Outline

- Who is Aux Sable?
- NGL supply fundamentals
- Canadian NGL infrastructure
- NGL value drivers
  - Western Canada
  - US / Global
- Alternative NGL market access
- Conclusions
Aux Sable Operations

- Fort St. John
- Septimus Gas Plant
- Heartland Offgas Plant
- Fort Saskatchewan
- Edmonton
- Calgary
- Regina
- Palermo Conditioning Plant
- Minot
- St. Paul
- Minneapolis
- Chicago
- Channahon NGL Facilities

Aux Sable plant

Alliance Pipeline

Aux Sable Pipeline
The Push to Develop Rich Gas and NGLs

- Shale driving growth in gas reserves across North America but low gas prices make drilling economics marginal.
- Improvements in drilling technologies and record high “frac spread” (NGL vs gas prices) have focused producers activities on developing unconventional rich gas resources.
- For rich gas to be valuable, NGLs must be recovered, processed and transported to market.
- New rich gas resource plays are isolated from existing NGL infrastructure and markets and costly field or processing infrastructure is required.

Source: ICF International
North American Full-cycle Unit Cost of New Supply 2011

Without NGL value, natural gas will be shut-in

Source: IHS CERA, 2012
Natural Gas and NGL Value Chain

Natural Gas Production → Processing & Treating → Natural Gas Transmission → Straddle Plant → Natural Gas Transmission

NGL Raw Mix Transportation → NGL Fractionation → NGL Storage → NGL Product Transportation

C_2+ or C_3+ → C_2+ → Refined Products, Petrochem Industry, Residential/Commercial

Natural Gas Storage → Natural Gas Distribution

Residential/Commercial/Industrial, Power Plants
NGLs Critical to Drilling Decisions

Note: Based on March 2012 gas and Edmonton NGL reference prices, netted back to the plantgate, assuming recoveries of 80% C2, 97% C3, and 100% C4+, from 1100 btu/cf raw gas. Netback prices only, no deduction for field plant extraction and capital costs.
NGL Markets and Supply Basins

Source: Bentek

NGLs Per Gross Production (Gallons/Mcf)

Montney 2.5 to 4.5 GPM

Source: Bentek
### Alberta NGL Facilities and Capacity

**Major Straddle Plants**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Estimated Capacity (MMcf/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cochrane</td>
<td>2,500</td>
</tr>
<tr>
<td>Empress</td>
<td>9,700</td>
</tr>
<tr>
<td>Other</td>
<td>1,200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13,400</strong></td>
</tr>
</tbody>
</table>

**Major Fractionators**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Estimated Capacity (kb/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redwater (C2+)</td>
<td>65 (25/40)</td>
</tr>
<tr>
<td>Dow (C2+)</td>
<td>70 (35/35)</td>
</tr>
<tr>
<td>Keyera (C3+)</td>
<td>35 (C3+ only)</td>
</tr>
<tr>
<td>Plains (C3+)</td>
<td>50 (C4+ only)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>135 C2+, 85 C3/C4+</strong></td>
</tr>
</tbody>
</table>
NGL Capacity Alberta vs Channahon

Source: ERCB ST-13a, 2011 average

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Announced Expansions of NGL Facilities

**NGL Pipelines**
- Pembina announced expansion of 17 mb/d to Northern NGL system (old Federated pipeline) and 35 mb/d on Peace Pipeline to Edmonton
- No other major expansions announced

**Fractionation**
- Keyera, Pembina have no firm plans but considering frac and storage expansion
- Fracs will almost certainly require long-term take or pay before facilities proceed

**Truck terminals**
- Small projects underway, mostly crude oil driven
Historical US Frac Spread

NGL value is driven primarily by the spread between crude oil and natural gas prices. Frac spread is volatile – midstream capital investments are risky.

Source: Petral
NGL Markets in Western Canada

Ethane (C2)
- Supply from straddle plants (via AEGS) and Fort Saskatchewan de-ethanizers (supplied by field deepcut plants connected to the Pembina gathering system)
- Only two ethane buyers (Alberta ethylene producers NOVA & Dow), who can crack up to 265 mb/d of ethane (nameplate capacity)
- Specification ethane (i.e. spec barrels in Fort Saskatchewan) typically trades at a gas value plus premium (i.e. AECO NIT price plus $5 to $7/bbl)
- No export capacity (i.e. if disruption at crackers, C2 must be flared or reinjected into gas stream)

Propane (C3)
- Western Canada is a significant net exporter of C3 into mainly space heating and crop drying markets
- Pricing typically driven off Conway, KS postings less a discount of 5 to 15 cents per gallon
- Expect market to become oversupplied with recent announcement by Kinder Morgan of reversal of Cochin pipeline and conversion to C5+ service

Butane (tC4)
- Field butane is used as a feedstock in the production of iso-octane and as a heavy oil diluent
- Pricing is typically based on a volatile discount or premium to Mont Belvieu, ranging from a discount of 2 cents per gallon to a premium of as high as 20 cents per gallon

Condensate (C5+)
- Used almost exclusively as a heavy oil diluent
- Pricing based on a differential to WTI that trades daily on NGX
Ethane: The Good News and the Bad

