The Diluent Market
A Midstream Operator’s Perspective

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Kinder Morgan at a glance

- Largest midstream and third largest energy company in North America with a combined enterprise value of approximately $110 billion

- Focus on stable, fee-based assets that are core to North American energy infrastructure

- Unparalleled footprint of diversified and strategically located assets

- Kinder Morgan owns or operates approximately 75,000 miles of pipelines and 180 terminals
a light liquid hydrocarbon primarily used to dilute bitumen (a highly viscous oil) for the purpose of reducing its viscosity to facilitate transportation.

Example Quality Specifications for Component Streams to the CRW (Condensate Blend) Pool

<table>
<thead>
<tr>
<th>Property</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>600 kg/m³</td>
<td>775 kg/m³</td>
</tr>
<tr>
<td>Kinematic Viscosity (7.5 °C)</td>
<td></td>
<td>2.0 cSt</td>
</tr>
<tr>
<td>Sulfur, total</td>
<td></td>
<td>0.5 wt%</td>
</tr>
<tr>
<td>Reid Vapour Pressure</td>
<td></td>
<td>103 kPa (14.9 psi)</td>
</tr>
<tr>
<td>Benzene</td>
<td></td>
<td>1.6 vol%</td>
</tr>
<tr>
<td>Aromatics, total (BTEX)</td>
<td></td>
<td>2.0 vol%</td>
</tr>
</tbody>
</table>

Bitumen & diluent mixtures can be identified by different names:
“Raw bitumen” contains no diluent, and requires insulated rail cars with steam coils for transportation
“Railbit” contains ~15% diluent and is transported by insulated rail cars
“Dilbit” contains ~30% diluent and is transported by pipeline

Source: Kinder Morgan Cochin LLC
From the Midstream perspective there are two main sources of diluent, Natural Gasoline and Condensate.
Both products contain mostly pentanes and heavier (C5+), and are liquids at ambient temperature and pressure.

<table>
<thead>
<tr>
<th>Property</th>
<th>Natural Gasoline (Mt Belvieu spec)</th>
<th>Condensate (KMCC Spec)</th>
<th>n-Butane (nC4)</th>
<th>n-Pentane (nC5)</th>
<th>n-Decane (nC10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>75-90 °API</td>
<td>45-75 °API</td>
<td>~ 110 °API</td>
<td>~ 94 °API</td>
<td>~ 62 °API</td>
</tr>
<tr>
<td>Kinematic Viscosity (7.5 °C)</td>
<td></td>
<td>&lt;0.2 cSt</td>
<td>~ 0.4 cSt</td>
<td>~ 1.7 cSt</td>
<td></td>
</tr>
<tr>
<td>Reid Vapour Pressure</td>
<td>&lt; 14 psi</td>
<td>&lt; 11 psi</td>
<td>~ 52 psi</td>
<td>~ 15.5 psi</td>
<td>&lt; 1 psi</td>
</tr>
<tr>
<td>Boiling End Point</td>
<td>&lt; 375 °F</td>
<td>&lt; 900 °F</td>
<td>30 °F</td>
<td>97 °F</td>
<td>345 °F</td>
</tr>
</tbody>
</table>

1 Year Average Properties

<table>
<thead>
<tr>
<th>Source: <a href="http://www.crudemonitor.ca/">http://www.crudemonitor.ca/</a></th>
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Due to the broad range of material that can be used as “diluent” the Canadian market has defined an Equalization Practice which, in the simplest terms possible, financially compensates (or penalizes) each diluent shipper based upon the difference in the product quality delivered into and received from the pipeline (or blend pool).

Detailed information about this practice is available at www.capp.ca/library/relatedLinks/Pages/EqualizationSteeringCommittee.aspx

This Equalization Practice is presided over and maintained by the Industry Equalization Steering Committee which is comprised of experts with three distinct perspectives of the industry (Producers, Marketers, and Refiners).

The committee's mandate is to establish and govern the equalization process by:

- Ensuring that the principles of equalization are maintained
- Ensuring that the data to recalculate the scales are maintained and that the procedures for updating the scales are performed and maintained
- Ensuring that shipper and pipeline concerns/issues are addressed

The current Industry Equalization Steering Committee is comprised of members from the following companies:

- Cenovus
- Imperial
- Keyera
- Nexen
- Tidal
- BP
- Canadian Natural Resources
- Advantage Insight
- Inter Pipeline Fund
- Pembina Pipeline
- CAPP
Equalization Overview

The equalization practice simply equalizes each product stream relative to all other received and delivered product streams.

