U.S. Midcontinent Crude Oil Outlook

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Presentation Agenda

- Introduction
- North American Crude Oil Supply
- Regional Refining Balances / Logistics
- WTI Pricing Track
About Purvin & Gertz, Inc.

- Company founded in 1947
- Independent firm owned by the active employees
- Provide technical, commercial and strategic advice in crude oil, natural gas, and gas liquids industries
- Offices in Houston (HQ), Calgary, London, Dubai, Moscow and Singapore
U.S. Midcontinent Crude Oil Study

- Study concluded and released in mid-June 2011
- Collaborative effort between Houston and Calgary offices
- Market changes have continued, but primary conclusions remain consistent
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Market Environment for Crude Production

- PGI anticipates a generally favorable market environment for growing output
  - Dated Brent long-term price expected in $100/B range
  - High price track provides necessary incentive for continued strong upstream activity

- Strong activity not only in well publicized shale plays, but also conventional production and oil sands
  - Recent output increases seen in mature U.S. basins including, Permian Basin, Unitah Basin, and Powder River
  - Improving economics increase continued probability of future oil sands development
  - Anticipate return to U.S. Gulf of Mexico activity since lifting of federal deepwater moratorium
Well Output from North Dakota

Thousand Barrels per Month

Sanish (EUR ~ 300 KB)  Parshall (EUR ~ 400 KB)

Upside Sensitivity = + Increased Fracturing Stages
                    + Drilling Technology
                    + Proppant Improvements

Downside Sensitivity = + Available Prime Acreage
                    + Lack of Completion Services

Months

Sanish (EUR ~ 300 KB)
Parshall (EUR ~ 400 KB)
Well Completions Outlook

- Completions continue to be a limiting factor for the shale plays
  - Well inventories continue to rise
  - Oil service companies are lacking both qualified personnel as well as equipment (i.e. HP pumps) and supplies (i.e. sand, water, proppant)

- Cost of completions is also increasing – due to supply/demand pressures
  - Depending on fracturing stages and proppant utilized completions can exceed drilling costs

- Outlook assumes the backlog continues near-term
Shale oil output forecast to reach 900,000 B/D by 2015 and surpass 1.4 million B/D by 2020.
Western Canadian Crude Oil Supply

Million Barrels per Day

- Conventional Light & C5+
- Segregated SCO
- Diluted Heavy Blends
Deepwater U.S. Gulf of Mexico Supply

Million Barrels per Day

- Moratorium Impact
- Deepwater GOM

250 – 350 KB/D of production loss
North American Crude Oil Balance

North American Crude Oil Supplies, Million Barrels per Day

- U.S. Lower 48 / Alaska
- Canadian Conventional
- Shale Oil (Base Case)
- Canadian Bitumen/SCO
- U.S. Sweet Crude Imports
- Other N. American Imports
- N. American Production

Crude Runs

Crude Production
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PGI proprietary LP model balances supply with demand within logistical constraints while seeking cost minimization.
## Midwest Major Refining Projects

<table>
<thead>
<tr>
<th>Year</th>
<th>Company</th>
<th>Location</th>
<th>Crude</th>
<th>Coker</th>
<th>FCCU</th>
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<tr>
<td>2011</td>
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<tr>
<td>2012</td>
<td>Tesoro</td>
<td>Mandan, ND</td>
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<tr>
<td>2013</td>
<td>BP</td>
<td>Whiting, IN</td>
<td>--</td>
<td>63</td>
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<tr>
<td>2013</td>
<td>Marathon</td>
<td>Detroit, MI</td>
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<tr>
<td>2015</td>
<td>BP/Husky</td>
<td>Toledo, OH</td>
<td>15</td>
<td>30</td>
<td>--</td>
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<tr>
<td></td>
<td>Total Midwest</td>
<td></td>
<td>95</td>
<td>186</td>
<td>27</td>
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</table>

The refining market has begun investment programs designed to process increasing volumes of Canadian heavy – in response to historical discounts to sweet crude.
Canadian heavy crude runs in the U.S. Midwest expected to increase ~ 250,000 B/D by 2015 as a result of projected investments.
Midwest Crude Oil Pipelines

Existing Inbound Pipelines

Existing Outbound Pipelines

Existing Midwest Inbound pipeline capacity
~ 5.3 million B/D compared to 200,000 B/D of existing outbound capacity
Proposed Pipeline / Logistics Projects

Over 1 million B/D of Cushing outbound pipeline capacity potential as projects
Cushing Region Takeaway Capacity

Million Barrels per Day

- Truck to Gulf Coast
- Barge to Gulf Coast
- Flanagan South & Wrangler P/L to Gulf Coast
- Cushing MarketLink P/L to Gulf
- Keystone XL P/L to Gulf Coast
- Centurion South P/L
- BP No. 1 P/L to Whiting
- COP Line 9 to Borger
- Ozark P/L to Wood River
- Net Refinery Consumption

Incoming Flows

- Net Refinery Consumption
- Flanagan South & Wrangler P/L to Gulf Coast
- Cushing MarketLink P/L to Gulf
- Keystone XL P/L to Gulf Coast
- Centurion South P/L
- BP No. 1 P/L to Whiting
- COP Line 9 to Borger
- Ozark P/L to Wood River
- Barge to Gulf Coast
- Truck to Gulf Coast

Midwest crude oversupply combined with increasing volumes of Eagle Ford will reduce foreign sweet imports by over 500,000 B/D.
Refinery Balance / Logistics Conclusions

- U.S. inland crude oil discounts provide the necessary incentive to clear oversupplied markets

- A Cushing originating pipeline to the USGC should sufficient to relieve current oversupply situation related to WTI

- Rebalancing assumption predicated on declining volumes of foreign sweet imports
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Oversupplied market and misaligned logistics creating massive WTI price discounts

Current discount is probably a mix of:
- Real physical constraints and
- Market psychology

How to assess market psychology?

What will be the impact of a Keystone XL or other pipeline announcement?
Price discounts have exceeded the highest of logistical costs

- Price discount above “typical” trucking cost
- Lack of rail loading facilities at Cushing and limited unloading capacity in USGC; but new rail facilities are being added
- Major pipeline ultimately expected to relieve Cushing bottleneck and dissipate the WTI discount
Where does WTI price go from here? ...and when?

WTI - LLS ($/Bbl)


Pipeline

Rail/Barge

Trucking
Pricing Conclusions

- Market remains dynamic both in terms of flows and expectations
- Direction, magnitude and timing of discount remain fluid
- We think a Cushing to USGC pipeline will ultimately push WTI discounts to near tariff costs
- Bakken and Chicago discounts versus international crudes should decline as Cushing logistics are improved and WTI pricing corrects
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