

Fracturing – What is it? Why all the Press? Benefits & Environmental Concerns

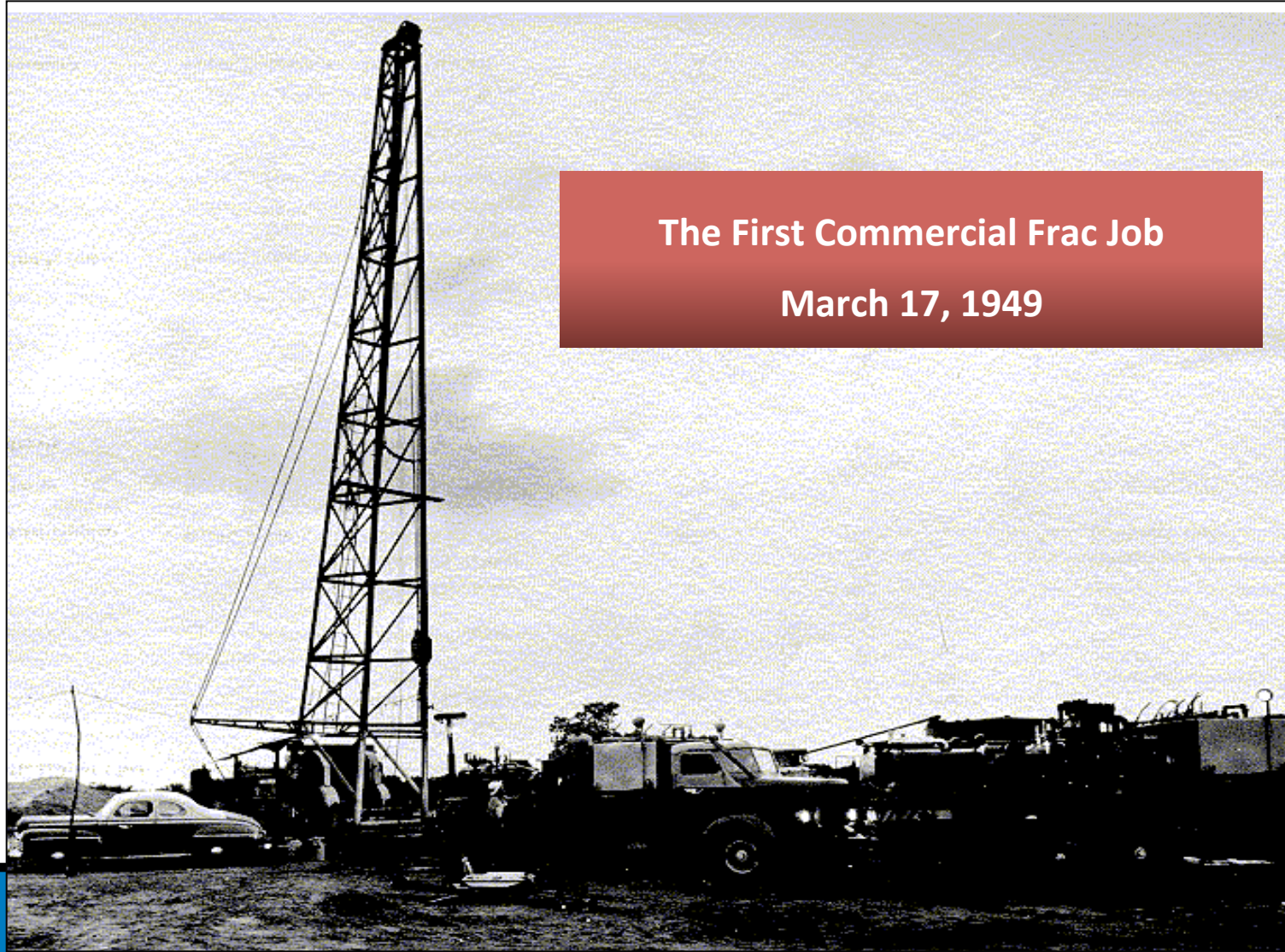
RICK MIDDAUGH P.E.



