per day. We calculate that its foreign reserves would last seventeen thousand days in that case.

Even if prices to fall to \$25, Saudi financial reserves would last over one thousand days at current output levels and eight thousand days if output increases. The concerns expressed by *PIW* can be dismissed regarding Saudi Arabia.

Venezuela has a problem, though, as does Iraq. The former's financial reserves will last fewer than three hundred days if prices drop to \$75 and fewer than 140 days if they fall to \$25. Not surprisingly, the Venezuelan foreign minister (and long-time oil minister) Rafael Ramirez called Friday for an emergency OPEC meeting.¹⁰

There will be no meeting. The fight for market share has become a bare knuckle affair. The countries with reserves and production capacity are moving to secure markets for their output, not just for 2015 but for the next decade. Prices will be allowed to decline until some producers have to cut production or shut down.

Many observers believe the prime candidates for shutdown are high-cost shale oil

¹⁰ "Caracas Calls for Emergency OPEC Meeting," Argus Media, October 10, 2014 [http://goo.gl/ekAz2p].

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producers in the US. Low prices are equally likely, however, to disrupt production from countries such as Venezuela, Nigeria, or Canada. The low-cost Middle East producers have said nothing and in truth they probably do not care. One can only be sure that Marquess of Queensbury rules do not apply.

We can postulate several ways to end the price war.

Russia could offer to cut output. Other producers would welcome this but few would believe it.

Oil workers could strike and effectively shut down Venezuela's oil industry permanently. A 2002 walkout by workers seriously disrupted world oil markets. A strike today, though, would have no effect because Middle Eastern producers would fill the gap. Since 2002, the Venezuelan government has taken great care to avoid unrest. Workers are pampered. However, the country's collapsing economy could claim the oil industry.

Low oil prices might exacerbate tensions in Nigeria. Civil war and strikes disrupted production in 2007 and 2008. A similar occurrence today would help stabilize global oil prices.

Prolonged low prices could force part of Canada's oil sands industry to close. Canadian crude is already seriously discounted to Middle Eastern crude. Production would slow or even stop if world prices fall to \$50 per barrel. Six months of low prices could exterminate the Canadian shale oil business.

Low prices could also temporarily disrupt development in the US Bakken, Permian Basin, and Eagle Ford shale fields. Low prices would accomplish this but only briefly. The US business is discrete. Capital costs per unit of output are

low and labor inputs high. Such businesses can be stopped quickly when prices fall and restarted equally quickly when prices rise. Shale is the source of incremental supply.

Expect oil volumes from non-OPEC sources and fringe OPEC producers such as Venezuela to decline significantly as prices drop. The falloff in production will allow Middle Eastern producers to preserve their market in Asia and restore prices to between \$80 and \$100 per barrel.

The price war has been precipitated by the global economic slowdown, which has cut use, and the success of US entrepreneurs. Declining consumption growth and increased non-OPEC supply have forced the world's low-cost producers (Kuwait, UAE, Iran, and Saudi Arabia) to act. At this point, their best option seems to be keeping their customers happy and letting prices fall to the point where the weakest producers are forced out.

The BBC television game show "The Weakest Link" offers a preview of things to come. On the program, participants vote off one contestant after another until one remains. In the oil game, look for the under-financed, high-cost producers to be pushed out.

The losers may include some high-cost US shale producers who have borrowed heavily in the high-yield (junk) bond markets. Last week, Fitch reported that the high-yield borrowings of high-cost US producers had risen from \$9 billion in 2009 to \$75 billion in 2014. Much of this debt will never be repaid.

Figure 3 (page 7) compares oil price movements in the three previous collapses. The data are monthly with observations centered on the month with the lowest prices.

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The 1985-1987 and 1997-1999 episodes are graphed against the left axis and the 2007-2009 episode against the right. From the graph, one can see that the declines and recoveries were roughly identical.

The current collapse also appears in the graph. The data suggest the market will hit bottom in March at \$30 per barrel. This is not a forecast. We only note that March and \$30 are consistent with past collapses.

We conclude with three observations. First, this is a war without rules. Middle Eastern producers will have maintained or increased market shares when the battle ends.

Second, the high-cost producers, particularly Venezuela and Canada, are at the greatest risk. Russian companies may be vulnerable, as well. The price war will end when some of those firms close.

Third, the major Middle Eastern producers have sufficient financial reserves to outlast the other countries and every company. Their strategy will work if they stick to the battle plan. The first indication of their intention to stay the course will come next week when they respond to Venezuela's call for an emergency OPEC meeting. If they decline to attend, we will know they do not intend to let up now.

