Performance of Industry Shale Plays

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U.S. Shale Plays

Source: IHS MS Streets & Trips
U.S. Gas Well Production

U.S. Historical Gas Well Facts

- Production
- Well Count
- Avg Well Rate

Estimated Critical Rate

18,400 wells/year

Source - EIA
Shale Play Well Count

Source - IHS
Shale Play Production

15% of U.S. Gas Well Production from Shale Wells

Shale Plays

Source - IHS
Well Production Rate Distribution

U.S. Gas Well Rate Distribution

Source: HDPI
Well Production Rate Distribution
Changes with Time

U.S. Gas Well Rate Distribution

Source: HDPI
U.S. Gas Well Rate Distribution

Current Year Wells and All Wells

Source: HDPI
Well Production Rate Distribution
Current Year Wells and All Wells

U.S. Gas Well Rate Distribution

- 2006 All Wells
- 2006 Wells in 2006
- 2006 Wells in 2007
- 2006 Wells in 2008

Source: HDPI

Liquid Loading 300 MCFD
Shale Play Gas Rate Distribution

Source - IHS
Distribution of Data Sources

Well Count

Wells

- Barnett (horiz)
- Barnett (vert)
- Abo
- Antrim
- Bossier
- Brown
- Coffee
- Devonian
- Fayetteville
- Gallup
- Haynesville
- Marcellus
- New Albany
- Ohio
- Queenston
- Woodford

Source - IHS
Shale Plays - Average Age of Wells

Average Age of Wells in IP Data Set

Years

Barnett (horiz)  Barnett (vert)  Abo  Antrim  Bossier  Brown  Coffee  Devonian  Fayetteville  Gallup  Haynesville  Marcellus  New Albany  Ohio  Queenston  Woodford

Source - IHS
Barnett Shale Well Performance

Source - IHS
Barnett Shale Initial Well Performance

Barnett Shale Initial Well Performance

Source - IHS
Barnett Shale Well Rate Distribution

Source - HDPI
Barnett Shale Well Rate Distribution – Horizontal & Vertical Wells

Barnett Shale Well Rate Distribution

- 2008 All Wells
- 2008 All Vertical Wells
- 2008 All Horizontal Wells

Source - HDPI
Barnett Shale Well Rate Distribution

“New” Wells & Field Average

Barnett Shale Well Rate Distribution

- 2006 All Wells
- 2006 Wells in 2006

Gas Rate, MCFD

Fraction of Total

Source - HDPI
Barnett Shale Well Rate Distribution – “New” Wells & Field Average

Barnett Shale Well Rate Distribution

Source - HDPI
Barnett Shale Well Count

Source - IHS
Barnett Shale Gas Production

Source - IHS
Shale Play 30 Day Well IP

Source - IHS

Shale Play Initial Well Performance

New "Plays" & drilling/completion technology

30 Day Well IP, MCDF

Source - IHS
Shale Play Average Well IP

Average 30 Day Well IP

Gas Production Rate, MCFD

Haynesville
Woodford
Barnett (horiz)
Fayetteville
Bossier
Barnett (vert)
Abo
Gallup
Antrim
Queenston
Devonian
Marcellus
Brown
New Albany
Ohio
Coffee

Source - IHS
Rate Distribution – 30 Day IP

Shale Play Well 30 Day IP Distribution

Fraction of Total

Gas Production Rate, MCFD

All Data
+ 2008 Wells

308 < P50 < 1567 MCFD

Source - IHS
Wells Used in 2008 IP Distribution

Well Count used for 2008 IP Distribution

Source - IHS
30 Day IP Rate Distribution - Comparison

Shale Play Well 30 Day IP Distribution

Limited Available Data

Source - IHS
Observations

- Gas production from shale reservoirs
  - 15% of U.S. gas production from gas wells

- The Barnett Shale is currently the largest shale play
  - Currently 5 BCFD from 11,200 wells
  - 9% of U.S. gas production from gas wells
  - 10% of new gas wells in US in 2008

- P50 gas rate from shales ranges 0.5-3,067 MCFD

- Use 30 Day Well IP

- Shale well IP’s have increased since 2004 as a result of new plays, drilling and completion technology
  - Rates in excess of 10 MMCFD are reported (less than 1% of 2008 wells)
  - Need to examine IP rate distributions to determine likely outcome
    - Current P50 rate is approximately 1.5 MMCFD
    - Check distribution for specific play and well type for likely outcome
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