Comparison of Selected Plays’ Core and Tier I PV-10 Breakeven Prices

<table>
<thead>
<tr>
<th>Play</th>
<th>Core Acreage Breakeven Price</th>
<th>Tier I Acreage Breakeven Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midland Basin</td>
<td>$20.00</td>
<td>$35.00</td>
</tr>
<tr>
<td>Delaware Basin</td>
<td>$25.00</td>
<td>$45.00</td>
</tr>
<tr>
<td>SCOOP / STACK</td>
<td>$30.00</td>
<td>$48.00</td>
</tr>
<tr>
<td>Eagle Ford</td>
<td>$30.00</td>
<td>$52.50</td>
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<tr>
<td>DJ Basin</td>
<td>$40.00</td>
<td>$60.00</td>
</tr>
<tr>
<td>Bakken</td>
<td>$40.00</td>
<td>$60.00</td>
</tr>
</tbody>
</table>

Note: Source: EIA, Wall Street Research, Company filings, investor presentations and Jefferies estimates.
Assumes crude oil to natural gas price ratio of 15:1.
NYMEX pricing as of November 28, 2016.
Permian and SCOOP / STACK Have Had a Robust Recovery

Key Points

- Recent rig activity has lagged the recovery and stabilization of oil prices
  - Total US onshore rig count is up 47% to 593 from its bottom of 404 in May 2016
- Resurgence in rig activity is primarily attributable to Permian and Mid-Con plays
  - 228 rigs currently operating in the Permian Basin
  - 77 rigs currently operating in the SCOOP / STACK

Source: Baker Hughes Rig Count as of November 23, 2016.
Wells by formation and spud Year

2013

2014

2015

2016
Key Points

- Continental is by far the most active driller pushing the play to the West with 14 active rigs.

- Most STACK operators have concentrated their Meramec drilling in the Volatile Oil Core near the Kingfisher/Blaine county border.

- Newfield is delineating the Meramec in central Kingfisher county and has just dropped back down to 5 rigs after ramping up to 7 rigs last year.

- Marathon and Cimarex continue testing the Meramec as part of their ongoing drilling activities.

### Active Rigs Currently in the STACK

<table>
<thead>
<tr>
<th>Operator Name</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continental</td>
<td>14</td>
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<tr>
<td>Devon</td>
<td>8</td>
</tr>
<tr>
<td>Newfield</td>
<td>5</td>
</tr>
<tr>
<td>Oklahoma Energy</td>
<td>4</td>
</tr>
<tr>
<td>BP</td>
<td>3</td>
</tr>
<tr>
<td>Cimarex</td>
<td>3</td>
</tr>
<tr>
<td>Citizen</td>
<td>3</td>
</tr>
<tr>
<td>Marathon</td>
<td>3</td>
</tr>
<tr>
<td>Tapstone</td>
<td>3</td>
</tr>
<tr>
<td>Comanche</td>
<td>2</td>
</tr>
<tr>
<td>Gastar</td>
<td>2</td>
</tr>
<tr>
<td>Vitruvian</td>
<td>2</td>
</tr>
<tr>
<td>Ward</td>
<td>2</td>
</tr>
<tr>
<td>Carrera</td>
<td>1</td>
</tr>
<tr>
<td>Chesapeake</td>
<td>1</td>
</tr>
<tr>
<td>Council Oak</td>
<td>1</td>
</tr>
<tr>
<td>Hinkle</td>
<td>1</td>
</tr>
<tr>
<td>LINN</td>
<td>1</td>
</tr>
</tbody>
</table>

Blaine, Kingfisher and Canadian Counties
STACK Stratigraphic Column and Type Log

Key Points
- Meramec
- Silty, shale reservoir sourced from the Woodford
- Highly varying areal distribution
- Found at depths of 6,000 – 12,000 ft
- Normal to slightly overpressured
- Gross Meramec thickness of ~150 – 500 ft
- Average porosity around 5%
- Average water saturation of 40% - entirely bound water
- Chester shale is regional seal
- OOIP estimates range from 13 to 30 MMBO/sec

- Woodford
- Siliceous, source rock
- Organic rich
- Natural and induced fractures