Figure 3
Monthly Oil Prices during Three Price Collapses and in 2014

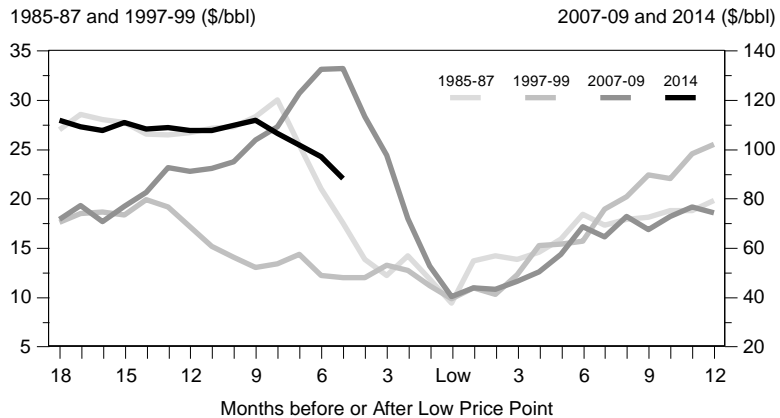
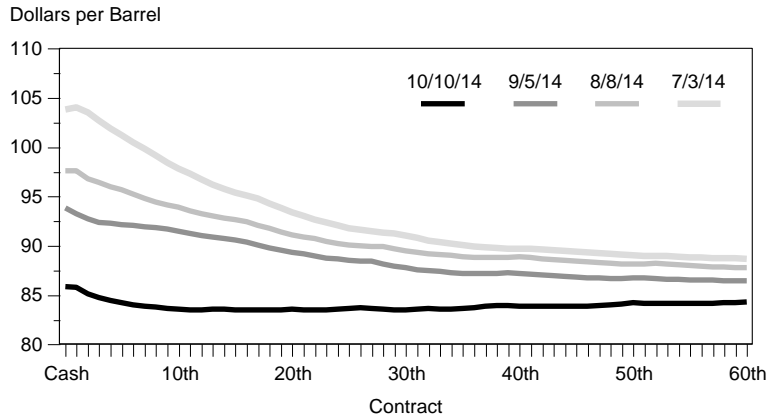


Figure 4
WTI Forward Price Curve from July to October 2014



Market Implications

The forward price curve for WTI has shifted steadily toward contango from backwardation over the last four months. Friday, the backwardation had almost vanished, as Figure 4 above shows. The graph presents the forward price curve for the first Friday in

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July, August, September, and October. The flattening is obvious.

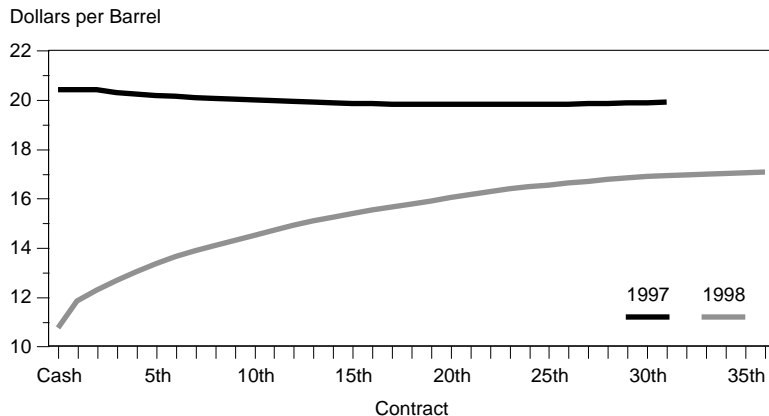
This type of movement is often observed in commodity markets as the supply-and-demand situation shifts from tightness to surplus. In the case of oil, it was clearly visible in 1997 and 1998.

In preparing this week's report, we examined the curve's shift from the date contango was last observed to the date prices reached their nadir. Contango was last observed in WTI on May 9, 1997, weeks before the Asian financial crisis began with the collapse of Thailand's currencies. WTI prices hit bottom on November 25, 1998, at \$10.84 per barrel. (Brent fell further and reached its lows in early 1999.)

Figure 5 compares the forward price curves on the two dates. Cash prices declined fifty percent over the period. Three-year-forward prices fell only sixteen percent.

Figure 6 shows what could happen to the WTI forward price curve in 2014 and 2015 should the pattern be observed again. Now, as we are always advised, "past performance is no indication of future returns." We present this curve here to suggest what might happen if the price war described above continues until production is cut back.

