Current Production Trends of the Woodford Shale and Surface to Subsurface Correlations of Overlying and Underlying Formation Boundaries

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TALK OUTLINE

• Regional distribution of Woodford producing wells

• Surface to subsurface correlation of bounding strata

• Production declines (some of the better wells)
Woodford producing wells in Oklahoma as of 4-08.
From IHS Energy Data.
Woodford wells in *Wagoner* Co. Oklahoma

**RESOURCES DEVEL**
**WCS INC**
**WCT OPERATING**

- **TD ~ 1,000 ft**
- **5-25MMCF cum/well**
Woodford producing wells in Oklahoma as of 4-08. From IHS Energy Data.
Woodford wells in *Carter Co.* Oklahoma

- **CIMAREX**
- **ONEAL** and **CHESAPEAKE**
- Perf ~4,000 ft
- Mostly older (vert) wells
- Both oil and gas
Woodford producing wells in Oklahoma as of 4-08.
From IHS Energy Data.
Woodford wells in *Marshall* Co. Oklahoma

Cimarex & Range Prod
- Older wells (vertical)
- Some poor-producing horizontal wells
- Perf ~4,000 ft
Woodford producing wells in Oklahoma as of 4-08. From IHS Energy Data.
Woodford wells in Oklahoma – Main Deep Trend
TALK OUTLINE

• Regional distribution of Woodford producing wells

• Surface to subsurface correlation of bounding strata

• Production declines (some of the better wells)
Woodford – Sycamore Strata S/of Arbuckles
West side I-35
SE/4 sec. 25, T2S-R1E

TXO #1 AE Smith, SW SW 31, T2S-R2E

Sycamore Woodford

GR- API
Den-Neu
Resistivity

Sycamore

~ 1 ¼ miles

Chert

Fay’s (1989) top

Traditional top

Woodford

Chert and siliceous shale with P nodules grading down into mostly shale

surface GR

Greenish-gray shale with lignitic clay

Woodford – Sycamore Contact; So of Arbuckles
Sycamore limestones

Greenish-gray, earthy shale below Sycamore carbonates and above Woodford Shale

Woodford Shale
Greenish-gray shale below Sycamore carbonates and above Woodford cherty beds

Cherty Woodford Shale
Traditional formation-boundary log picks

east side of I-35
SW NE NE 30
T 1S R2E

<1 mi

Placid Oil Company No. 1 Joyce
C NE SW 20, T1S-R2E

GR
Den-Neu Por
Resistivity

Sycamore Ls
Woodford Shale
Hunton Ls

Hunton/Woodford/Sycamore Strata N/of of Arbuckles

east SH-77D
& W/of I-35
SE NW NE 30
T 1S R2E

covered
Woodford – Sycamore Contact N/of Arbuckles
Placid Oil Company No. 1 Joyce C NE SW 20, T1S-R2E

Traditional formation-boundary log picks

Hunton/Woodford/Sycamore Strata N/of of Arbuckles

east side of I-35 SW NE NE 30 T 1S R2E
east SH-77D & W/of I-35 SE NW NE 30 T 1S R2E

covered

<1 mi
Woodford – Hunton Contact N/of Arbuckles
Woodford Shale

Note: these beds are overturned

Up-section

Hunton contact

Hunton – lower part (Henryhouse? Fm)

Transgressive shale

Unconformity conglomerate
Woodford Shale

Transgressive shale

Unconformity conglomerate

Note: these beds are overturned
Unconformity conglomerate just above Hunton
Green & black shale between Hunton and Woodford
TALK OUTLINE

- Regional distribution of Woodford producing wells
- Surface to subsurface correlation of bounding strata
- Production declines (some of the better wells)
Woodford Shale monthly production Jan 2000 through March 2008. Data from IHS Energy

Avg 640 MMCF per well cum
415 horiz wells, 94 >1 MMCF/D
Only 7 >1BCF Cum (~economic)

Cum prod
125 BCFG

Cum prod
486 MBO
Devon 1-20H Billie Jean
NW NW 20, 3N-11E

Newfield 1H-32 Wilson
NW NW 32, 2N-11E

Newfield 1H-7 Sprague
NE NW 7, 2N-11E

Newfield 1H-20 Melvin
NE NE 20, 4N-11E

Newfield 2H-31 Patterson
SE SW 31, 4N-11E

Newfield 4H-22 Sherman Ellis
SW SW 22, 5N-12E
Devon 1-20H Billie Jean
NW NW 20-3N-11E

NOTES
Horizontal well
- TVD: 8,105 ft
- BHL: ~3,700' S
- IP: 2,266 MCF
- BHP: 1,433 psi
- Frac: 75K #sd (initial)
  ??K #sd
  ??K #sd

Pay out??