So, if all the streams received by and delivered from a particular pipeline are of similar quality, then the penalty or credit issued to each shipper is small.

Reference density is set at 750 kg/m³ (or 57 API)

- Density penalty factor is set each month based upon the relative value of crude and condensate each month
- Heavier streams are penalized, while lighter streams receive credits
- 2012 Enbridge CRW receipt monthly avg. density: 697-721 kg/m³ (or 72-65 API)

Maximum sulfur content is 0.5 wt%

- Sulfur penalty factor is set equal to the crude scale sulfur penalty
- Higher sulfur streams are penalized and lower sulfur streams receive credits

Target “Deemed C4- Content” is now <5.0 vol%

- Equalization methodology was revised effective February 2013 because the Equalization Steering Committee identified a gradual increase in the light ends content of certain streams entering the CRW condensate pool.
Butane blending

In general, the volume of butane and lighter components blended into the diluent stream is restricted by RVP specification limits.

Changes have recently been made to the equalization practice to further discourage blending of lighter components.

Previous equalization process:
- All light ends (butane and lighter; or C₄-) were weighted equally
- If the C₄- content was less than or equal to 5 vol%, there was no penalty
- C₄- content between 5 & 7% was valued at 50% of the Edmonton butane price
- If the C₄- content was >7 vol%, the excess volume was given zero value

Revised equalization process:
- Propane and lighter (C₃-) content is multiplied by 3 and then added to the butane content to arrive at the “Deemed C₄- Content”
- If the Deemed C₄- Content is less than or equal to 5 vol%, there is no penalty
- If the Deemed C₄- Content is >5 vol%, the excess volume is given zero value
Canadian Diluent Demand:

- 2010: 200-280 kbpd
- 2014: 310-380 kbpd
- 2020: 470-670 kbpd

Source: CERI, ERCB, CAPP, NEB
Current Canadian Diluent Supply

Local Canadian Supply 150 kbdp
Projected to remain flat or decline through 2020

Rail Supply 30 kbdp (as of 9/2012)

Pipeline Capacity 275 kbdp
Southern Lights 180 kbdp
Cochin 95 kbdp (estimated in service July 2014)
New Opportunity

- Canadian import requirement for diluent forecast to expand
  - 2013: 200,000 bpd
  - 2020: >500,000 bpd

- Western Canada is a logical outlet for the increasing condensate production in the U.S.

- Conversion of the underutilized Cochin pipeline opens up access to this growing condensate market

Source: Canadian Energy Research Institute Forecast
Cochin Reversal Project

- Reversing flow to provide 95,000 bpd light condensate to oil sands producers in Western Canada
- $260 Million investment
- Supported by 85,000 bpd shipper commitments for initial 10 year term
- Project includes construction of new 1 million barrel receipt terminal / tank farm
- Receipt connection from Explorer pipeline, allowing shippers to source product from Eagle Ford using KMCC
- In-service July 2014
Reversal of 300 miles of existing Cochin pipeline coupled with truck or rail offloading will provide initial solution in mid-2014

JV Pipeline & expansion of Cochin’s Kankakee terminal in 2015 will provide flow assurance as volumes continue to increase

Cochin’s proposed connection from Kankakee to Manhattan will provide producers with access to committed shippers on Cochin and Southern Lights

Potential 2 million barrel tank farm
Kinder Morgan Condensate Processing

- Processing Unit and 1.9 Million barrels of new tankage on 60 acres within KM’s Galena Park Terminal
- Access to feedstock from KMCC pipeline through KM’s Pasadena terminal
- Unit engineered for Eagle Ford production; Splits condensate into light and heavy naphthas, kerosene, and gas oil
- Project supported by fee-based contract with BP
- Estimated in-service:
  - April 2014 – 50,000 bpd
  - 1Q 2015 – 100,000 bpd
Kinder Morgan Crude & Condensate (KMCC)

- Batched system delivering crude & condensate from Eagle Ford (Dewitt) to Houston Ship Channel
- Completed June 2012
- 300,000 bpd capacity
- Provides producers with access to condensate market via Explorer/Cochin and Beaumont/LA Refining market through KMCC Houston Ship Channel delivery points
- Sweeny Lateral to Phillips 66 Refinery under construction; Est. In-service Q4 2013
CERI forecasts Canadian diluent import demand will exceed 500 kbd by 2020.

Kinder Morgan is investing over $900 Million for condensate gathering and processing infrastructure to meet this demand.
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Questions