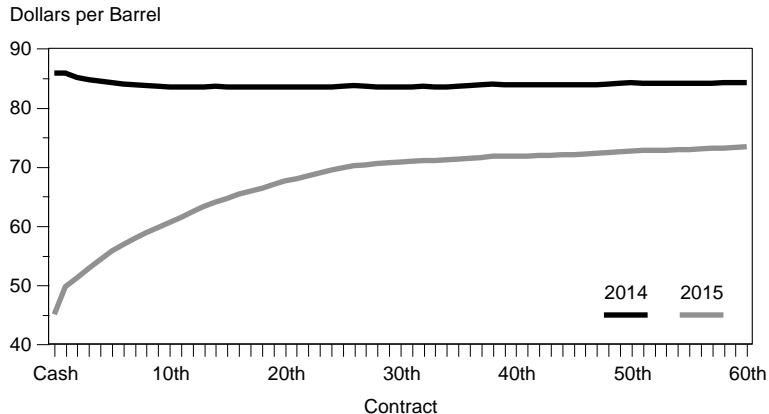
Figure 5
WTI Forward Price Curve on May 9, 1997
and November 28, 1998



Source: PKVerleger LLC.



Figure 6
WTI Forward Price Curve on October 10, 2014,
and a Date in 2015 Should the 1997-98 Example Apply



Source: PKVerleger LLC.



In this illustration, cash WTI decreases to \$45 per barrel, while forward prices fall to around \$72. Such declines would have important implications for North American crude production. Forward oil at \$72 would probably provide sufficient incentive to maintain activity in the Bakken, Eagle Ford Shale, Julesburg, and Permian Basin shale

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fields. Production increases would be smaller, but activity could go on, especially if firms continue to roll their forward hedges.

One must add that inventory balances in the United States would need to change dramatically for the contango shown in Figure 6 to occur. Cushing tanks would need to fill, among other things. Cushing tanks were full in 1998 when WTI dipped below \$11 per barrel. At the time, traders explained that one shipper had to pay \$2 per barrel to store one hundred thousand barrels moved from the Gulf to Cushing when the arranged storage capacity suddenly became unavailable. The shipper sold the oil at a steep discount rather than pay the charge.

For Cushing tanks to fill, storage charges to rise, and contango to materialize today, inventories would have to rise almost sixty million barrels.¹¹ Such an increase would be consistent with a developing a price war. The battleground could easily become the US Gulf if Middle East producers adjust discounts for their heavy crude oils to keep them competitive with exports from Canada. Canadian oil would then arrive at Cushing and sit, waiting for buyers as outright prices fell.

Should cash WTI fall to \$45 per barrel, as shown in Figure 6, activity in Alberta would come to a standstill. West Canada Select (WCS) trades at a discount to WTI of \$10 to \$20 per barrel. Canadian producers would receive between \$25 and \$35 should WTI prices decrease as illustrated. Much if not all Canadian heavy production would

