

# **US - China Oil & Gas Industry Forum 2009:**

## **The Transformation of Newfield Exploration by Unconventional Shale Gas Resource Plays**

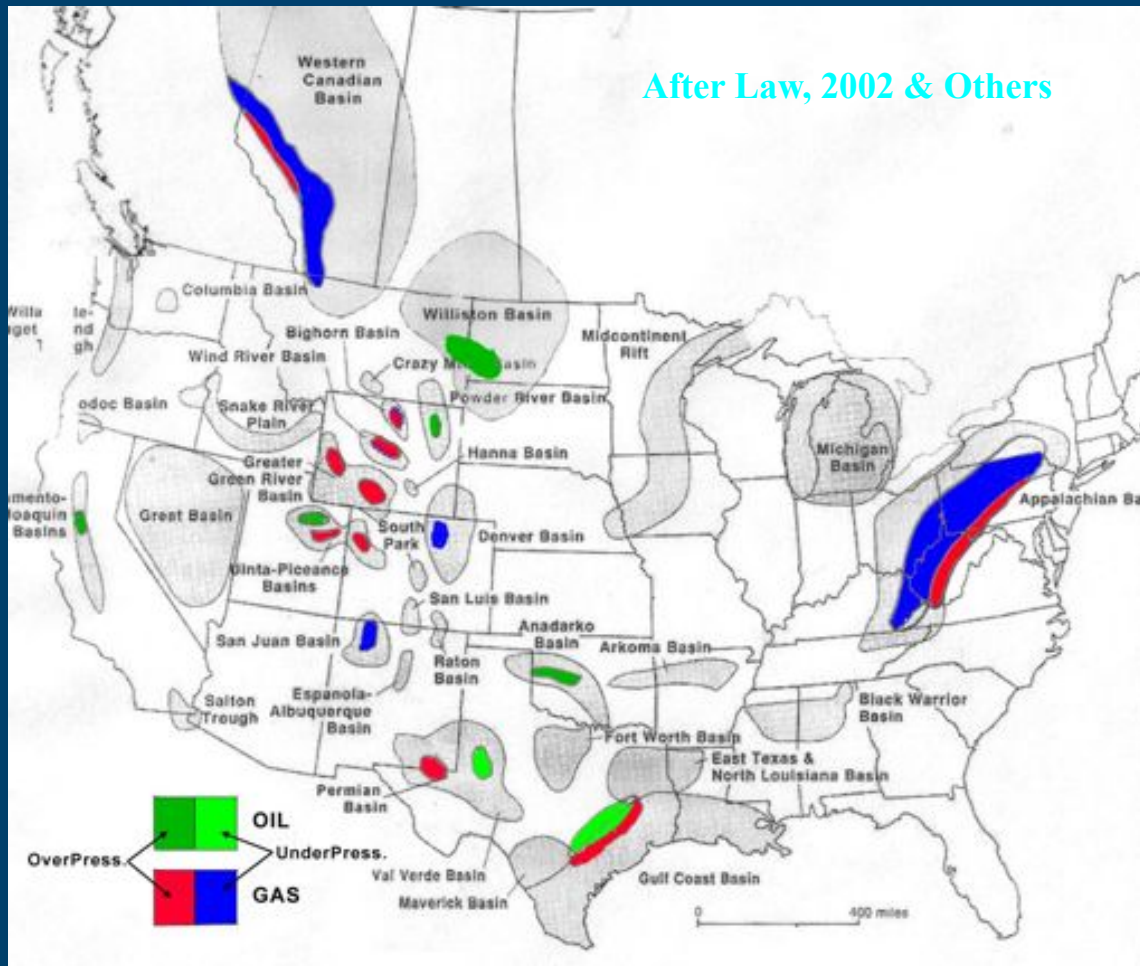
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# Outline of Presentation

- **Unconventional Resource Plays in North America**
- **Newfield's Woodford Shale Play**
- **Implications for Supply and Prices**

