

BAKER & O'BRIEN  
INCORPORATED

Contact: Benjamin F. Schrader  
832-358-1453  
[ben.schrader@bakerobrien.com](mailto:ben.schrader@bakerobrien.com)

**U.S. REFINING MARGINS DECLINE AS MID-CONTINENT CRUDE OIL AND LIGHT/HEAVY DIFFERENTIALS NARROW**

**Will Jones Act Ships Play a Larger Role Supplying the U.S. Northeast?**

*Houston, March 1, 2012*

Baker & O'Brien, Inc.'s fourth quarter (Q4) 2011 release to *PRISM*<sup>TM1</sup> subscribers reported a significant cash margin<sup>2</sup> decrease from the previous quarter, in every PADD. Margins in PADDs 2 and 4 dropped considerably more than the rest, largely due to the narrowing of the West Texas Intermediate (WTI) price discount that coincided with the announced reversal of the Seaway Pipeline. Flat year-to-year cash margin results for the United States (U.S.), as a whole, masked improvement in the Midwest and Rocky Mountains, and declines in PADDs 1, 3, and 5.

**PRISM Cash Margins vs. Previous Periods (\$/Bbl.)**

	<b>11Q4 vs. 11Q3</b>	<b>11Q4 vs. 10Q4</b>
<b>PADD 1</b>	-2.90	-0.81
<b>PADD 2</b>	-14.88	+4.25
<b>PADD 3</b>	-4.38	-1.18
<b>PADD 4</b>	-13.54	+8.88
<b>PADD 5</b>	-2.75	-2.94
<b>U.S. Overall</b>	<b>-6.50</b>	<b>+0.11</b>

In Q4, inland refineries processing WTI priced crude oil continued to enjoy above-average margins, due to discounted Mid-Continent crude oil pricing. However, in early 2012, refined product prices in Chicago and the greater PADD 2 area were significantly below prices in the U.S. Gulf Coast (USGC). For example, in January, gasoline in Chicago was approximately 13 cents per gallon (¢/Gal.) below the USGC, and in February that differential rose dramatically to average about 30¢/Gal. Similar differentials were noted for diesel. These lower product prices eroded part of the otherwise advantageous margins due to crude oil price discounts. At present time, Chicago gasoline pricing has returned to parity with the USGC, but diesel remains heavily discounted.

Coking refinery margins during Q4 declined considerably with the narrowing of the light-heavy crude oil price spread. The price of Maya crude oil, which is the de facto benchmark for USGC heavy crude oil, is based on a pricing formula that has had to be adjusted extensively with the collapse of WTI prices in early 2011, and the subsequent partial recovery in November 2011. However, the amount of new coking capacity being placed into service, together with modest

---

<sup>1</sup> *PRISM* is Baker & O'Brien's refining database system that models the operational and economic performance details for all of the refineries in the U.S.

<sup>2</sup> Net Cash Margin (Refinery EBITA), US\$/Bbl. of input.

growth in heavy oil production, is likely to continue to limit coking margins over the medium term, particularly in PADD 3.

**Key Refining Margin Metrics, \$/Bbl.**

	<b>2012</b>	<b>2011</b>	<b>2010</b>	<b>2011</b>	<b>2010</b>
	<b>Jan</b>	<b>Q4</b>	<b>Q4</b>	<b>Annual</b>	<b>Annual</b>
LLS crude price	110.80	<b>110.80</b>	89.54	112.33	82.83
LLS – Maya	4.74	<b>7.42</b>	13.68	13.66	12.59
USGC LLS 321*	9.35	<b>3.21</b>	8.05	6.15	8.21
USGC LLS 6321**	7.06	<b>1.44</b>	1.08	2.86	2.13
Chicago WTI 321***	13.60	<b>19.31</b>	9.43	25.55	10.11

\* 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

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

**U.S. Jones Act Fleet: A Potential Source of Incremental Products Supply to U.S. Northeast?**

Recent refinery closures in the U.S. Northeast and Virgin Islands have prompted questions about replacement supply sources and associated product price impacts. One “seemingly obvious” source of supply is USGC refineries, many of which are now exporting refined products to Latin America and Europe. However, with Colonial pipeline volumes frequently allocated, incremental supply of refined products from the USGC would have to be transported in U.S.-built, flagged, and operated vessels (per Merchant Marine Act of 1920 Section 27, better known as the Jones Act).