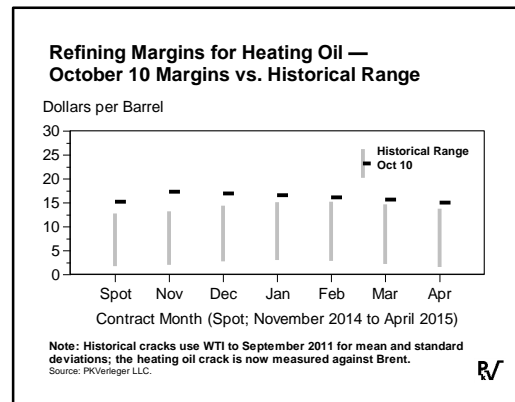
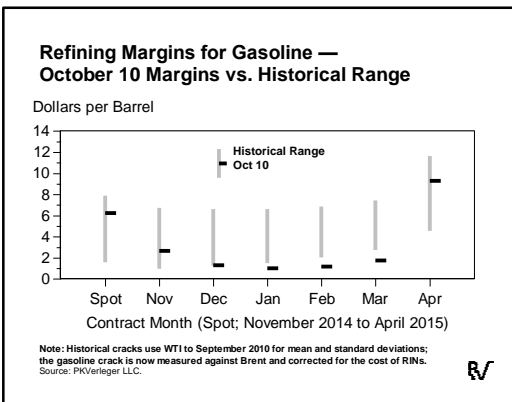
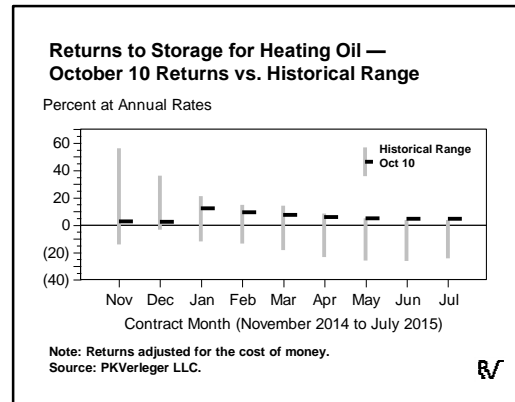
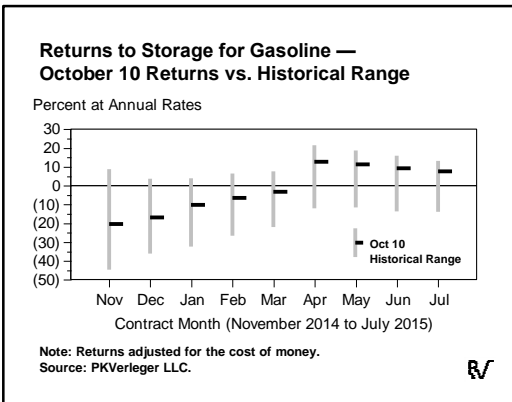
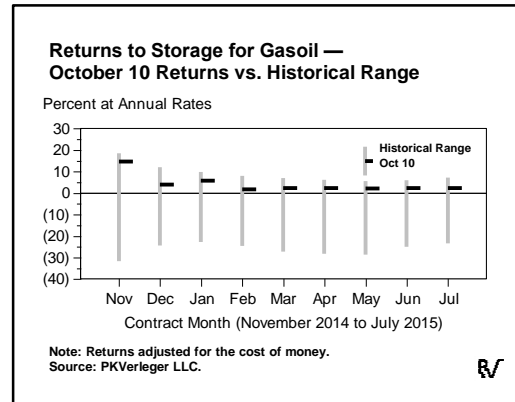
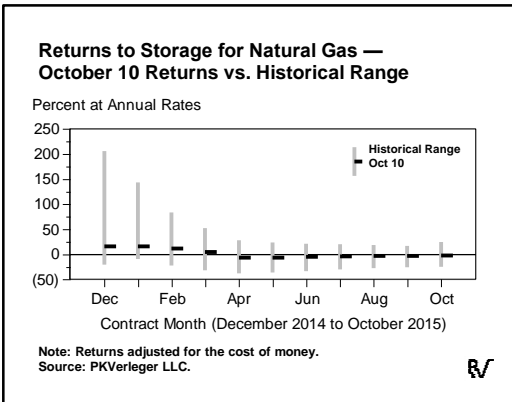
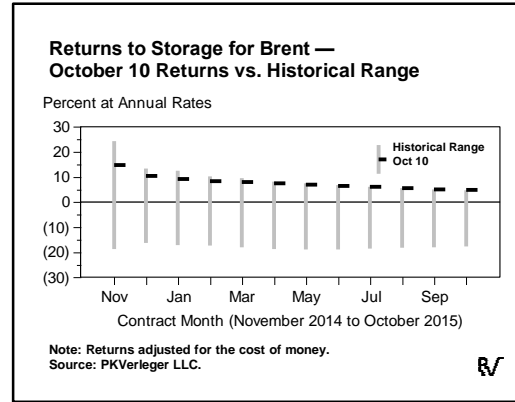
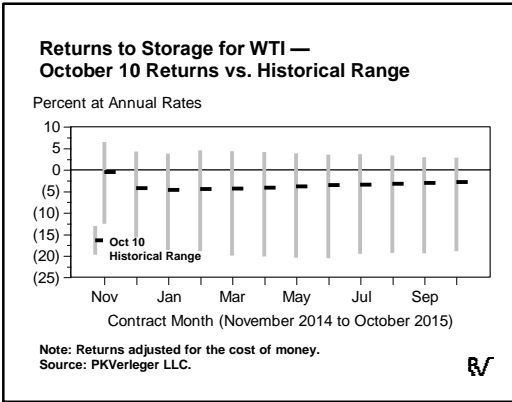
probably shut in this case, and the shut-downs would be long term.