# Unconventional Resource Plays



- Tight Gas Sands
- Shale Gas
- Coal Bed Methane
- Heavy Oil Sands

# U.S. Gas Production - 2007

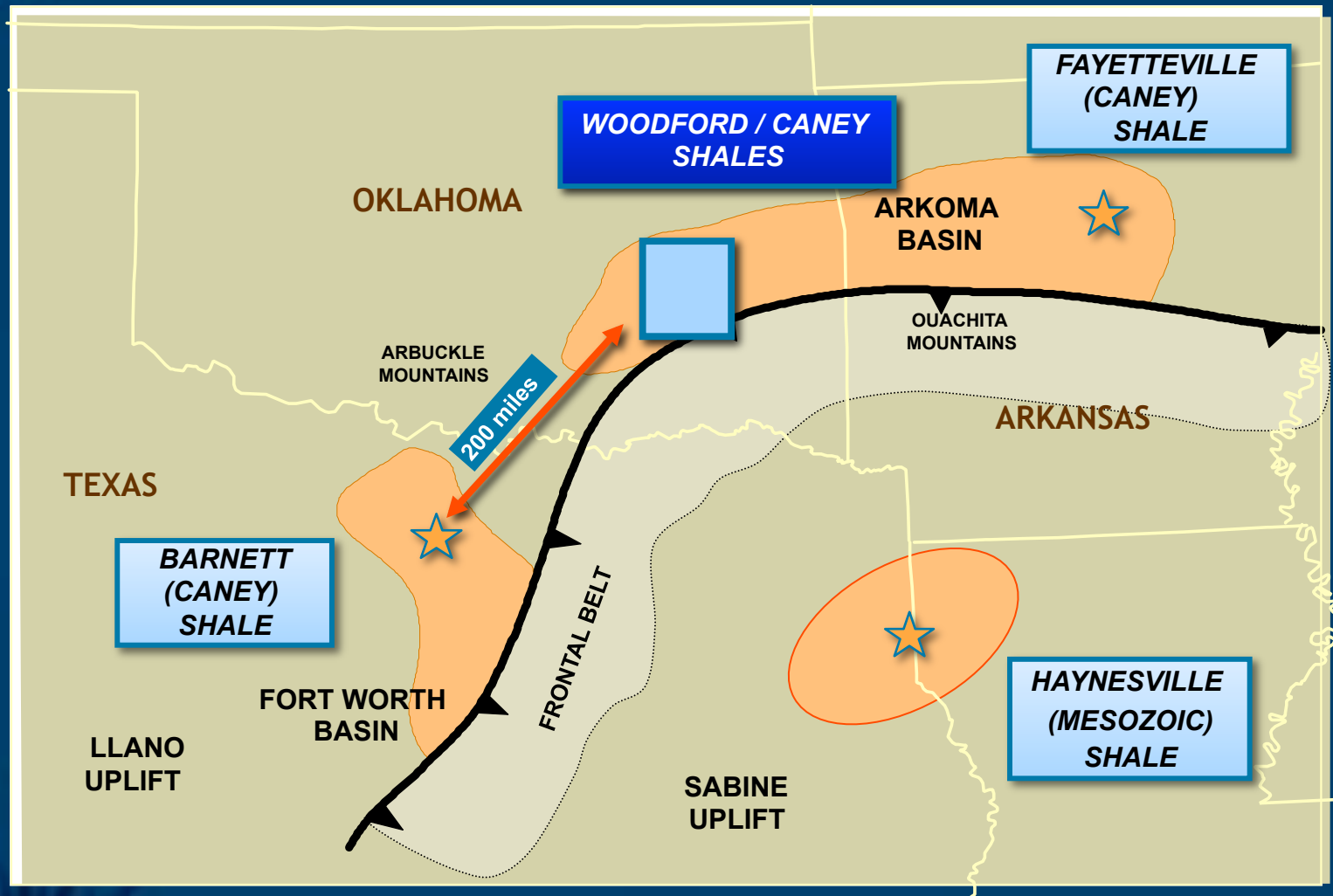
## Top 10 U.S. Fields Ranked by Gas Production from Estimated 2007 Field Level Data\*