Dallas Section

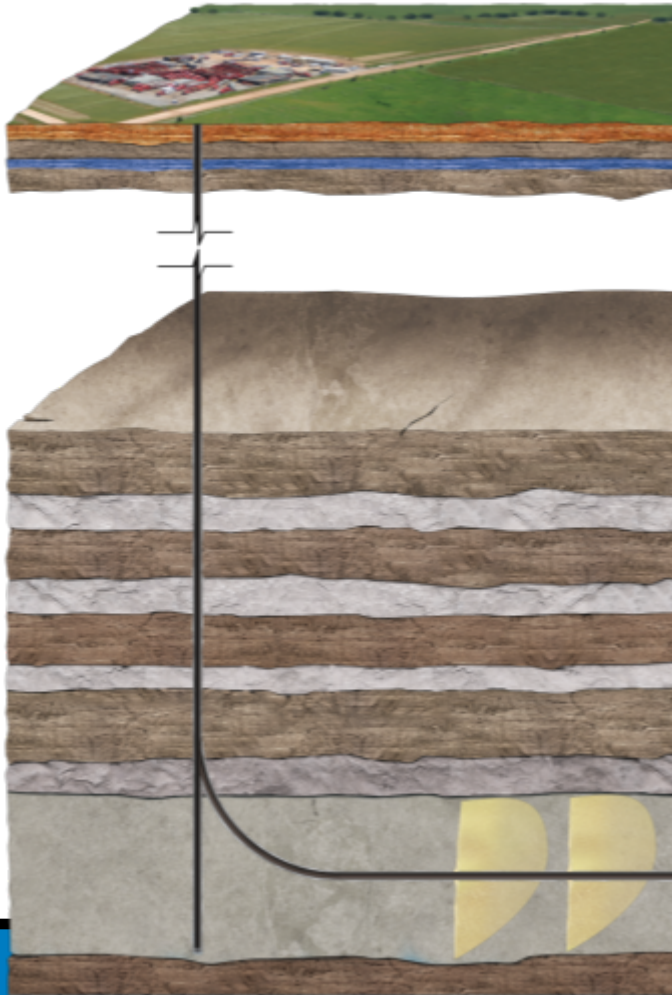


Velma, Oklahoma



The First Commercial Frac Job
March 17, 1949

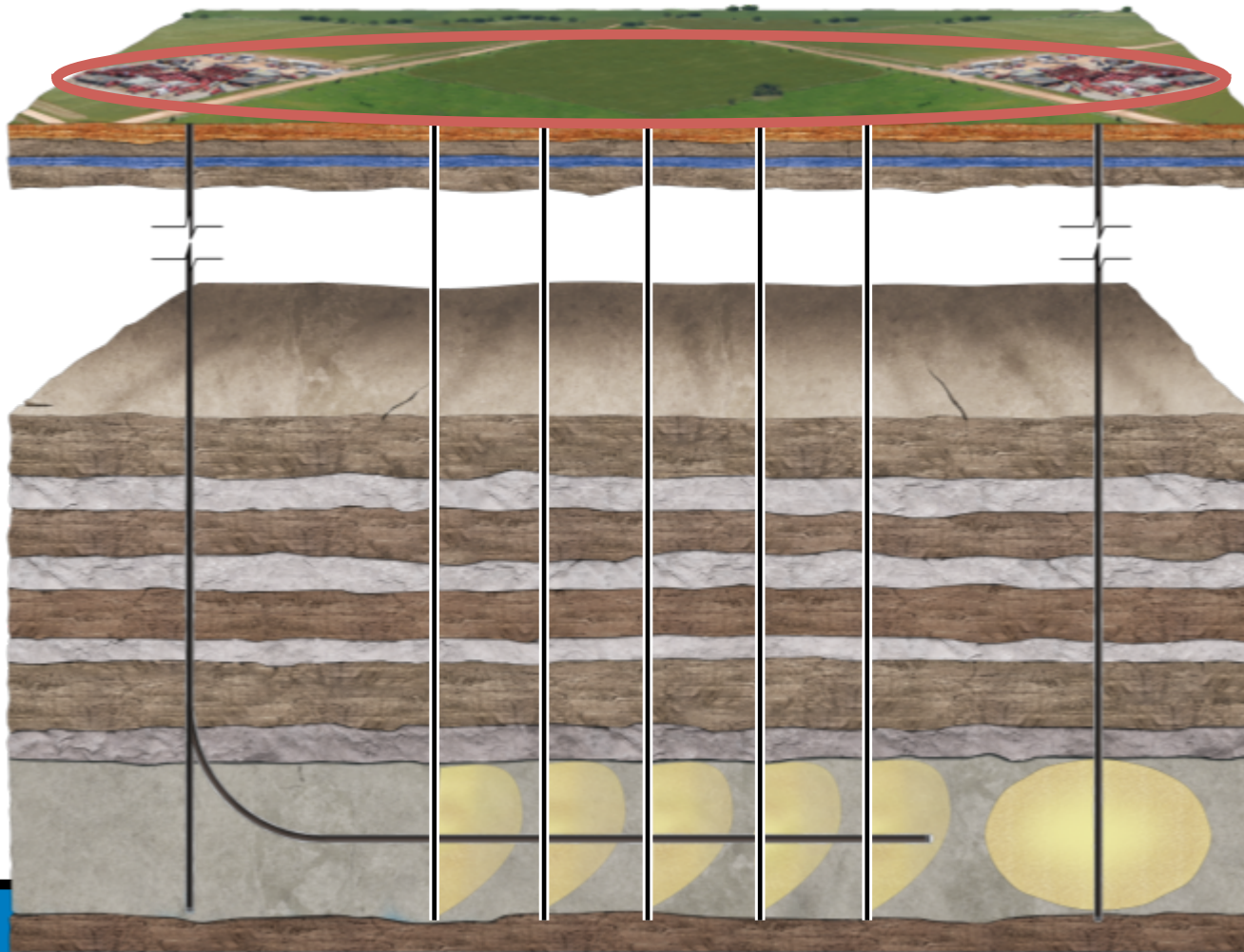
What is “Hydraulic Fracturing?”