- Hunton and Osage horizontal plays are emerging
STACK Activity Map

1. Carrera Energy
   Heath 3-1H
   Frac’d 08-21-2016
   Waiting on Results

2. Carrera Energy
   Big Hunk 7-1H

3. Carrera Energy
   Mounds 16-1H

4. Carrera Energy
   Robinson-Payday 16-1H
   IP30: 354 Boe/d

5. Cimarex
   Peoples 1-29H
   IP30: 827 Boe/d

6. Cimarex
   Peterson 1H-2821X
   IP24: 3,318 Boe/d
   57% Oil

7. Comanche
   Ward 21-1H

8. Continental
   Andersons Half
   Flowing back

9. Continental
   Boden 1-15-10XH
   IP24: 3,508 Boe/d
   28% Oil

10. Continental
    Compton 1-2-35XH
    IP30: 2,061 Boe/d
    65% Oil

11. Continental
    Foree 1-1B-7XH
    IP30: 2,061 Boe/d
    65% Oil

12. Continental
    Frankie Jo 1-25-24XH
    IP24: 2,627 Boe/d
    56% Oil

13. Continental
    Ludwig 1-22-15XH
    IP30: 1,570 Boe/d

14. Continental
    Madeline 1-9-4XH
    IP24: 3,538 Boe/d
    71% Oil

15. Continental
    Quintle 1R-10-3XH
    IP24: 2,192 Boe/d
    74% Oil

16. Continental
    Wintersole 1-33-28XH
    Spud 06-04-2016
    Non-Op: 11.3% WI

17. Continental
    Yocum
    Current: 1,621 Boe/d

18. Council Oak
    Haigler 1-4H
    Spud 08-29-2016
    Non-Op 1.7% WI

19. Devon
    Pump House 7
    IP15: 2,200 Boe/d
    1 mile laterals

20. Devon
    Marmot 19/18 1XH
    IP24: 3,400 Boe/d
    70% Oil

21. Devon
    Virginia Lee 10-19N-16W

22. Devon
    Blue Ox 3130-4AH
    IP24: 4,000 Boe/d
    70% Oil

23. Newfield
    Scheffer 1H-9X
    IP30: 1,681 Boe/d

24. Newfield
    Scheffer 1-9X
    IP30: 1,681 Boe/d

25. Oklahoma Energy
    Brown 1706 6-27MH

26. PayRock Energy
    Eve 1506 1-20MH

27. Tapstone Energy
    Howard 5-19-17 1H

Jeffries LLC / November 2016
STACK Meramec

Key Points

- Mississippian Meramec depocenter indicated by thickest Meramecian section (400+ ft)
  - Mix of siliciclastic and carbonate prone shales. Average porosity ~7%. Silica content increases to the South
  - At least two distinct flow units (Upper and Lower Meramec)
  - Codevelopment possible when gross Meramec >300 ft
  - Meramec thins abruptly and gives way to hundreds of feet of Osage carbonates
  - Osage capped with a thin Meramecian shale known as the St. Genevieve

- STACK overpressure (0.6+ psi/ft) driven by hydrocarbon generation facilitates word class rates

- Volatile Oil to Black Oil roughly coincides with the Overpressure/Normal pressure boundary

- Operators are still finding excellent returns outside of overpressure, owing to liquids and low D&C
**Key Points**

- Meramec and Osage total thickness in the NW Stack ranges from 925-1,500’, approximately twice as thick as it is in the STACK.
- Osage is generally comprised of tripolitic chert, dense chert, and limestone.
- Osage is a fracture porosity play.
- Still early innings with mixed results.
- Key is to understand why and where Osage works.
- Faulting is critical for creating secondary porosity, enhancing permeability, and opening hydrocarbon migration pathways.
- Fractures can yield very high rates and recoveries.
Woodford Thins to the North

Key Points

- Two discrete landing zones in the Upper and Lower Woodford, separated by a ductile, TOC-rich middle
- Primary landing zone is the >50' thick Upper Woodford
- Upper Woodford thins significantly to the North
- Overall clay content appears to increase north of Cana
- Key questions are: how much does the middle Woodford contribute, and what thickness of the Brittle Upper Woodford is necessary for a successful well
## Selected STACK Type Curve Summary