Rank	Field Name	Location	Accumulation Type	Continuous Classification	Discovery Yr	2007 Est. Prod. Vol. Bcf
1	San Juan Basin Gas Area	CO & NM	Continuous	Coalbed gas	1927	1,320.7
2	Newark East	TX	Continuous	Shale Gas	1981	1,110.3
3	PRB Coalbed	MT & WY	Continuous	Coalbed gas	1992	442.0
4	Jonah	WY	Continuous	Tight sandstone and basin centered gas	1977	366.3
5	Hugoton Gas Area	KS, OK & TX	Conventional	NA	1922	357.8
6	Pinedale	WY	Continuous	Tight sandstone and basin centered gas	1955	313.4
7	Carthage	TX	Conventional	NA	1936	231.7
8	Natural Buttes	UT	Continuous	Tight sandstone and basin centered gas	1940	170.4
9	Wattenberg	CO & NM	Continuous	Chalk gas and basin centered	1970	169.0
10	Prudhoe Bay	AK	Conventional	NA	1967	168.7

\*Energy Information Administration, US Crude Oil, Natural Gas and Natural Liquids Reserves 2007 Annual Report

Shale gas + tight gas + coalbed methane = 42% of US gas production in 2007 and could account for ~48% by 2010  
(Warlick Int. NA Unconventional Gas Market Report 2008)