- Hydraulic Fracturing:
 - The use of fluids to create a pathway to the wellbore
 - The placement of small granular solids into the pathway to ensure that it remains open after the hydraulic pressure is removed
- Objective:
 - Increase the rate at which the well is capable of producing oil or gas
 - Increase the economically recoverable reserves for a well



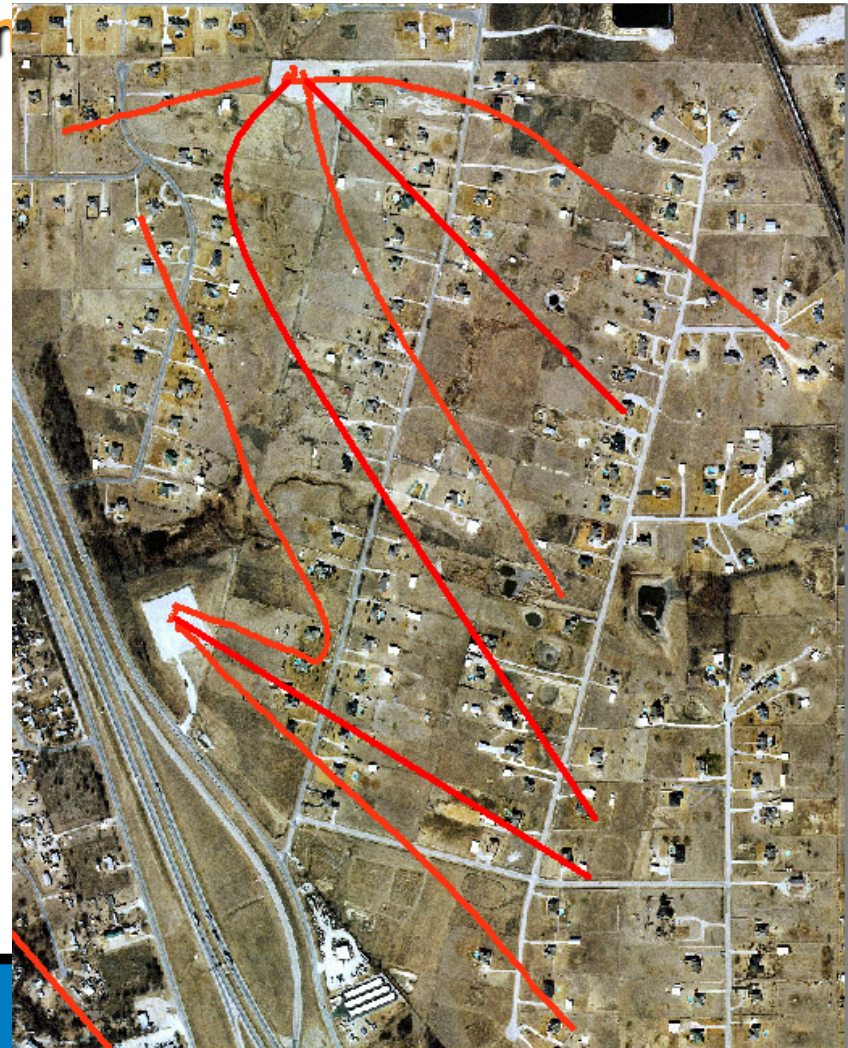
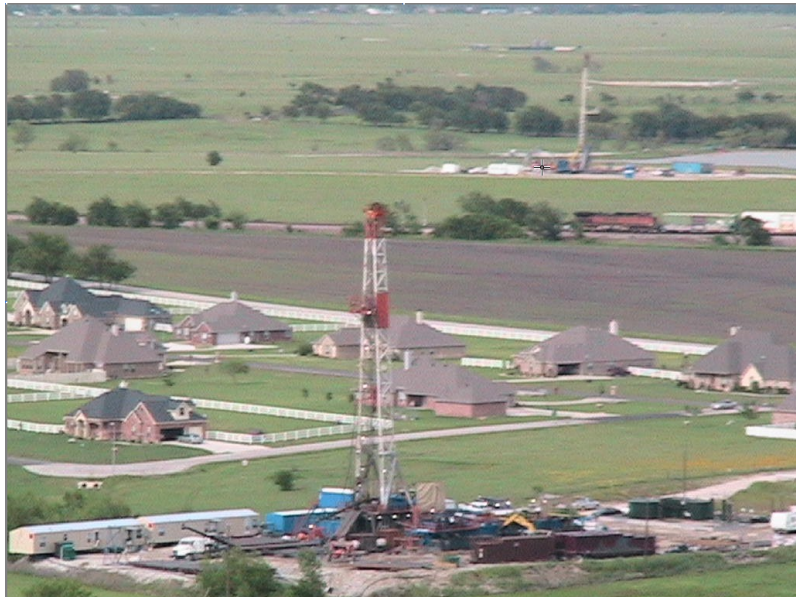
Horizontal versus Vertical Wells