Canada today is a net exporter of 1.8 million barrels per day and this volume is expected to rise. Canadian exports to the US have reached 3.2 million barrels per day, according to the most recent weekly data from the US Department of Energy, with heavy Canadian oil moving south offset by light crude exports from the Bakken delivered to refiners in Eastern Canada.

As noted, WTI at \$45 per barrel would almost certainly terminate Canada's heavy crude production. Perhaps this is the primary goal of Middle Eastern producers. Perhaps they want to turn Calgary back into a ghost town. They may well succeed.

¹¹ Cushing storage capacity is now estimated to be eighty million barrels; current stocks are reported to be around ten million barrels.

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Table 3. Returns to Storage for Crude, Products, and Natural Gas — Second Week of October vs. Prior Week and Second Week of October in Prior Years (Percentage at Annual Rates)

	<u>Current</u>	<u>Last Week</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>
<u>Gasoline</u>							
December	(16.8)	(27.6)	(6.2)	(29.8)	(23.7)	(18.2)	3.8
January	(10.2)	(20.0)	(5.0)	(27.0)	(20.1)	(11.2)	9.0
February	(6.4)	(15.2)	(3.0)	(21.5)	(17.0)	(6.1)	11.6
March	(3.2)	(11.4)	(1.1)	(16.4)	(14.4)	(2.7)	13.0
April	12.8	3.7	10.6	(4.4)	(5.2)	8.2	26.3
<u>Distillate</u>							
November	2.8	(0.0)	(0.2)	(5.7)	15.8	9.7	8.2
December	2.6	0.1	(0.3)	(6.9)	5.6	10.0	12.8
January	12.3	1.5	(0.3)	(1.1)	(0.3)	0.3	0.4
February	9.3	1.0	(0.4)	(1.4)	(0.5)	0.5	0.6
March	7.5	0.5	(0.6)	(2.8)	(3.1)	8.0	15.1
<u>Gasoil</u>							
November	14.7	9.8	(0.6)	(14.6)	(16.5)	33.8	20.9
December	4.0	7.0	(2.2)	(14.8)	(16.1)	17.2	19.3
January	5.8	6.2	(2.7)	(13.5)	(14.7)	11.7	19.1
February	1.7	2.8	(3.1)	(12.4)	(13.7)	9.8	18.3
March	2.3	3.1	(3.4)	(11.8)	(13.0)	8.5	16.4
<u>WTI</u>							
November	(0.5)	0.8	1.4	(0.1)	(6.7)	(1.0)	(6.7)
December	(4.2)	(4.7)	0.8	2.5	(2.0)	5.1	(0.2)
January	(4.6)	(6.2)	(0.3)	3.6	(1.0)	6.8	2.9
February	(4.4)	(6.6)	(1.4)	4.2	(0.4)	7.1	4.6
March	(4.3)	(6.7)	(2.6)	4.4	(0.2)	7.1	5.4
<u>Brent</u>							
November	14.8	14.9	4.5	(0.7)	4.5	4.7	17.0
December	10.5	12.0	(1.2)	(6.4)	(8.1)	4.3	14.8
January	9.2	10.3	(3.2)	(6.7)	(10.8)	5.2	14.0
February	8.4	9.2	(4.1)	(6.7)	(11.0)	5.3	13.5
March	8.0	8.6	(4.6)	(6.7)	(11.1)	5.4	13.3
<u>Natural Gas</u>							
January	16.4	11.9	31.9	54.8	52.9	112.0	147.5
February	11.7	8.2	22.5	38.1	37.8	76.3	99.7
March	5.4	2.2	15.7	25.5	26.1	51.5	69.5
April	(6.5)	(9.9)	9.1	16.8	19.8	38.0	51.8
May	(6.6)	(9.7)	8.4	15.0	18.4	33.4	44.2

Note: "Current" = October 10, 2014. All returns to storage are adjusted for the cost of money.

Source: PKVerleger LLC.

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Table 4. Open Interest for Crude, Products, and Natural Gas — Second Week of October vs. Prior Week and Second Week of October in Prior Years (Number of Contracts)