# Paleozoic Shale Gas Plays

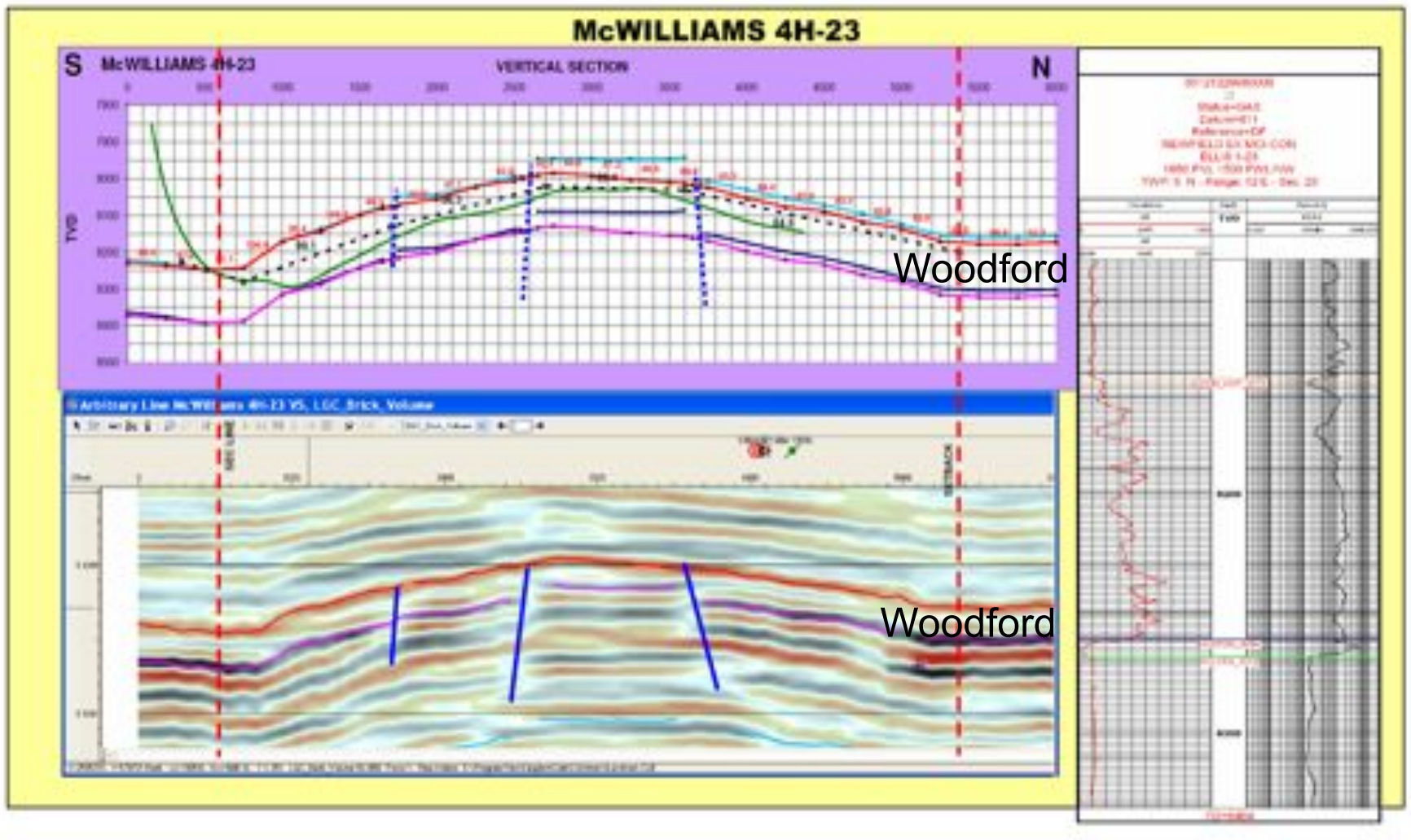




# Recipe for Success

- **Commercial risks outweigh geologic risk**
- **Collect science early**
  - *Regional perspective to define sweet spots*
- **Operational solutions are key to success**
  - *Ability to rapidly build a learning curve and adapt to change*
  - *Integration of G&G and Operations is key to lowering cost*
- **Fracture containment is imperative**
- **Geophysics are important – don't drill WITHOUT 3-D!**
- **Horizontal drilling improves economics**

# Geosteering



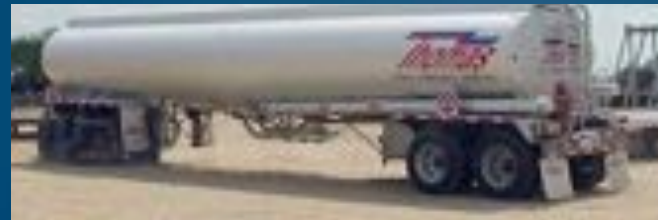
# Woodford Horizontals – Fracture Treatment Size