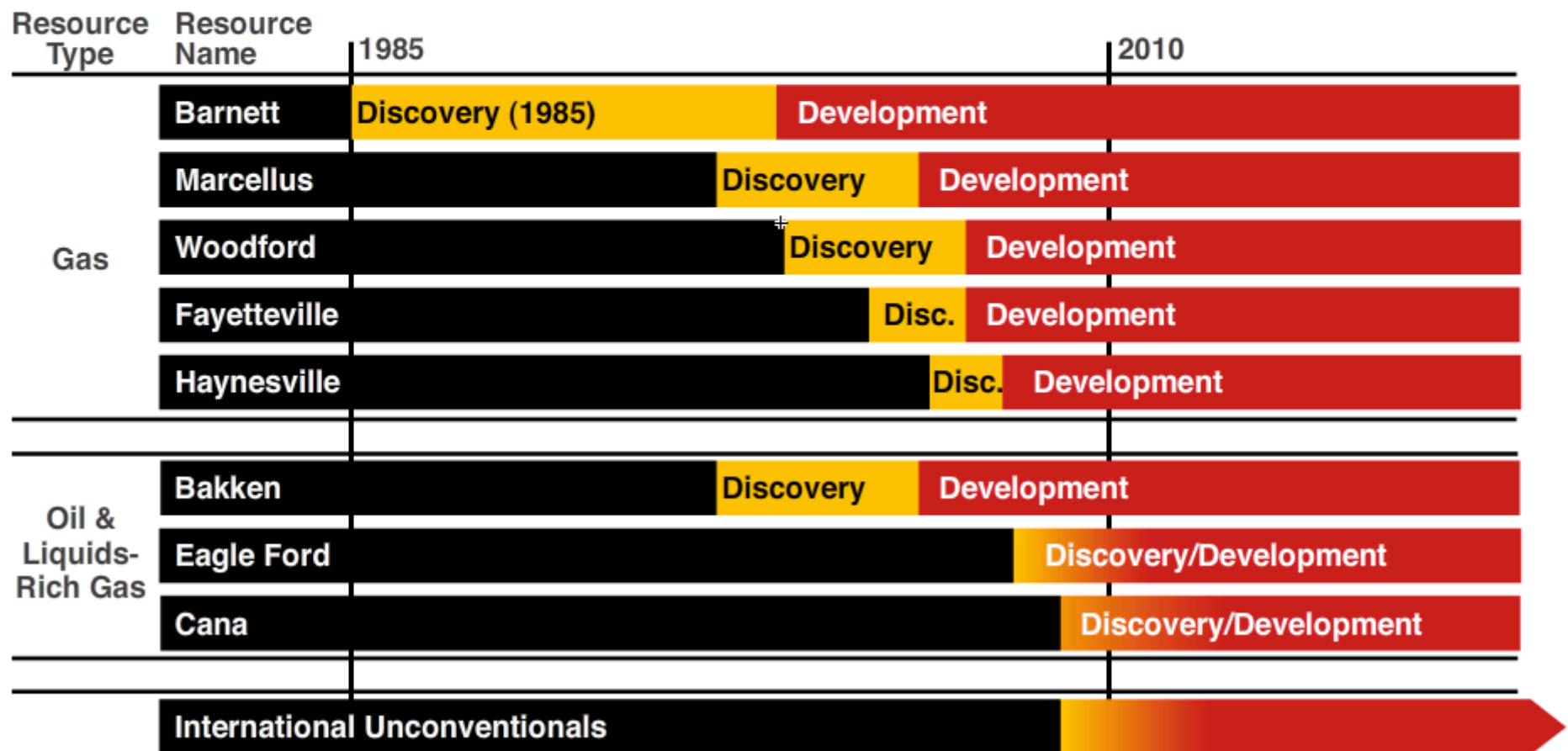
- Improve efficiency
- Reduce surface footprint

