

BAKER & O'BRIEN INCORPORATED

U.S. REFINING MARGINS DECLINE—BUT REMAIN STRONG IN PADDs 2, 4

Special Topic: How is Expanding U.S. Production Affecting Waterborne Crude Oil Imports?

Houston, February 6, 2013

Baker & O'Brien, Inc.'s fourth quarter 2012 (12Q4) release to *PRISM*¹ subscribers reflects a decline in average U.S. refining margins in all PADDs versus 12Q3. However, overall margins were still good by historical standards, and remain especially strong in PADDs 2 and 4. Average cash margins across all PADDs declined by about \$4/Bbl. (See adjacent table). In comparison to the year ago 11Q4 period, when many U.S. refiners reported near breakeven margins, the 12Q4 period was much better. Only PADD 5 average margins remained virtually unchanged for the two periods.

PRISM Cash Margins vs. Previous Periods, \$/Bbl.

	<u>12Q4 vs. 12Q3</u>	<u>12Q4 vs. 11Q4</u>
PADD 1	-3.49	+5.09
PADD 2	-4.52	+12.57
PADD 3	-3.14	+4.55
PADD 4	-3.60	+9.93
PADD 5	-5.77	-0.13
U.S. Overall	-4.04	+5.70

The observed margin decline between 12Q4 and 12Q3 was largely the result of reduced crack spreads experienced in most markets. For example, the U.S. Gulf Coast (USGC) Louisiana Light Sweet (LLS) 321 crack spread declined by more than \$8.50/Bbl. between these periods. (See table below). At the same time, the benchmark light-heavy crude oil price spread (LLS-Maya) *increased*

by over \$4.50/Bbl., providing USGC coking refineries with a more typical margin advantage over simpler cracking facilities. During 12Q3 coking and cracking refineries had operated almost at parity. The 12Q4 USGC

Key Refining Margin Metrics, \$/Bbl.

	2013	2012	2012	2012	2011
	<u>Jan.</u>	<u>Q4</u>	<u>Q3</u>	<u>Annual</u>	<u>Annual</u>
WTI	94.25	88.09	92.11	94.16	95.05
LLS	112.16	109.43	109.40	111.72	112.28
Brent	112.63	110.02	109.61	112.58	112.28
LLS – Maya	14.49	16.55	11.90	12.14	13.62
USGC LLS 321*	4.55	5.54	14.26	9.81	7.12
USGC LLS 6321**	2.94	4.18	11.34	7.58	4.24
Chicago WTI 321***	17.78	28.65	37.51	29.24	25.35

*LLS deemed conversion to 67% conventional 87R gasoline and 33% ULSD

**LLS deemed conversion to 50% conventional 87R gasoline, 33% ULSD and 17% Fuel Oil (1% S)

***WTI deemed conversion to 33% conventional 87R gasoline, 33% RBOB and 33% ULSD

LLS price of \$109.43/Bbl. was about \$0.60/Bbl. below that of North Sea Brent—this compared to a \$0.20/Bbl. discount in 12Q3 and a \$0.14/Bbl. premium for all of 2012. This reflects gradual

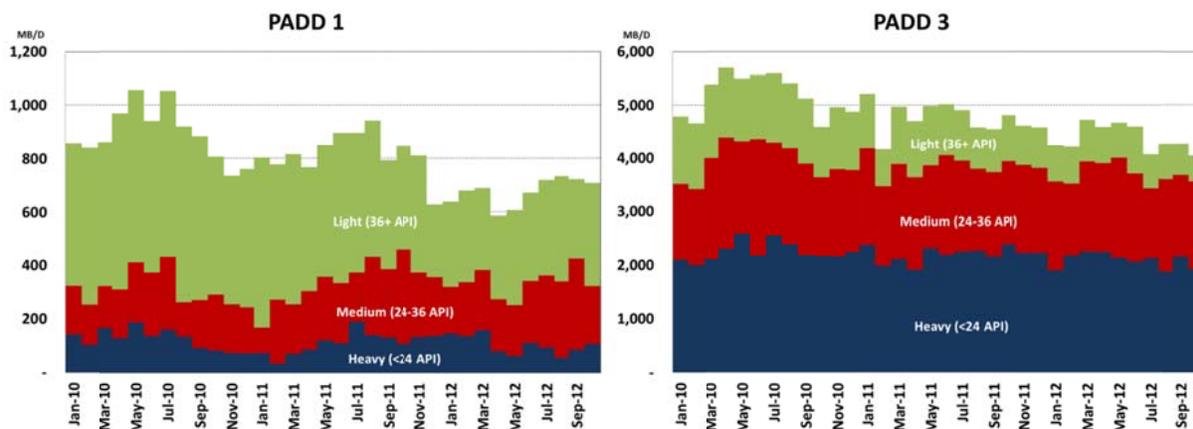
¹ *PRISM*TM is Baker & O'Brien's refinery modeling and database system that includes operational and economic performance details for refineries in the U.S., Canada, Europe, and Asia.

downward pressure on the benchmark LLS price as more domestic light sweet crude oils find their way to USGC refineries.