Typical Job Size = 12,000 bbls = 504,000 gallons = 126 Tanker Trucks



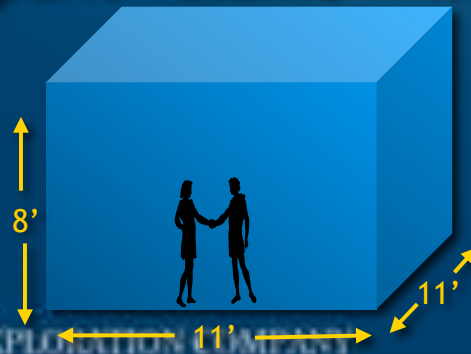
x 126

Typical Job Rate = 100 bbls/min = 4200 gallons/min = 1 Tanker Truck/min



Per Minute

Typical Proppant Volume = 100,000 lbs = 1000 cu. ft



Would fill an  
8'x 11'x 11' room

# Aerial View of Locations



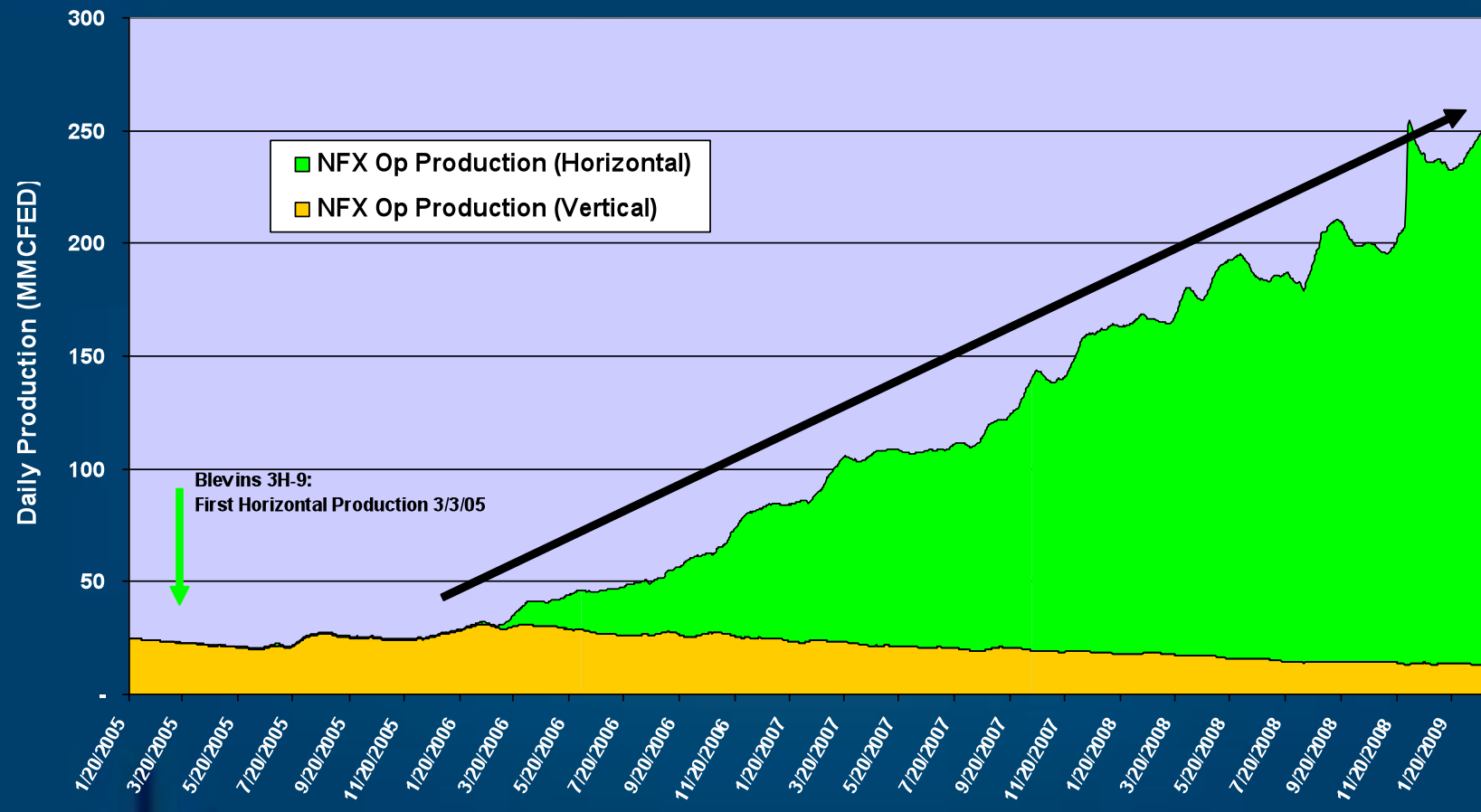
Frac Ponds

# Typical Frac Location Set Up



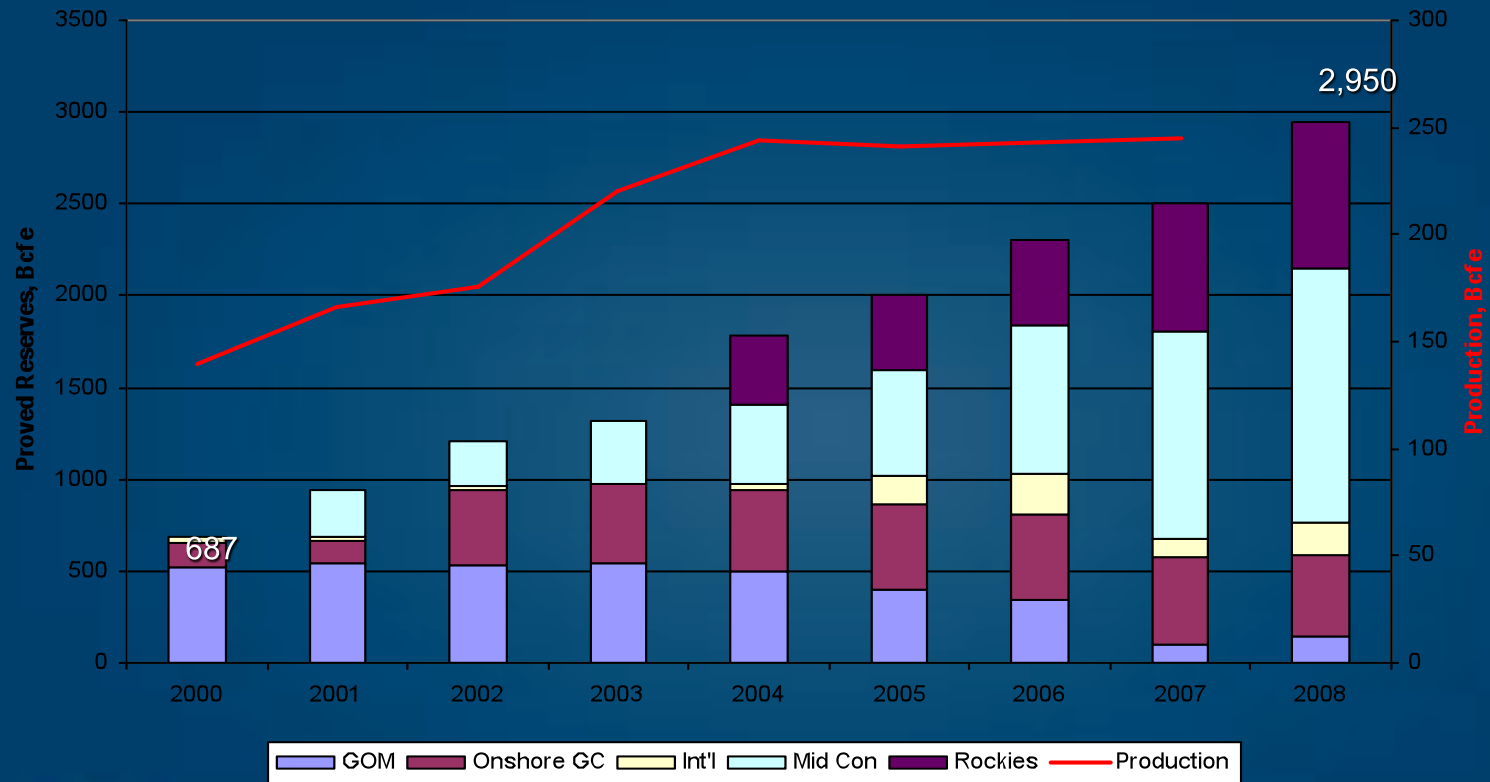
# Woodford History – NFX Gross Production