Engineering Design - HASLET HEIGHTS

Operating SAFELY is a joint



THE HISTORY OF DEVELOPMENT

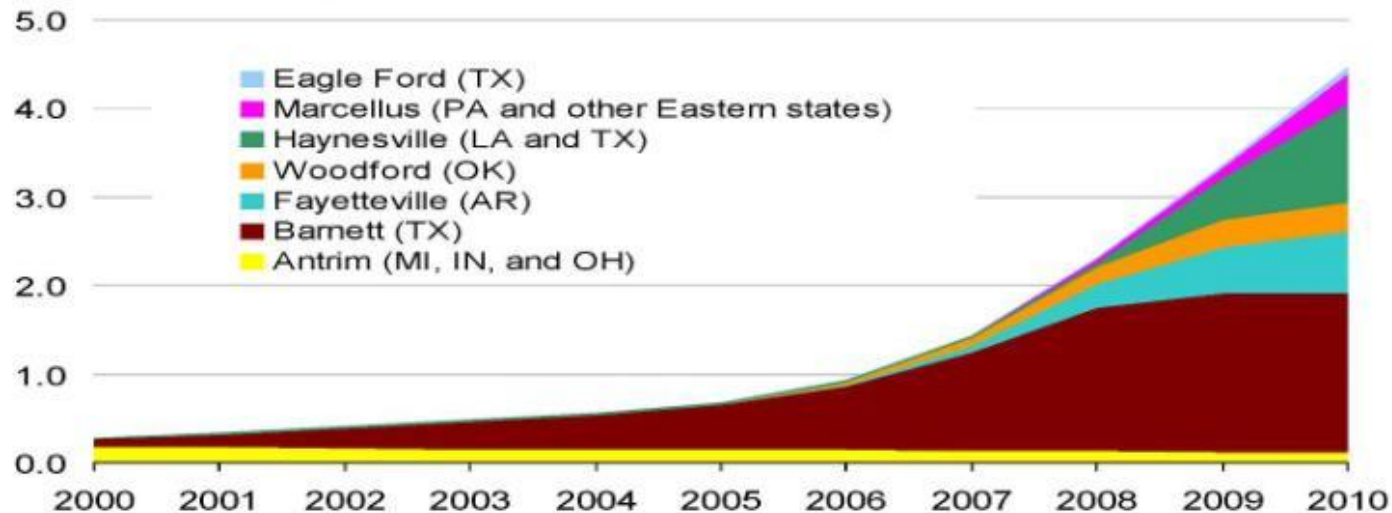


Shale Gas Production

Game Changer

U.S. shale gas production increased 14-fold over the last decade; reserves tripled over the last few years

