Outlook for Rail Crude Oil Transport

Rail Energy Transportation Advisory Committee

Surface Transportation Board
March 14, 2013

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Agenda

- Crude Oil in the News
- US Production Growth
- Crude-by-Rail Growth
- Market Dynamics
- Conclusion
Crude Oil in the News

- US Crude Oil Production Tops 7 Million Barrels Per Day; Highest since December 1992 (EIA)
- US Production Surge “Rebalancing” World’s Oil Supply (IHS)
- Transportation Booms Alongside Shale Industry (Calkins Media)
- Canadian Crude Oil Finds a New Pathway Through Minnesota (Star Tribune)
- More Oil Traveling to Refineries on Trains (AP)
- Tank Car Production Bolsters Railcar Orders (Railway Age)
- Crude Oil Gains Flow Into State (Times Record)
- Oil and Gas Energy Sectors Responsible for 427,761 Jobs in Texas (Texas Railroad Commission)
## Rail Investment in Crude

### What the Analysts are Saying

“Rail provides better optionality…We expect rail to be part of the long-term infrastructure solution.”  [Morgan Stanley]

“Crude on rail remains a promising opportunity for the North American Railroads.”  [Wells Fargo]

“With limited pipeline infrastructure to reach the coasts from the interior shale regions, the railroads will likely be the long-term solution.”  [Barclays]

“The enormous flexibility that the rails have to respond to rapidly changing…market conditions is a tremendous asset that should ensure the industry’s long-term sustainability in the shale revolution.”  [Credit Suisse]

Source: Bloomberg, Business Week, Railway Age, various analysts equity research
U.S. Crude Oil Production Growth

- In 2008, U.S. was producing 5M barrels per day (bpd)
- Domestic unconventional oil production contributed significantly to achieving 6M bpd in Q1 2012
- By Q4 2012 U.S. production reached to 7M bpd; a 20 year high
- Production in the shale areas have increased total domestic oil production by 40% since 2008
- Bakken and Eagle Ford production growth accounts for 1.2M bpd of growth; 60% of the total
- The International Energy Agency estimates that the U.S. will surpass Saudi Arabia in oil production by 2020
Growth of Bakken Crude Oil Production

Source: EIA
Bakken Crude Oil Transportation - 2012

- Rail providing majority of transport until new pipeline infrastructure develops
- Rail & Pipeline growth both needed to meet continuing Bakken expansion

Source: North Dakota Pipeline Authority, November 2012 estimate
Why is Shipping Crude Oil by Rail Growing?

- Rapid unconventional production volume growth has outpaced traditional oil field export capacity
- Initially rail mode was considered a short-term solution until sufficient traditional capacity was developed

The marketplace has enjoyed benefits in rail:

- Capacity may be increased with a typically shorter lead time
- More flexible off-take
  - Ability to more effectively adapt to production fluctuations
  - Versatility in shipping to multiple markets
- Maximizes Crude Oil Value
  - Access to higher demand markets
  - Potential availability of more alternatives within each market
  - Maintains quality of specification
Crude Oil Rail Transport

Originated Carloads on US Class I Railroads (1000’s)

Source: Association of American Railroads, 2012

300% growth

Source: Association of American Railroads, 2012
### Room for Additional Growth

#### Type of Freight Carried for Year 2011 (preliminary)

<table>
<thead>
<tr>
<th>Commodity Group</th>
<th>Tons Originated (000)</th>
<th>% of Total</th>
<th>Gross Revenue (million)</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>815,986</td>
<td>43.3 %</td>
<td>$16,138</td>
<td>24.7 %</td>
</tr>
<tr>
<td>Chemicals &amp; allied prod.</td>
<td>193,661</td>
<td>10.3 %</td>
<td>8,984</td>
<td>13.8 %</td>
</tr>
<tr>
<td>Farm products</td>
<td>156,507</td>
<td>8.3 %</td>
<td>5,556</td>
<td>8.5 %</td>
</tr>
<tr>
<td>Non-metallic minerals</td>
<td>127,790</td>
<td>6.8 %</td>
<td>2,340</td>
<td>3.6 %</td>
</tr>
<tr>
<td>Misc. mixed shipments*</td>
<td>116,556</td>
<td>6.2 %</td>
<td>8,245</td>
<td>12.6 %</td>
</tr>
<tr>
<td>Food &amp; kindred products</td>
<td>107,334</td>
<td>5.7 %</td>
<td>5,133</td>
<td>7.9 %</td>
</tr>
<tr>
<td>Metallic ores</td>
<td>76,035</td>
<td>4.0 %</td>
<td>699</td>
<td>1.1 %</td>
</tr>
<tr>
<td>Metals &amp; products</td>
<td>50,343</td>
<td>2.7 %</td>
<td>2,517</td>
<td>3.9 %</td>
</tr>
<tr>
<td><strong>Petroleum &amp; coke</strong></td>
<td><strong>43,792</strong></td>
<td><strong>2.3 %</strong></td>
<td><strong>2,025</strong></td>
<td><strong>3.1 %</strong></td>
</tr>
<tr>
<td>Waste &amp; scrap materials</td>
<td>42,778</td>
<td>2.3 %</td>
<td>1,294</td>
<td>2.0 %</td>
</tr>
<tr>
<td>Stone, clay &amp; glass prod.</td>
<td>41,801</td>
<td>2.2 %</td>
<td>1,599</td>
<td>2.4 %</td>
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<tr>
<td>Pulp, paper &amp; allied prod.</td>
<td>31,628</td>
<td>1.7 %</td>
<td>2,090</td>
<td>3.2 %</td>
</tr>
<tr>
<td>Lumber &amp; wood products</td>
<td>25,452</td>
<td>1.3 %</td>
<td>1,370</td>
<td>2.1 %</td>
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<tr>
<td>Motor vehicles &amp; equip.</td>
<td>23,403</td>
<td>1.2 %</td>
<td>4,046</td>
<td>6.2 %</td>
</tr>
<tr>
<td>All other commodities</td>
<td>32,372</td>
<td>1.7 %</td>
<td>3,221</td>
<td>4.9 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,885,437</strong></td>
<td><strong>100.0 %</strong></td>
<td><strong>$65,258</strong></td>
<td><strong>100.0 %</strong></td>
</tr>
</tbody>
</table>