	<u>Current</u>	<u>Last</u> <u>Week</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>
<u>Gasoline</u>							
Total	298,157	284,231	241,892	286,408	273,047	274,915	195,715
November	78,885	93,244	73,981	75,652	57,076	58,459	73,473
December	75,936	59,590	75,411	88,291	65,187	80,967	39,424
January	38,642	31,456	34,064	44,774	39,159	41,766	28,158
February	18,585	17,496	13,030	19,857	15,890	15,262	8,702
<u>Distillate</u>							
Total	396,146	381,817	292,012	325,911	296,657	320,956	309,283
November	88,134	101,415	70,302	80,759	62,067	64,563	57,670
December	72,647	61,089	59,005	77,624	63,716	83,290	62,002
January	51,882	40,950	48,481	44,224	43,351	56,464	41,436
February	35,647	35,647	28,064	22,894	21,950	18,535	20,606
<u>Gasoil</u>							
Total	476,966	650,730	568,950	610,043	553,119	674,079	567,711
November	159,555	154,761	168,534	130,972	112,138	154,844	108,787
December	115,935	95,408	119,946	144,414	82,098	126,972	93,312
January	65,683	53,513	51,864	67,310	52,462	84,686	57,408
February	27,828	25,740	34,687	33,384	41,843	42,037	27,275
<u>WTI</u>							
Total	1,521,755	1,502,986	1,851,040	1,571,534	1,429,641	1,476,288	1,249,906
November	165,329	252,017	195,808	163,807	108,514	140,915	240,606
December	271,342	236,863	327,648	293,607	330,762	382,370	245,184
January	145,828	104,465	141,715	149,372	170,944	157,512	109,864
February	49,929	46,045	64,572	65,714	59,731	64,092	43,244
<u>Brent</u>							
Total	1,480,810	1,461,215	1,588,015	1,219,458	891,806	823,405	742,153
November	129,564	249,704	133,966	73,842	13,835	9,260	92,620
December	345,026	321,854	348,512	280,560	222,050	280,666	228,863
January	214,562	142,287	197,456	167,658	115,326	150,664	79,698
February	71,129	61,126	66,526	65,363	74,333	79,709	35,411
<u>Natural Gas</u>							
Total	923,963	927,874	1,248,238	1,201,793	981,566	800,490	705,201
November	157,915	206,861	165,074	179,595	129,263	118,665	154,057
December	99,757	95,440	124,549	131,507	119,547	116,531	72,153
January	161,236	134,243	230,950	248,584	229,842	157,648	93,072
February	51,441	50,355	46,213	42,985	69,086	50,275	32,153

Note: "Current" = October 10, 2014.

Source: PKVerleger LLC.

October 13, 2014

Table 5. Gasoline Cracks – Second Week of October vs. Prior Week, Prior Month, and Second Week of October in Prior Years (\$/bbl)

	<u>Current</u>	<u>Last Week</u>	<u>Last Month</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>22-Year Average</u>
Spot	6.22	11.66	12.74	0.86	11.07	7.55	8.61	2.13	4.84
November	2.67	5.74	6.69	(0.33)	6.88	3.96	2.09	2.49	3.94
December	1.31	2.94	3.92	(0.11)	4.57	4.09	4.95	2.61	4.05
January	1.02	2.00	1.96	0.41	4.04	4.49	4.80	3.18	4.19
February	1.17	1.96	1.09	1.42	4.44	4.98	5.19	3.72	4.56
March	1.75	2.39	1.06	2.70	5.72	5.81	5.64	4.27	5.16
April	9.29	10.03	1.54	9.75	12.46	10.94	9.94	9.04	8.45
Average	3.35	5.25	4.14	2.10	7.03	5.98	5.89	3.92	5.03

Note: "Current" = October 10, 2014. Gasoline cracks measured against Brent from 2010 with RIN cost removed.

Source: PKVerleger LLC.

Table 6. Heating Oil Cracks – Second Week of October vs. Prior Week, Prior Month, and Second Week of October in Prior Years (\$/bbl)

	<u>Current</u>	<u>Last Week</u>	<u>Last Month</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>22-Year Average</u>
Spot	15.23	19.01	18.42	16.76	20.96	12.69	11.21	5.09	7.58
November	17.32	17.57	17.99	16.19	20.78	13.66	7.42	6.05	7.93
December	16.98	17.17	17.46	16.91	20.91	15.73	12.03	6.68	8.87
January	16.63	16.84	17.03	17.55	20.70	16.79	12.55	7.39	9.37
February	16.15	16.35	16.68	18.13	20.22	17.06	12.71	6.80	9.39
March	15.65	15.79	16.22	18.47	19.54	16.86	12.32	7.33	8.92
April	15.03	15.18	15.56	18.47	18.69	15.73	11.95	7.52	8.13
Average	16.14	16.84	17.05	17.50	20.26	15.50	11.46	6.69	8.60

Note: "Current" = October 10, 2014. Heating oil cracks measured against Brent from 2011.

Source: PKVerleger LLC.