Assumes NYMEX strip pricing as of November 11, 2016

### Development Assumptions

<table>
<thead>
<tr>
<th>Unit</th>
<th>Woodford</th>
<th>Osage</th>
<th>Meramec</th>
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<td>NA</td>
<td>Woodford Dry</td>
<td>Vol Oil East</td>
</tr>
<tr>
<td>EUR, Crude Oil</td>
<td>MBbls</td>
<td>-</td>
<td>329</td>
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<tr>
<td>EUR, Natural Gas</td>
<td>MMcf</td>
<td>9,968</td>
<td>898</td>
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<tr>
<td>EUR, Wellhead</td>
<td>MBoe</td>
<td>1,661</td>
<td>479</td>
</tr>
<tr>
<td>EUR, Residue Gas</td>
<td>MMcf</td>
<td>9,669</td>
<td>673</td>
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<tr>
<td>EUR, NGLs</td>
<td>MBbls</td>
<td>150</td>
<td>117</td>
</tr>
</tbody>
</table>

### Differential & Processing Assumptions

| Differential, Crude Oil: | 2017 | $ / Bbl | $(3.00) | $(2.35) | $(2.35) | $(2.35) | $(2.35) | $(2.35) | $(2.35) | $(2.35) | $(2.35) | $(2.35) |
| Differential, Natural Gas: | 2017 | % | 90.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| Differential, NGL | % | 35.0% | 35.0% | 35.0% | 35.0% | 35.0% | 35.0% | 35.0% | 35.0% | 35.0% | 35.0% |
| Shrink Factor | % | 97.0% | 75.0% | 75.0% | 75.0% | 75.0% | 75.0% | 75.0% | 75.0% | 75.0% | 80.5% | 80.5% |
| NGL Yield | Bbls / MMcf | 15.0 | 130.0 | 130.0 | 130.0 | 130.0 | 130.0 | 130.0 | 130.0 | 94.0 | 94.0 |

### Operating Assumptions

| Fixed Opex / Well | Month 1 | $ / Well / M | $7,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 |
| Fixed Opex / Well | Month 7+ | $ / Well / M | $7,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 | $14,500 |
| Variable Opex, Crude Oil | $ / Bbl | $ | 3.00 | - | - | - | - | - | - | - | - | - |
| Variable Opex, Natural Gas | $ / Mcf | $ | 0.80 | - | - | - | - | - | - | - | - | - |
| Variable Opex, Water | $ / Bbl | $ | - | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |
| D&C Capex | 2017 | $M | $6,500 | $3,000 | $4,500 | $4,500 | $4,500 | $3,700 | $4,000 | $3,700 | $4,000 | $3,700 | $3,000 |
| Lateral Length | Feet | 7,500' | 5,000' | 5,000' | 5,000' | 5,000' | 5,000' | 5,000' | 5,000' |

### Single Well: IRR

| % | 62.5% | 64.4% | 30.7% | 47.5% | 49.1% | 20.0% | 33.7% | 239.6% | 44.1% | 94.8% | 85.9% |
The SCOOP has High Momentum and Impactful Results in the Woodford Shale
Based on 24-hour IP Rate

Key Points

- The SCOOP is located towards the very south of the Anadarko Basin
- The SCOOP has recently seen high momentum and is the top liquids-producing area in the Woodford Shale
- Operators are continuing to delineate the play extent, and are testing spacing and the potential for stacked laterals in the SCOOP
**SCOOP Stratigraphic Column and Type Log**

**Key Points**
- World-class source rock
  - Oil-Prone Type II Kerogen
- Found at depths of 8,000 – 16,000 ft. and overpressured (0.6 – 0.7 psi/ft.)
- Vitrinite Reflectance 0.6 – 1.2%
- Gross thickness of Woodford SCOOP ~ 150 – 420 ft.
- Porosity ranges from 5 to 10%
- Resource base estimated at 150 to 200 BCF/section
- Recent economic success from horizontal drilling in the Springer Shale substantially increased the potential for the SCOOP to be a stacked play

