Unlocking the Treasure of the Alberta Montney

Montney is NOT Monotony!

BMO Capital Markets
We’re here to help.

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Montney Fun Facts

- Exploration focus for dozens of companies
  - over 50 companies actively playing Montney
  - About half of these are pure-play Montney
- Significant capital invested to date
  - at least $3B spent acquiring Crown mineral rights in the unconventional fairway
- Over 8,000 horizontal wells drilled since 2007
  - at $5MM to $10MM DCET per well gives total capital spend of $40B to $80B on wells alone!
- Of the ~200 active rigs in Western Canada, 40 are drilling Montney\(^1\)
- Over 6,000 horizontal Montney wells are producing 7.2 Bcf/d and 190 Mbbbl/d liquids
  - the Montney alone accounts for >38% of total Western Canada raw gas production\(^2\)

Source: geoSCOUT, GeoEDGES, BMO Capital Markets
The Big Picture – Resource Wise

Generalized Lithology(3)

- In-Place resource estimate of 4,274 Tcf gas and 268.4 Bbbl oil and NGLs(4)
- Unconventional play area is roughly ~480 km by 70 km; 34,000 km²
- Montney thickness (unconventional areas) between 200 and 300 metres (Calgary Tower is 191 m tall, Suncor is 215 m, The Bow is 236 m and Brookfield Place is 247 m tall!)

Depositional Schematic(5)

Source: geoSCOUT, GeoEDGES, BMO Capital Markets
Thick and Pervasively Charged from End to End

• Original Montney development (apart from the subcrop play) was in vertical gas wells targeting the deep, high porosity turbidite scour and fan deposits in the Pouce Coupe, Valhalla and La Glace areas.

• By 2007 and 2008, operators were having great success placing horizontals into the tighter siltstones in and around these legacy fields, beginning a boom in unconventional development.

• Today, operators are stacking horizontals into the Montney, four or five benchs isn’t uncommon.

Source: geoSCOUT, BMO Capital Markets
Montney Land Grab - Riding the Wave

Crown Sale Activity by Year

Montney Area
- North BC
- South BC
- North AB
- Southwest AB
- Southeast AB
- Other Subcrop

Sections Sold at Crown Sales by Area

<table>
<thead>
<tr>
<th>Year</th>
<th>North BC</th>
<th>South BC</th>
<th>North AB</th>
<th>Southwest AB</th>
<th>Southeast AB</th>
<th>Other Subcrop</th>
<th>Total</th>
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<td></td>
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<td>2011</td>
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<td>2012</td>
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<td>1,421</td>
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<td>1,232</td>
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<td>2018</td>
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<td>1,441</td>
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</table>

Source: geoSCOUT, BMO Capital Markets
Development of the Unconventional Montney Play

Horizontal Wells RR’ed since 2007

- 1,578 since 2007
  - 4 rigs running
- 2,560 since 2007
  - 9 rigs running
- 800 since 2007
  - 5 rigs running
- 1,309 since 2007
  - 17 rigs running
- 1,090 since 2007
  - 5 rigs running

Horizontal Production (Bcfe/d)

- 1.87 Bcfe/d from 900 wells (July 2018 cal day)

Horizontal Wells Rig Released

- 144, 336, 364, 619, 679, 856, 1,181, 790, 587, 1,148, 608

Biggest Growth Area

- 34% of HZ Montney wells RR’ed the Study Area

Source: geoSCOUT, BMO Capital Markets
Alberta Montney: A Spectrum of Thermal and Play Maturity

Generalized Montney Thermal Maturity

All areas show favourable economics which is why the Alberta Montney is garnering its fair share of capital commitment leading to delineation in the understanding of the extent and types of hydrocarbons in this region.

Source: geoSCOUT, BMO Capital Markets
Alberta Focus: Who plays in this Sandbox?

Many Pure-Play Operators
Large and Contiguous Acreage Footprints
Land situation is very dynamic
Ongoing consolidation and expansion
Very active area, currently 17 rigs running

Top Fifteen Operators by Well Count

<table>
<thead>
<tr>
<th>Operator</th>
<th>Well Count</th>
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<td>Seven Generations</td>
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<td>NuVista</td>
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<td>Encana</td>
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<td>Hammerhead</td>
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<td>Paramount</td>
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<tr>
<td>XTO</td>
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<td>Sinopec</td>
<td>1</td>
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<tr>
<td>Velvet</td>
<td>1</td>
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<tr>
<td>Pipestone Oil</td>
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<tr>
<td>Iron Bridge*</td>
<td></td>
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</tbody>
</table>

Source: geoSCOUT, BMO Capital Markets, Land from corporate presentations, press releases and public sources
* BMO Capital Markets is Restricted on Iron Bridge Resources Inc.
Delineating and Derisking the Play

Rig Releases by Year

Production Adds by Year (MMcfe/d)

Continues to attract significant capital with ~3X production growth in the last two years, over 200 wells rig released since January 2018 and 270 wells currently licensed or drilling

75% of the current Alberta Montney well licenses and 67% of the 2018 YTD spud wells are focused in this area of Alberta

Source: geoSCOUT, BMO Capital Markets
Improved Completion Methods Optimize Deliverability

Lateral Length (m)

R² = 0.96

Longer Lateral Length
Average completed lateral lengths have increased by almost 900 m; Top longest completed lengths ~5,000 m

Source: geoSCOUT, BMO Capital Markets, Verdazo Analytics, geoLOGIC Well Completions & Frac Database, Company Corporate Presentations
Improved Completion Methods Optimize Deliverability