annual shale gas production
trillion cubic feet per year

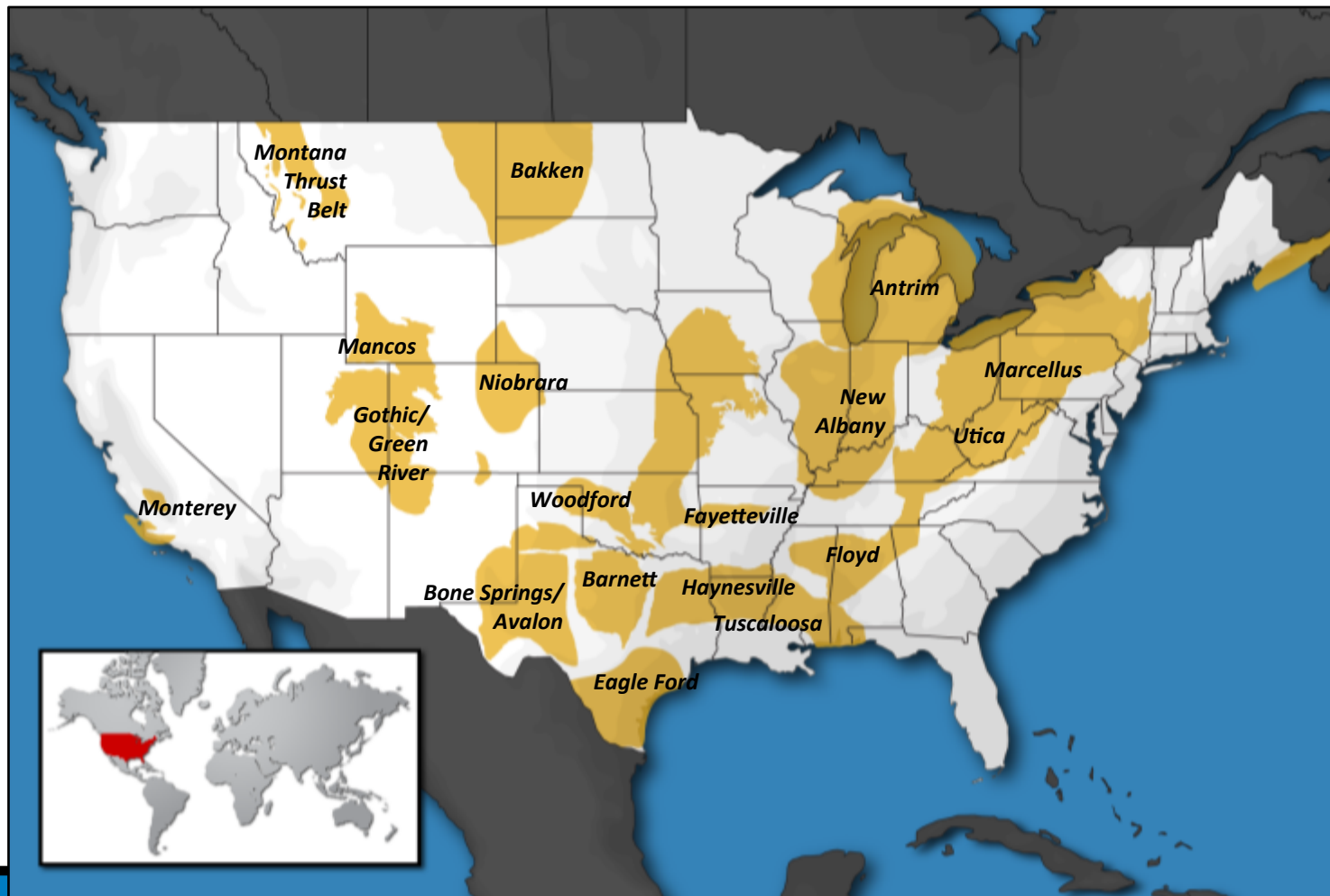