## 20-Day Moving Average

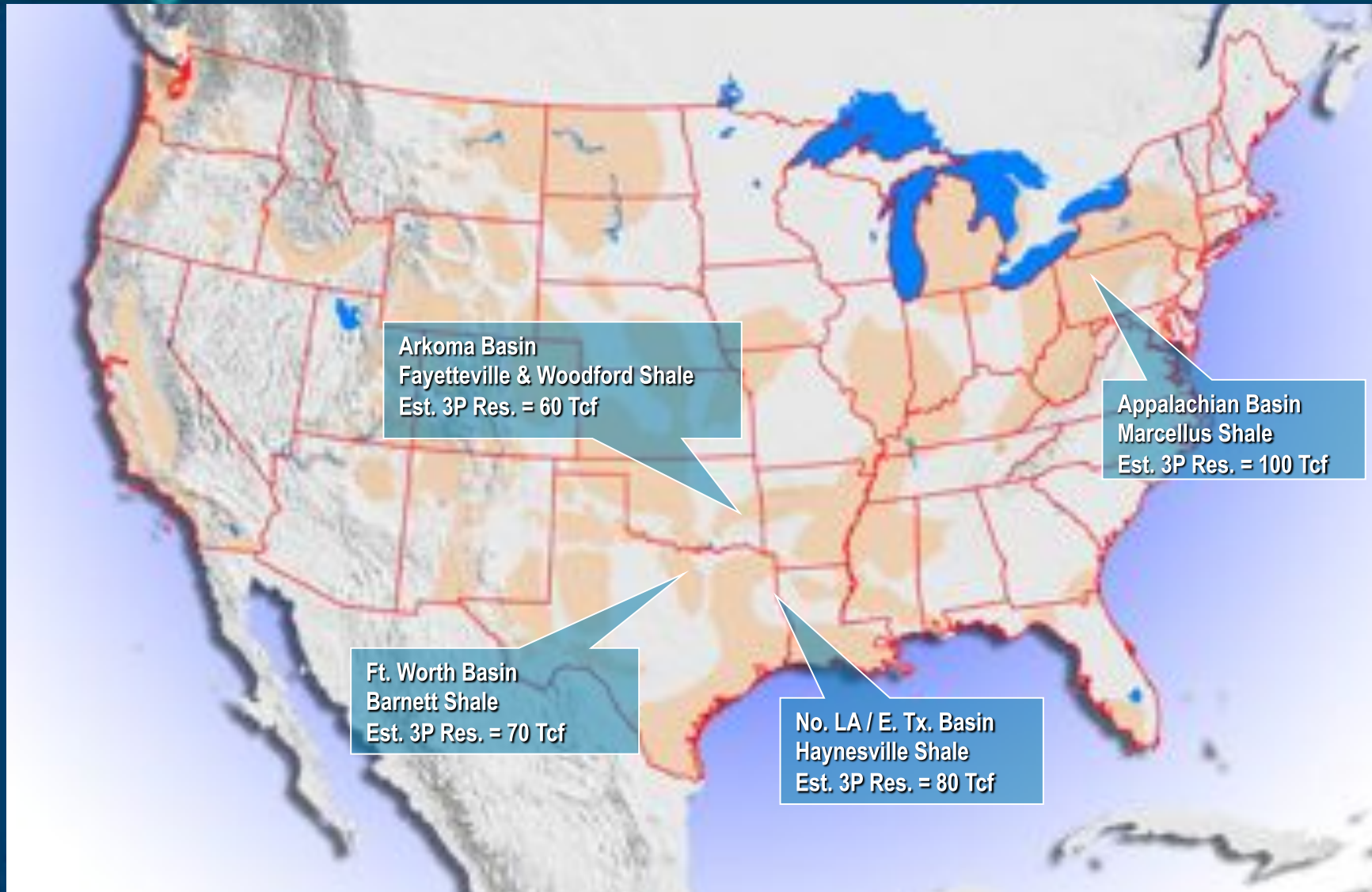


# Woodford Reserve Growth

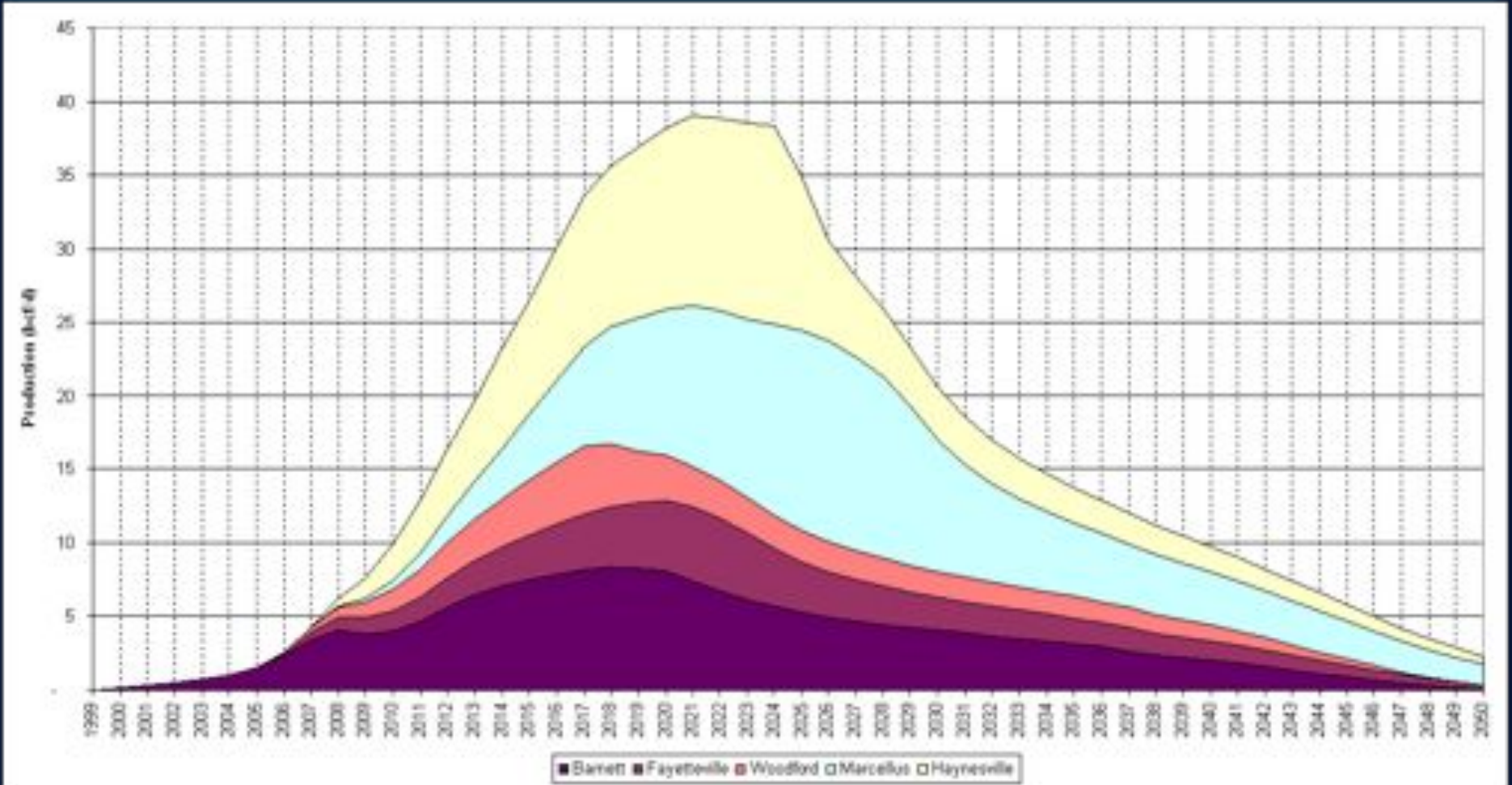
www.newfield.com



# Major U.S. Shale Gas Plays



# Impact on U.S. Gas Production



# Implications for Gas Supply

- **Abundant new source of natural gas in North America**
- **LNG regasification facilities in US are overbuilt and underutilized.**
- **Arctic pipelines to produce Alaska and Mackenzie Delta gas will be delayed.**
- **Natural gas will begin to displace crude oil in some segments in the US.**

# Implications for Natural Gas Prices

- Supply in No. America exceeds demand.
- Prices have fallen from >US\$13.00/mmbtu in mid-2008 to <US\$4.00/mmbtu currently.
- Natural gas prices in No. America will continue to be lower than prices in Europe and Asia in coming years.

# Conclusions

- **Reserves additions from unconventional resource plays have reversed a 30 year decline in US natural gas reserves.**
- **Production from shale gas represents 10% of US supply and will grow significantly in the future.**
- **Unconventional resource plays on other continents could have similar impact on natural gas markets worldwide.**