Frac Spacing (m)

R² = 0.87

Frac Spacing has significantly decreased from an average of 105 m to 55 m resulting in increased number of stages from <15 to >60
Improved Completion Methods Optimize Deliverability

Total Proppant Placed (t)

**Increased Proppant Placed**
In every area except Gold Creek, proppant tonnage has significantly increased from an average of ~800 t to >8,000 t

Source: geoSCOUT, BMO Capital Markets, Verdazo Analytics, geoLOGIC Well Completions & Frac Database, Company Corporate Presentations
**Highlighted Recent Successes**

- **ECA reported yields (bbl/MMcf)**
  - Volatile Oil >250
  - Very Rich CND 150-250
  - Rich Gas CND 50-150

- **Recent NuVista Acquisition Production**
  - 9,600 Boe/d (~23% oil & liquids)
  - 80-90 bbl/MMcf

- **Blackbird testing UM & MM**
  - 48 hr test rates btw 1 - 3 MMcf/d CGR
  - 90 to >400 bbl/MMcf

- **NuVista Elmworth Hi-Fi Type-Curve**
  - 7.0 Bcf CGR 40 bbl/MMcf

- **NuVista (Gold Creek)**
  - Avg IP<sub>30</sub> 5.0 MMcf/d CGR
  - 81 bbl/MMcf

- **NuVista (Bilbo) Upper Montney**
  - 56 well avg IP<sub>30</sub> 6 MMcf/d
  - CGR 124 bbl/MMcf
  - testing Lower Montney
  - IP<sub>30</sub> 3.6 CGR 182 bbl/MMcf

- **Paramount (SW Karr)**
  - TC IP<sub>30</sub> 4.2 MMcf/d CGR 96 bbl/MMcf
  - Avg. Peak IP<sub>30</sub> rate of ~2,000 boe/d
  - Executed first high-intensity completion in Lwr Mnty

- **Paramount (SE Karr)**
  - TC IP<sub>30</sub> 5 MMcf/d CGR 102 bbl/MMcf
  - UM & MM 48 hr test Avg 1.3 Mboe/d
  - LM 48 hr test Avg 2.1 Mboe/d

- **Hammerhead (Gold Creek)**
  - Gen III TC IP<sub>30</sub> 1.5 Mboe/d

- **Hammerhead (Sweet Spot)**
  - IP<sub>30</sub> of 20 wells
  - 607 bbl/d and 4.9 MMcf/d

- **Hammerhead (Karr)**
  - Gen III TC IP<sub>30</sub> 1.5 – 2.0 Mboe/d with EUR 1.2 – 1.4 MMboe
  - testing Lwr Mnty IP<sub>30</sub> 430 bbl/d

- **Seven Generations (Nest 2)**
  - IP<sub>30</sub> 1.2 – 1.7 boe/d
  - Avg CGR 205 bbl/MMcf
  - 06-12-063-05W6
  - Peak Gas IP >20MMcf/d

- **Seven Generations (Nest 1)**
  - IP<sub>30</sub> 1.3 Mboe/d CGR 135 bbl/MMcf

- **Seven Generations (Nest 3)**
  - IP<sub>30</sub> 2 Mboe/d CGR 55 bbl/MMcf

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Source: geoSCOUT, BMO Capital Markets, Company Corporate Presentations
What to Watch For in the Alberta Montney...

Continued optimization of well design and production practice
- New generation well completions are showing extraordinary initial well results
- Multi-well pads results in reduced capital and increased recoveries (no parent-child impact)
- Reservoir management strategies to optimize long-term condensate performance (slow-back or extended soaking)

Continued delineation of the tight-oil fairway, and pushing the play eastward
- The high condensate ratios in the ultra-rich & volatile-oil fairways are the best in the basin

Lower Montney showing great promise
- Some of the first wells into the lower zones are showing higher than expected liquids
- Will the Lower Montney play double the locations of the Upper/Middle Montney?

Continued land consolidation and M&A activity
- Are there more consolidations to come?

Continued midstream investment with near term incremental processing capacity with visibility to handle expected production growth
- Major investments by Keyera, Pembina, Plains and Tidewater

Plenty more treasure to be discovered
Acknowledgments & Contributions:

BMO Capital Markets A&D Advisory Group
Publications: www.bmoaddeals.com

Questions?
Reference Material and Footnotes

Sources and References:
• geoSCOUT, GeoEDGES, BMO Capital Markets
  Note: Public production data (July, 2018) is raw gas, oil and field condensate (which is rarely reported). Production does not include plant liquids.

Footnotes:
1. Daily Oil Bulletin (DOB) - Weekly Activity Report, Sept 14, 2018
2. BMO Canadian A&D Market Monitor publications; www.bmoaddeals.com
3. Alberta Geological Survey WCSB Atlas Figure 16.24
4. NEB Energy Briefing Note, 2013 The Ultimate Potential for Unconventional Petroleum from the Montney Formation of BC and AB
5. Schematic modified from NEB Briefing Note, 2009 A Primer for Understanding Canadian Shale Gas
6. Cross Section modified from CSPG Bulletin, 2018 The Montney Play of Western Canada Vol. 1 Figures 12 and 14
7. Well Counts as of Sept 17, 2018. Producing: produced in the last 12 months (LTM); Standing: no production but RRed in the LTM; Location and Drilling: licensed in last 2 years with no RR date on record