### Stratigraphic Column and Type Log

<table>
<thead>
<tr>
<th>Period</th>
<th>Series</th>
<th>Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennsylvanian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missourian</td>
<td>Missourian</td>
<td>Hoxbar Sands</td>
</tr>
<tr>
<td>Des Moinesian</td>
<td>Des Moinesian</td>
<td>Deese Sands</td>
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<td>Atokan</td>
<td>Atoka Sands</td>
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<td>Morrowan</td>
<td>Morrow Sands</td>
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<tr>
<td>Chesterian</td>
<td>Chesterian</td>
<td>Springer Sands</td>
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<tr>
<td>Meramec</td>
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<tr>
<td>Osagean</td>
<td>Sycamore Limestone</td>
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<tr>
<td>Silurian</td>
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<tr>
<td>Cayugan</td>
<td>Hunton Limestone</td>
<td></td>
</tr>
<tr>
<td>Niagara</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordovician</td>
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<td>Cincinnati</td>
<td>Cincinnati</td>
<td>Viola Limestone</td>
</tr>
<tr>
<td>Champlainian</td>
<td>Champlainian</td>
<td>Simpson Sands &amp; Limestone</td>
</tr>
</tbody>
</table>

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Key Points

- Operators have primarily targeted the M1 Springer in the South and the M2 in the North.
- CLR has been active in the M1 Springer, while Vitruvian has been active in the M2 Springer.
- Phase windows are separated by a north south fault:
  - Condensate to the West
  - Oil to the East
- Springer Gas Condensate Wellhead EUR of 15.4 Bcfe.
SCOOP Woodford

Key Points

- Recent completion enhancements in the SCOOP have delivered some of the best shale gas results in the L48.
  - Operators have adopted high rate slickwater completions to enhance fracture complexity
  - Continental has tested spacing at 6, 8 and 10 wells/section
  - Vitruvian’s recent Anita Fowler, tested at 18.6 MMcf/d and 380 bbl/d
  - Citizen’s Governor James well delivered an IP-30 of 2,074 BOE/d (70% oil), extending the productive Woodford trend to the North
SCOOP Sycamore

Key Points

- Sycamore is basinal equivalent of Osage
- Porosity development more similar to that of a basinal shale
- Sycamore development is in its early stages, with Citizen leading the charge
Selected SCOOP Type Curve Summary
Assumes NYMEX strip pricing as of November 16, 2016

<table>
<thead>
<tr>
<th>Development Assumptions</th>
<th>Unit</th>
<th>South Woodford</th>
<th>Sycamore</th>
<th>Springer</th>
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<tbody>
<tr>
<td><strong>Type Curve Name</strong></td>
<td><strong>NA</strong></td>
<td>Lean Gas</td>
<td>N Wet Gas</td>
<td>North Cond.</td>
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<td><strong>MBbls</strong></td>
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<td>345</td>
<td>681</td>
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<tr>
<td>EUR, Natural Gas</td>
<td><strong>MMcf</strong></td>
<td>25,299</td>
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<td>EUR, Wellhead</td>
<td><strong>MBoe</strong></td>
<td>4,289</td>
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<td>EUR, Residue Gas</td>
<td><strong>MMcf</strong></td>
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<td>879</td>
<td>894</td>
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<tr>
<td>EUR, Processed</td>
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<td>4,753</td>
<td>3,861</td>
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**Differential & Processing Assumptions**

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<tr>
<th>Differential, Crude Oil:</th>
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<th>(5.00)</th>
<th>(5.00)</th>
<th>(5.00)</th>
<th>(5.00)</th>
<th>(5.00)</th>
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</thead>
<tbody>
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<td>$ / Mcf</td>
<td>$ -</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<td>Differential, Natural Gas:</td>
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<td>90.0%</td>
<td>90.0%</td>
<td>90.0%</td>
<td>90.0%</td>
<td>90.0%</td>
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<tr>
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<td>35.0%</td>
<td>35.0%</td>
<td>35.0%</td>
<td>35.0%</td>
<td>35.0%</td>
<td>35.0%</td>
<td>35.0%</td>
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</tr>
<tr>
<td>Shrink Factor</td>
<td>%</td>
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<td>90.0%</td>
<td>90.0%</td>
<td>90.0%</td>
<td>90.0%</td>
<td>90.0%</td>
<td>90.0%</td>
<td>95.0%</td>
<td>95.0%</td>
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<tr>
<td>NGL Yield</td>
<td>Bbls / MMcf</td>
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<td>50.0</td>
<td>80.0</td>
<td>85.0</td>
<td>50.0</td>
<td>35.0</td>
<td>35.0</td>
<td>35.0</td>
<td></td>
</tr>
</tbody>
</table>