Jones Act tank vessels are typically classified into three services: (1) crude oil carriers primarily working the Alaskan North Slope routes in the Pacific; (2) product tankers that transport chemicals and “clean” refined products such as gasoline, diesel fuel, and heating oil; and (3) oceangoing articulated barges that can operate in both clean product service (e.g., product shipments to Florida) and “dirty” service (e.g., crude oil lightering, asphalt, and fuel oil). The table below summarizes the approximate number of vessels, average vessel size, and “ratable capacity.”

***Jones Act Tank Vessel Fleet Characteristics and Capacity<sup>1</sup>***

<b>Type/Service</b>	<b>Number of Vessels</b>	<b>Average Vessel Size, 000 barrels</b>	<b>Normalized Ratable Capacity<sup>2</sup></b>	
			<b>Each Vessel, MB/D</b>	<b>U.S. Fleet, MB/D</b>
Crude Oil Carriers	13	1,000	54.8	712
Product Tankers	43	375	20.5	882
Articulated Barges	134	135	7.4	991

Notes: 1. Source: U.S. Department of Transportation Maritime Administration

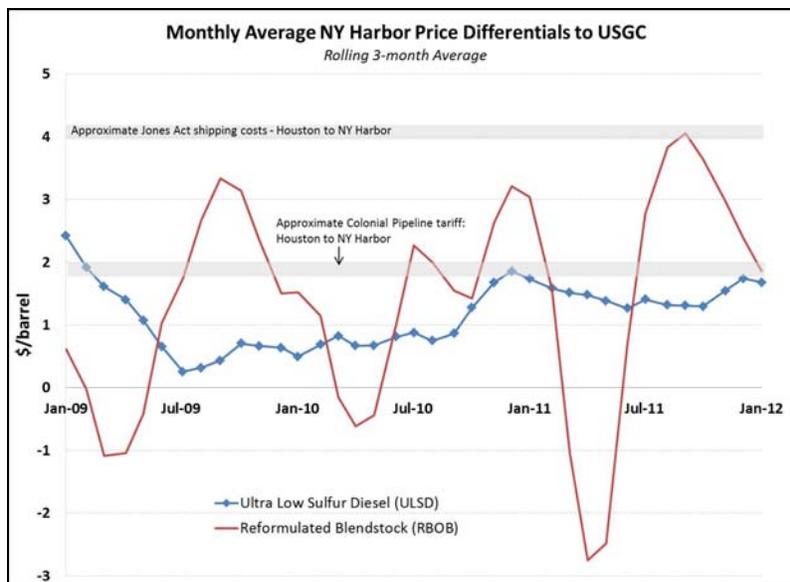
2. Assuming 20 one-way voyages per year, typical of the Houston-to-NY Harbor route

For each product tanker placed in service, approximately 20 thousand barrels per day (MB/D) of product could be ratably delivered from Houston to New York (NY) Harbor. Therefore, replacing the supply lost from a refinery producing 200 MB/D of light refined products would require about 10 tankers (25% of the fleet) – a sizeable impact on the tanker fleet. With the

potential decline in Delaware Bay area crude oil lightering service, and the continuing decline in ANS production, there may be the potential for released capacity of other vessel classes.

Baker & O'Brien estimates that a shipment of refined product from Houston to NY Harbor on a Jones Act product tanker would cost about \$4 per barrel (/Bbl.) (assuming no back-haul opportunity), based on recent time charter equivalent rates. This cost reflects a \$2 premium, compared to Colonial Pipeline tariffs that are on the order of \$2/Bbl. An increasing demand for Jones Act tanker could increase this cost premium. However, based on recent history, the price difference between NY Harbor and USGC light products has only occasionally fully covered the Colonial Pipeline tariff. Therefore, without a significant strengthening of NY Harbor prices relative to the USGC, Jones Act vessels are not likely to become the incremental source of supply for the U.S. Northeast.

### ***Refined Product Price Differentials: NY Harbor vs. USGC***



#### ***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 and 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 analysis, 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 selected refineries in the Asia Pacific region. The *PRISM* system is available for license and is used in consulting assignments for Baker & O'Brien clients.