The good news

- Ethane prices provide a steady premium over gas value alternative
- Ethane buyers can consume more ethane than they do today (~60 mb/d more) with some new capital expenditure (derivative plants only)
- Government royalty credits available (IEEP) but only to “incremental ethane in Alberta”

The bad news

- Ethane deepcuts are expensive to build, and complex and expensive to operate, ethane investments are not always cash positive
- With multiple ethane sellers and only two ethane buyers the market is not a level playing field
- Ethane transportation and fractionation infrastructure is costly and close to or at capacity
- Significant new flood of supplies are imminent
  - Vantage pipeline 40 mb/d
  - Williams Suncor 11 mb/d
  - New field deepcuts 20 mb/d (Musreau, Resthaven, Saturn, Gordondale, Minnehik Buck Lake)
  - Many more field deepcuts announced
Alberta ethane producers enjoy a much lower percentage of the ethylene value chain than their US counterparts.

Source: Petral and Aux Sable
US Ethane Market Expansion

New capacity on the US Gulf Coast

- Exxon 3.3 billion lbs per year, 90 mb/d ethane feedstock, 2016
- Dow 3.3 billion lbs per year, 90 mb/d ethane feedstock, 2017
- CP (Chevron Phillips) Chem 3.3 billion lbs / yr, 90 mb/d C2, 2017
- Shell 3.3 billion lbs per year, 90 mb/d ethane feedstock, 2017

Conversion projects

- Lyondell Basell
- Westlake Chemical
- BASF–Total
US Ethane Supply/Demand Growth

Max US Ethane Supply vs Max Demand (1000 BPD)

Source: Envantage Inc 2012
### LPG Netbacks from Growing Export Markets

Exports of propane from the US Gulf Coast enjoy strong netbacks vs domestic prices.

<table>
<thead>
<tr>
<th>Netbacks (March 2012, US cpg)</th>
<th>US Gulf Coast to Japan</th>
<th>US Gulf Coast to NWE</th>
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</thead>
<tbody>
<tr>
<td><strong>C3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Price</td>
<td>201</td>
<td>186</td>
</tr>
<tr>
<td>Less:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mont Belvieu Price</td>
<td>126</td>
<td>126</td>
</tr>
<tr>
<td>Tanker Loading</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Freight</td>
<td>23</td>
<td>13</td>
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<tr>
<td>Subtotal</td>
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<td>152</td>
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<tr>
<td>Margin</td>
<td>39</td>
<td>34</td>
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<tr>
<td><strong>C4</strong></td>
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<td></td>
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<tr>
<td>Market Price</td>
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<tr>
<td>Less:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mont Belvieu Price</td>
<td>185</td>
<td>185</td>
</tr>
<tr>
<td>Tanker Loading</td>
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<td>6</td>
</tr>
<tr>
<td>Freight</td>
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<td>15</td>
</tr>
<tr>
<td>Subtotal</td>
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<td>206</td>
</tr>
<tr>
<td>Margin</td>
<td>19</td>
<td>5</td>
</tr>
</tbody>
</table>

Landed Costs of C3 and C4 Exports to Growth Markets (US cents per gallon)

US propane and butane are competitive with supplies from the Middle East and Africa

## Purvin and Gertz Survey of US LPG Export Terminal Expansions

<table>
<thead>
<tr>
<th>Terminal</th>
<th>LPG Capacity* (bbl/d)</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Enterprise | 156,000 to 312,000 bbl/d | ➢ Enterprise is expanding its LPG terminal on the Houston Ship Channel by 4Q12  
➢ Load rates for international grade propane will be able to load 3 vessels at one time |
| Targa | 52,200 to 70,000 bbl/d | ➢ Expanding at Galena Park  
➢ Expects to be able to load 3 to 4 VLGCs per month of international grade propane by 3Q13 |
| Conoco / Occidental / TransMontaigne | 240,000 to 480,000 bbl/d | ➢ LPG import / export terminal on the Houston Ship Channel operational in 2014  
➢ Connections to Mont Belvieu (CP has a fractionator, Oxy has a pipeline corridor and TransMontaigne has the land) |
| Vitol | 100,000 to 200,000 bbl/d | ➢ Propane export terminal at Coastal Caverns near Beaumont to start up in 1Q 2013  
➢ Will include a 100 MBPD processing facility and salt dome storage at Spindletop |

* Assumes loading capacity online from 12 to 24 hrs per day.
Aux Sable/Alliance Value Chain

Natural Gas Production → Processing & Treating → NGL Product Transportation → Auxiliary/Alliance

- Exports
- Refined Products
- Petrochem Industry
- Residential/Commercial

Natural Gas Storage → Natural Gas Distribution → Residential/Commercial/Industrial → Power Plants
Summary

- Significant new volumes of NGLs will be produced in North America driven by high NGL frac spread, low gas prices and rich gas directed drilling activities.

- Frac spread seems to have structurally shifted to a new higher level, with temporary weakness as the local and global market absorbs new volumes.

- To capture frac spread, NGLs need to be recovered, processed and transported to market (domestic and export).

- Significant midstream infrastructure investments are required in Western Canada in the field, in Edmonton, and to facilitate export of NGLs.

- Alternative ways to access frac spread exist: Aux Sable is well positioned to assist producers in capturing enhanced NGL and gas value without costly capital investments or long-term take or pay obligations.
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