Cum Prod:
990 MMCF

~2 MMCF/D

~425 MCF/D

Monthly Gas Production (MCF)
Devon 1-20H Billie Jean
NW NW 20, 3N-11E

Newfield 1H-7 Sprague
NE NW 7, 2N-11E

Newfield 1H-32 Wilson
NW NW 32, 2N-11E

Newfield 1H-20 Melvin
NE NE 20, 4N-11E

Newfield 2H-31 Patterson
SE SW 31, 4N-11E

Newfield 4H-22 Sherman Ellis
SW SW 22, 5N-12E

Atoka Co.
Hughes Co.
McIntosh Co.
Pittsburg Co.
Coal Co.
Newfield 1H-7 Sprague
NE NW 7, 2N-11E

NOTES
Horizontal well
- TVD: 10,648 ft
- BHL: ~2,000' S
- IP: 3,239 MCF
- FTP: 890 psi
- Frac: 83K #sd
- 190K #sd
- 185K #sd
- Total #sd = 458K

May not payout

Cum Prod: 658 MMCF

71% decline in 3 mo
~3,929MMCF/D

48% decline in 14 mo

-590 MCF/D
Devon 1-20H Billie Jean
NW NW 20, 3N-11E

Newfield 1H-7 Sprague
NE NW 7, 2N-11E

Newfield 1H-32 Wilson
NW NW 32, 2N-11E

Newfield 1H-20 Melvin
NE NE 20, 4N-11E

Newfield 2H-31 Patterson
SE SW 31, 4N-11E

Newfield 4H-22 Sherman Ellis
SW SW 22, 5N-12E
Newfield 1H-32 Wilson
NW NE 32, 2N-11E

24% decline in 15 mo

~2,802 MCF/D

~1,921 MCF/D

Pay-out??

Cum Prod: 1,151 MMCF

NOTES
Horizontal well
- TVD: 10,127 ft
- BHL: ~4,000' S
- IP: 1,720 MCF
- FTP: 900 psi
- Frac: 275K #sd
- 216K #sd
- 218K #sd
- 225K #sd
- 215K #sd
- 227K #sd
- 180K #sd
- Total #sd = 1,556,000
Devon 1-20H Billie Jean
NW NW 20, 3N-11E

Newfield 1H-7 Sprague
NE NW 7, 2N-11E

Newfield 1H-32 Wilson
NW NW 32, 2N-11E

**Newfield 1H-20 Melvin**
NE NE 20, 4N-11E

Newfield 2H-31 Patterson
SE SW 31, 4N-11E

Newfield 4H-22 Sherman Ellis
SW SW 22, 5N-12E
Newfield 1H-20 Melvin NE NE 20, 4N-11E

Cum Prod: 722 MMCF

79% decline in 15 mo

~2,282 MCF/D

Pay out: A long time from now!!

~474 MCF/D

NOTES
Horizontal well
TVD: 8,051 ft
BHL: ~3,000' SW
IP: 5,265 MCF
FCP: 3,204 psi
Frac: 212K #sd
   221K #sd
   224K #sd
Total #sd ~ 657K

Monthly Gas Production (MCF)
Devon 1-20H Billie Jean
NW NW 20, 3N-11E

Newfield 1H-7 Sprague
NE NW 7, 2N-11E

Newfield 1H-32 Wilson
NW NW 32, 2N-11E

Newfield 1H-20 Melvin
NE NE 20, 4N-11E

Newfield 2H-31 Patterson
SE SW 31, 4N-11E

Newfield 4H-22 Sherman Ellis
SW SW 22, 5N-12E
Devon 1-20H Billie Jean  
NW NW 20, 3N-11E

Newfield 1H-7 Sprague  
NE NW 7, 2N-11E

Newfield 1H-32 Wilson  
NW NW 32, 2N-11E

Newfield 1H-20 Melvin  
NE NE 20, 4N-11E

Newfield 2H-31 Patterson  
SE SW 31, 4N-11E

Newfield 4H-22 Sherman Ellis  
SW SW 22, 5N-12E

Okfuskee Co.  
Hughes Co.  
Pittsbug Co.  
Atoka Co.  
Coal Co.  
McIntosh Co.
Newfield 4H-22 Sherman Ellis
SW SW 22, 5N-12E

Cum Prod: 2,732 MMCF

~10,835 MCF/D

~3,570 MCF/D

67% decline in 11 mo

Pay-out?

NOTES
Horizontal well
TVD: 8,014 ft
BHL: ~3,200’ N-NW
IP: 11,200 MCF
FCP 900 psi
Frac: 211K #sd
217K #sd
217K #sd
217K #sd
Total #sd = 862,000
NYMEX Henry- Hub natural Gas Prices - 12 previous months

Unfriendly price for shale gas!