Richard Newell, December 16, 2010

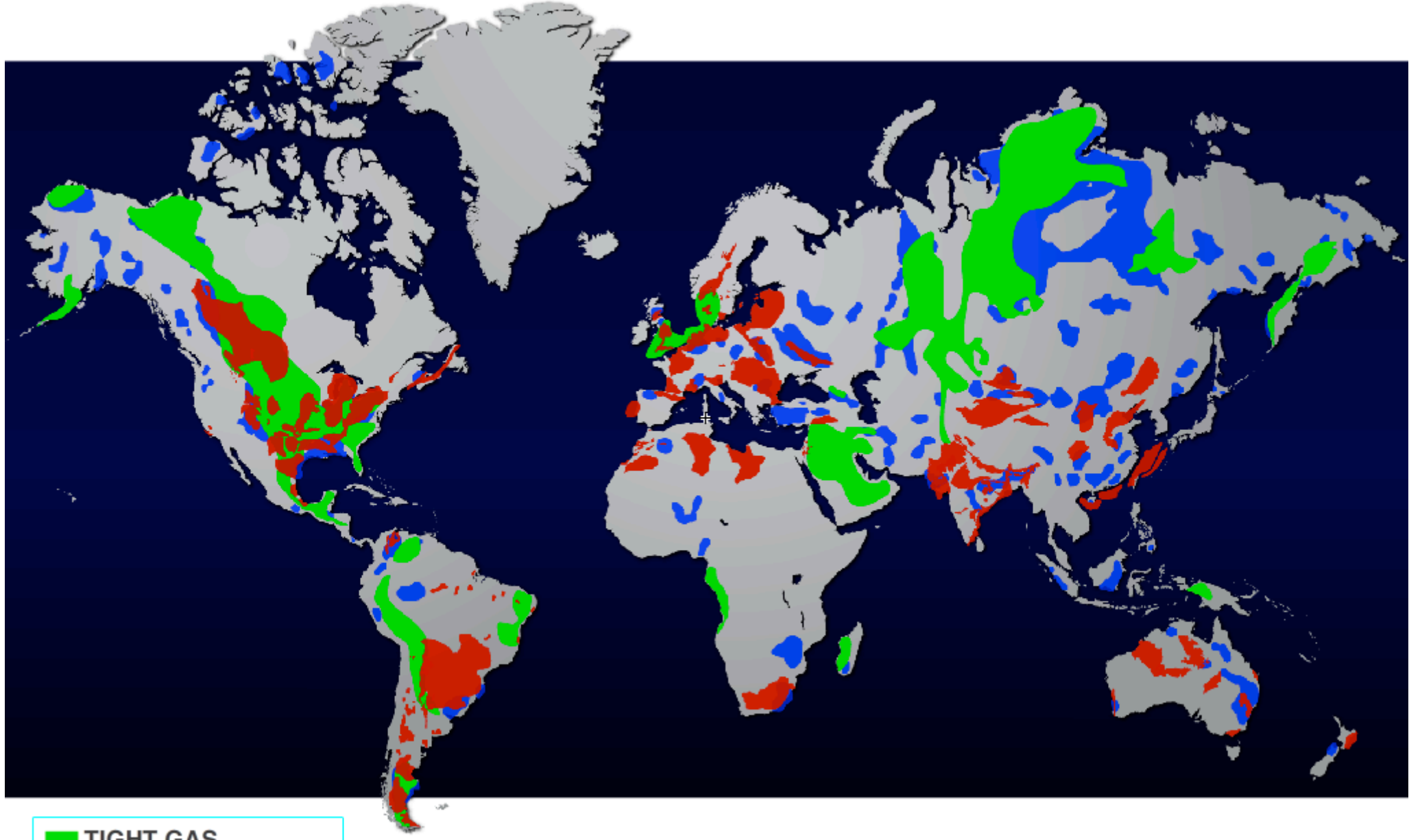
Source: Lippman Consulting (2010 estimated)