Increasing U.S. production of “light tight oil” (LTO) has been headline news over the past two years. As LTO production grows, waterborne imports of comparable quality crude oils will gradually be displaced. Such displacements will alter the historical price relationships between domestic and imported crudes (e.g., LLS vs. Brent). The quality of the displaced crudes, and the pace of their displacement, will determine the potential price distortions that result.

The two graphs below show the trends in waterborne crude oil imports into PADDs 1 and 3 over the last three years. From 2010 to late 2012, PADD 1, the largest importer of light sweet crude oils, saw a decrease in such imports of about 250,000 barrels per day (B/D). However, as has been widely reported, there was no meaningful presence of domestic LTOs in the Northeast until 12Q4. Therefore, with the exception of the latter period, most of the observed decline in waterborne imports is attributable to a net reduction in operable refining capacity (including temporary closure of the Trainer facility and permanent closure of Sunoco’s Marcus Hook facility). As of October 2012, approximately 385,000 B/D of imported light crude oils were still being processed in PADD 1 refineries—more than one-half of the total PADD 1 imports of 700,000 B/D. However, imported light crude oil volumes into PADD 1 can be expected to decline considerably in the future as the result of additional rail infrastructure (for the movement of LTOs from the Mid-Continent) and the greater utilization of Jones Act vessels (to transport LTOs from the USGC to PADD 1).

Waterborne Crude Oil Import Trends to PADDs 1 and 3



Source: U.S. DOE/EIA

Total waterborne imports to PADD 3 were slightly over 4 million B/D in October 2012, down from a peak of approximately 5.7 million B/D in early 2010. Although there were declines in imports of all crude oil grades, light crude oils were most pronounced, consistent with the increases in domestic LTO production. Light crude oil imports declined by approximately 800,000 B/D over the two-year period. Such imports in October 2012 were only approximately 500,000 B/D.

Thus, in little more than two and one-half years, waterborne light crude oil imports into the U.S. have declined by more than one million B/D. This is approximately equal to the increase in U.S.

production during the same period.² As of October 2012, the volume of light imported crude oils east of the Rockies stood at approximately 875,000 B/D. This included both “long-haul” imports (from the North Sea and North and West Africa), as well as “short-haul” imports (from Canada, Mexico, Colombia, and Venezuela). As U.S. domestic production of LTO increases and more domestic infrastructure is developed, it is highly likely that virtually all long-haul imports of light crudes will eventually be displaced. Following that, competition will intensify between domestic LTOs, light short-haul grades, and longer-haul crudes of medium and heavier quality. Ultimately, the price level for lighter grades at coastal refineries will have to decline further to encourage competing grades to seek other markets. The discount of LLS to Brent is expected to increase, benefitting a greater number of U.S. refiners.

About Baker & O’Brien

Baker & O’Brien is an independent professional consulting firm specializing in technology, economics, and management practice for the international oil, gas, chemical, and related industries. With offices in Dallas, Houston, and London, the firm focuses primarily on the downstream industry and assists clients with strategic studies, mergers and acquisitions, and technology evaluations. The firm also provides expert services to support insurance claims, investigate operating incidents, and support a wide range of commercial disputes in the energy industry.

About PRISM

Baker & O’Brien’s *PRISM* software is used to perform detailed analysis of individual refineries and the refining value chain from crude oil load port to products truck rack. The system combines a large historical database with a robust refinery simulator to provide analytical support to competitive assessments, strategic planning, crude oil valuation, and delivered cost of supply. The *PRISM* database currently includes operational and economic performance details for all refineries in the U.S. and Canada, most refineries in Europe, and over 50 refineries in the Asia Pacific region. The *PRISM* system is available for license and is used in consulting assignments for Baker & O’Brien clients.

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² This is not an exact barrel-for-barrel displacement, since there are other factors at play, including pipeline imports of Canada, varying refinery throughput rates, and inventory effects.