A Detailed Look at North Dakota’s Drilled but Uncompleted Wells

June 30, 2016

Justin J Kringstad
Geological Engineer
Director
North Dakota Pipeline Authority
Objective
Identify production potential and estimate price levels required to complete wells on NC & NCW status (Not Completed & Not Completed Waiver) in North Dakota.

Method
Analyze past Bakken-Three Forks well performance adjacent to non-confidential NC/NCW wells and estimate breakeven pricing for the various producing regions of North Dakota.

Disclaimer
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Peak Month Minimum
400 BOPD

Peak Month Well Production, BOPD

<table>
<thead>
<tr>
<th>Well Cost</th>
<th>Peak Month Well Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 MM</td>
<td>400</td>
</tr>
<tr>
<td>7 MM</td>
<td></td>
</tr>
<tr>
<td>8 MM</td>
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</tbody>
</table>

Breakeven Wellhead Price (AT IRR of 20%)
Peak Month Minimum
500 BOPD

4,676 Wells

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2.5 Mile Buffer
Peak Month Minimum
600 BOPD

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2.5 Mile Buffer

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Peak Month Minimum
700 BOPD
Peak Month Minimum
800 BOPD

Peak Month Well Production, BOPD

Well Cost

<table>
<thead>
<tr>
<th>6 MM</th>
<th>7 MM</th>
<th>8 MM</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
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<td>$10</td>
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<td>$10</td>
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<td>$20</td>
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<tr>
<td>$30</td>
<td>$35</td>
<td>$40</td>
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<tr>
<td>$40</td>
<td>$45</td>
<td>800</td>
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</table>

Breakeven Wellhead Price (AT IRR of 20%)

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2.5 Mile Buffer

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Peak Month Minimum
900 BOPD
Peak Month Minimum
1,000 BOPD

Peak Month Well Production, BOPD

Well Cost

6 MM
7 MM
8 MM

$0 $5 $10 $15 $20 $25 $30 $35

Breakeven Wellhead Price (AT IRR of 20%)

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2.5 Mile Buffer
Peak Month Minimum
1,200 BOPD

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Peak Month Well Production, BOPD

Well Cost

<table>
<thead>
<tr>
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<th>6 MM</th>
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<th>8 MM</th>
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<td>$8</td>
<td>$12</td>
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<td>$16</td>
<td>$20</td>
<td>$24</td>
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<td>$32</td>
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Breakeven Wellhead Price (AT IRR of 20%)

2.5 Mile Buffer

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Peaks Month Minimum
1,500 BOPD

Peak Month Well Production, BOPD

<table>
<thead>
<tr>
<th>Well Cost</th>
<th>6 MM</th>
<th>7 MM</th>
<th>8 MM</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>$0 $2 $6 $8 $10 $12 $14 $16 $18 $20 $22 $24 $26 $28</td>
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Breakeven Wellhead Price (AT IRR of 20%)
All “NC” & “NCW” Wells June 23, 2016

704 Wells

Spud Month

<table>
<thead>
<tr>
<th>Month</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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<tr>
<td>Jan</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>72</td>
<td>65</td>
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<tr>
<td>Feb</td>
<td></td>
<td>1</td>
<td>14</td>
<td>44</td>
<td>30</td>
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<tr>
<td>Mar</td>
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<td></td>
<td>14</td>
<td>31</td>
<td>24</td>
</tr>
<tr>
<td>Apr</td>
<td></td>
<td></td>
<td></td>
<td>21</td>
<td>8</td>
</tr>
<tr>
<td>May</td>
<td></td>
<td></td>
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<td></td>
<td>14</td>
</tr>
<tr>
<td>Jun</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Regions

- BILLINGS: 5
- BOTTINEAU: 1
- DIVIDE: 42
- DUNN: 78
- MCKENZIE: 289
- MCLEAN: 145
- MORTON: 4
- STARK: 138
- WILLIAMS: 138
Breakdown of NC/NCW Wells by Maximum 2.5mi Production Buffer Zone
NC/NCW Wells Inside 2.5mi 500 BOPD Buffer

12 Wells
NC/NCW Wells Inside 2.5mi 700 BOPD Buffer

38 Wells

Spud Month

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

Division-wise Wells:

- Divide: 3
- Dunn: 12
- McKenzie: 2
- Williams: 21
NC/NCW Wells Inside 2.5mi 800 BOPD Buffer

Spud Month

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
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<td>2</td>
<td>5</td>
<td>9</td>
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<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

57 Wells

Divide: 9
Dunn: 7
McKenzie: 11
Mountrail: 6
Williams: 24
NC/NCW Wells Inside 2.5mi 900 BOPD Buffer

- Spud Month
  - November 2014: 1
  - January 2015: 2
  - March 2015: 2
  - May 2015: 7
  - July 2015: 16
  - September 2015: 9
  - November 2015: 5
  - January 2016: 5
  - March 2016: 1
  - April 2016: 2
  - May 2016: 2

- Location:
  - 68 Wells

- Counties:
  - Dunn: 12
  - McKenzie: 42
  - Williams: 14

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NC/NCW Wells Inside 2.5mi 1,000 BOPD Buffer

Spud Month:
- March 2013: 1 well
- August 2014: 1 well
- November 2015: 4 wells
- February 2016: 2 wells

194 Wells

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NC/NCW Wells Inside 2.5mi 1,200 BOPD Buffer

Spud Month

<table>
<thead>
<tr>
<th>Year</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
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<tr>
<td>2014</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>7</td>
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<tr>
<td>2016</td>
<td>3</td>
<td>13</td>
<td>7</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

133 Wells

DUNN: 4
MCKENZIE: 89
MOUNTAIL: 21
STARK: 4
WILLIAMS: 15

Map showing location of wells.
NC/NCW Well Count by Maximum 2.5mi Buffer Zone
Converting Well Performance to Estimated Breakeven Wellhead Pricing

Percent of NC/NCW Wells Within 2.5mi Breakeven Buffer Zones

<table>
<thead>
<tr>
<th>Price Range</th>
<th>Percent</th>
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<tbody>
<tr>
<td>0</td>
<td>1.70%</td>
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<tr>
<td>$25-$29</td>
<td>20.45%</td>
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<tr>
<td>$28-$32</td>
<td>18.89%</td>
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<tr>
<td>$31-$36</td>
<td>27.50%</td>
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<td>$32-$39</td>
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<tr>
<td>$35-$42</td>
<td>8.10%</td>
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<tr>
<td>$38-$46</td>
<td>5.40%</td>
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<tr>
<td>$42-$52</td>
<td>4.97%</td>
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<tr>
<td>$48-$60</td>
<td>1.70%</td>
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<tr>
<td>$57-$71</td>
<td>1.56%</td>
</tr>
</tbody>
</table>
Conclusions

• A vast majority of the current NC/NCW wells in North Dakota are well positioned relative to adjacent well performance.

• Completion decisions will vary by operator, but a reasonable assumption is that many of these NC/NCW wells may be the first wells completed when adequate and stable pricing is achieved.

• It must be noted that regardless of neighboring well performance, geologic risk is ever present and will be a major consideration in scheduling completions.
Contact Information

Justin J. Kringstad, Director
North Dakota Pipeline Authority

600 E. Boulevard Ave. Dept. 405
Bismarck, ND 58505-0840

Phone: (701)220-6227
Fax: (701)328-2820
E-mail: jjkringstad@ndpipelines.com

Websites:
www.pipeline.nd.gov
www.northdakotapipelines.com