*Miscellaneous mixed shipments (STCC 46) is almost all intermodal traffic. Some intermodal traffic is also included in commodity-specific categories. STCC 46 accounts for about two thirds of intermodal tonnage.*

**Gross Revenue is not adjusted for absorption (incentive rebates etc.) or correction.**

Source: Association of American Railroads, 2012
Consumptive Demand by State

Key Crude Oil Rail Origins and Destination Facilities

- **Canadian Oil Sands**
- **Bakken**
- **Niobrara**
- **Utica**
- **Anadarko**
- **Permian**
- **Barnett**
- **Eagle Ford**

**Unit Train Terminals**

**Rail Origins**

**Thousand Barrels per day**
- < 500
- 501 – 1,000
- 1,001 – 1,900
- > 1,900
U.S. Crude Oil Pipelines & Class I Railroads
## Rail Investment in Crude

### What the Railroads are Doing

**BNSF:** $200+ million in infrastructure to support crude growth

**CN/Tundra:** MOU for Cromer, MB crude oil loading terminal

**CP:** Opened rail hub in North Dakota in 2012; $90+ million to upgrade Manitoba to Saskatchewan line

**CSX:** $26 million for River Line track expansion

**UP:** $225+ million in Southern Region capacity/commercial facilities infrastructure during 2012 with continued spending in 2013 to support overall volume growth

Sources: Bloomberg, Business Week, Railway Age, various analysts equity research
North American Production & Distribution

■ U.S.
  • Production growth continues in Bakken, Permian, and Eagle Ford formations; others to follow
  • Growth projected from 6.7M bpd in 2012 to 11.6M bpd in 2022

■ Canada
  • Expected to provide more than 80% of U.S. crude imports by 2022
  • Growth projected from 3.5M bpd in 2011 to 5.6M bpd in 2025

■ Rail is important key to accommodate this new growth
  • If half of this incremental 7M bpd moves by rail, there will be a need for a fleet of at least 70,000 railcars to move it
  • Pipeline infrastructure is not in place yet; future pipeline development is an open question

Sources: BENTEK, GATX
Tank Car Production Backlogs

- Tank cars are at a historically and disproportionately high percent of the overall railcar market
- 80% of current railcar backlog is tank cars (48.2K out of 60.2K)
- Crude-capable fleet up 22.3K since 1/1/08
  - If non-crude tank car demand is down roughly 10%, this suggests the crude fleet is at roughly 30K cars.
  - This would imply a current crude-by-rail capability in North America of roughly 1 to 1.5M bpd depending upon turn times, car types, and crude types.

Source: ARCI, FTR, EPA, AAR
North American Tank Car Fleet

Sources: AAR, GATX, Global Insight, Barclays
Crude-by-Rail Growth Risks

- Railroad capacity/service – Carriers performing well to date
- Development of loading and off-take terminals
- Adequate tank car fleet – limited manufacturing capacity
- Ongoing tank car regulatory activity
  - FRA and industry have collaborated on design improvement Task Forces for Packing Groups I & II
  - The consensus result is Petition P-1577 before PHMSA for approval
  - With AAR CPC-1232 the industry has self-adopted the P-1577 standard for new crude oil tank cars
  - Prompt approval needed to address uncertainty from lack of approval
  - Consideration of new design requirements tied to older cars
  - API/RFA/ACC/CI Petition P-1612 supported by RSI suggests prompt approval of P-1577 specification separate from the “pre-Petition” cars
Conclusion

- North America has the potential to be energy independent by developing crude oil and shale gas
- America is undergoing a large shift in how/where we extract our energy resources
- Development is outpacing infrastructure
  - Crude purchasers can get crude from oil fields to chosen destination by rail
- Increased reliance on rail by the oil industry and increased demand for tank cars
- Oil industry can continue to increase rail shipments beyond historical levels