**Operating Assumptions**

| Fixed Opex / Well | Month 1 | $ / Well / M | 7,500 | 7,500 | 7,500 | 7,500 | 7,500 | 7,500 | 7,500 | 7,500 |
| Fixed Opex / Well | Month 7+ | $ / Well / M | 7,500 | 7,500 | 7,500 | 7,500 | 7,500 | 7,500 | 7,500 | 7,500 |
| Variable Opex, Crude Oil | $ / Bbl | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Variable Opex, Natural Gas | $ / Mcf | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| Variable Opex, Water | $ / Bbl | - | - | - | - | - | - | - | - |
| D&C Capex | 2017 | $M | 9,500 | 9,500 | 9,500 | 9,500 | 9,500 | 9,500 | 6,500 | 6,500 | 10,000 | 10,000 |
| Lateral Length | Feet | 7,500' | 7,500' | 7,500' | 7,500' | 7,500' | 7,500' | 7,500' | 7,500' |
| **Single Well: IRR** | % | 110.0% | 69.5% | 70.8% | 65.4% | 47.5% | 41.7% | 17.8% | 43.4% | 31.5% |
Merge Geologic Overview

Key Points

- The Woodford is the primary Source rock engine that drives the entire Hydrocarbon system of the Anadarko Basin

- The Woodford is prospective across the Merge, though slightly higher in VClay and thinner than in the SCOOP
  - The Woodford in the Merge has been largely ignored and has not seen the benefit of modern completions

- The Sycamore is the basinal equivalent of the Osage/Meramec System in the STACK
  - Mississippian system grades from carbonate in the north to a more siliceous shale in the south
  - Sycamore rock properties on par or even better than core Meramec
  - In general, the Mississippian section of the Merge has higher Porosity than the STACK

Note: From Jones IR Presentation Materials.
Recent Results in the Merge Play
Sycamore / Woodford / Meramec Formations

1. Devon
   Wildcard 2215-1H
   IP-30: 757 boe/d
   75% oil

2. Cimarex
   Straka 1H-36X
   IP-30: 888 boe/d
   55% oil

3. Citizen
   Rosemary 1H-1-36
   IP-30: 1,599 boe/d
   70% oil

4. Citizen
   Rosemary 2H-1-36
   IP-30: 1,316 boe/d
   75% oil

5. Newfield
   Peters 1H - 15X
   IP-30: 918 boe/d
   80% oil

6. Marathon
   Meyer 1106 1-21W H
   IP-30: 670 boe/d
   35% oil

7. Citizen
   Gov. James 1H - 32
   IP-30: 2,074 boe/d
   70% oil

8. Newfield
   Carole 1H-21X
   IP-30: 535 boe/d
   80% oil
Key Points

- Jefferies Type Curve Areas were built starting with Vitrinite Reflectance data from the Woodford and then trued up to well head GOR data
- Legacy vertical well data was incorporated along with newer vintage wells; however, the data were not sufficient to warrant subdividing TC areas more granular than a Western area that is more gas prone and an Eastern area that is more oil prone
- The Sycamore is largely a migrated system
  - Given the proximity of the Sycamore to the underlying Woodford Source Rock, they are likely to have nearly identical hydrocarbon phases

<table>
<thead>
<tr>
<th>Area</th>
<th>Woodford</th>
<th>Sycamore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type Curve</td>
<td>Oil</td>
<td>Gas</td>
</tr>
<tr>
<td>Lateral (Feet)</td>
<td>7,500'</td>
<td>7,500'</td>
</tr>
<tr>
<td>IP (Bbl/d, Mcf/d)</td>
<td>355</td>
<td>1,350</td>
</tr>
<tr>
<td>EUR (MMbbl, MMcf)</td>
<td>634</td>
<td>1,605</td>
</tr>
<tr>
<td>Di (%)</td>
<td>40</td>
<td>54</td>
</tr>
<tr>
<td>Df (%)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>IRR (%)</td>
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<td>60</td>
</tr>
<tr>
<td>b</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Summary

Key Points

- STACK continues to march towards the West. Likely to continue sing big STACK gas wells

- Further testing of the STACK Woodford with high proppant completion designs should yield material re-rating of play

- Encouraging results from the thin Meramec in NW STACK. Still very early in the NW STACK Osage. 3D Seismic could be a game changer

- Merge is the next hot area with favorable rock qualities, high EUR's and low D&C make for IRR's >100%

- Operators have been focused their SCOOP drilling Woodford to hold all rights

- Encouraging SCOOP Sycamore results could add a third bench to the SCOOP