21

U.S. Shale Today

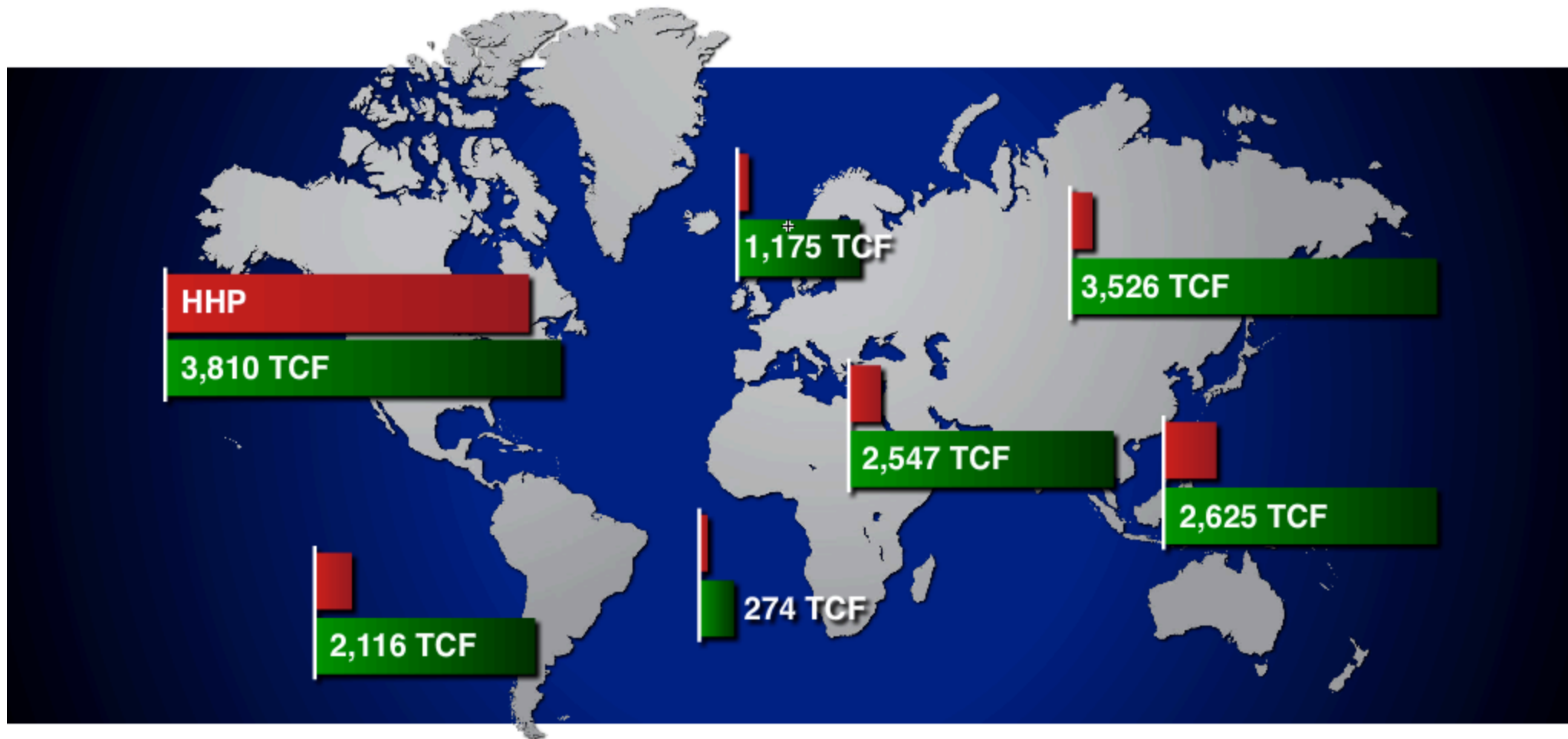


http://www.eia.gov/oil_gas/rpd/shale_gas.jpg



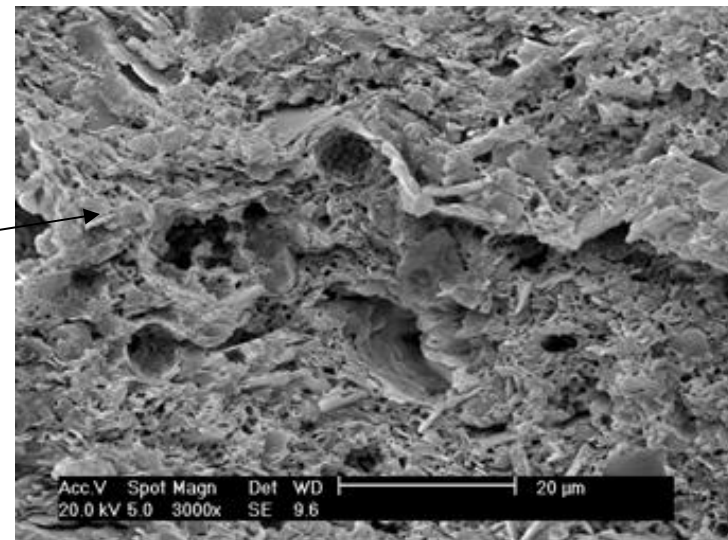
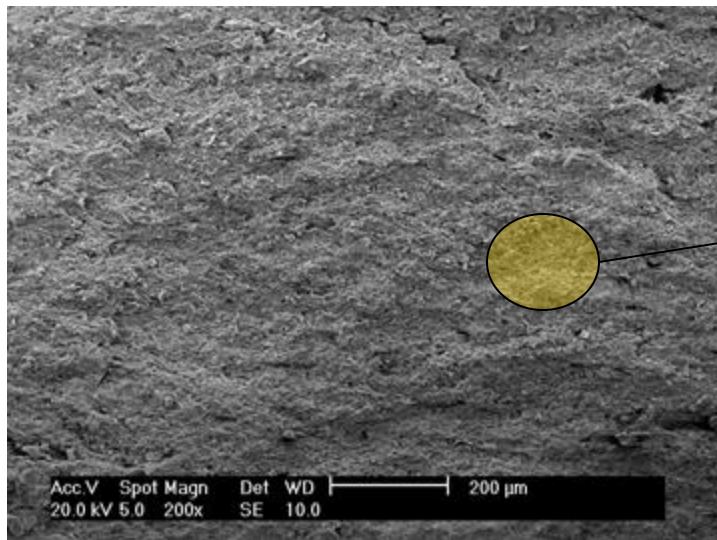
- TIGHT GAS
- SHALE
- COALBED METHANE

GLOBAL GAS MARKETS



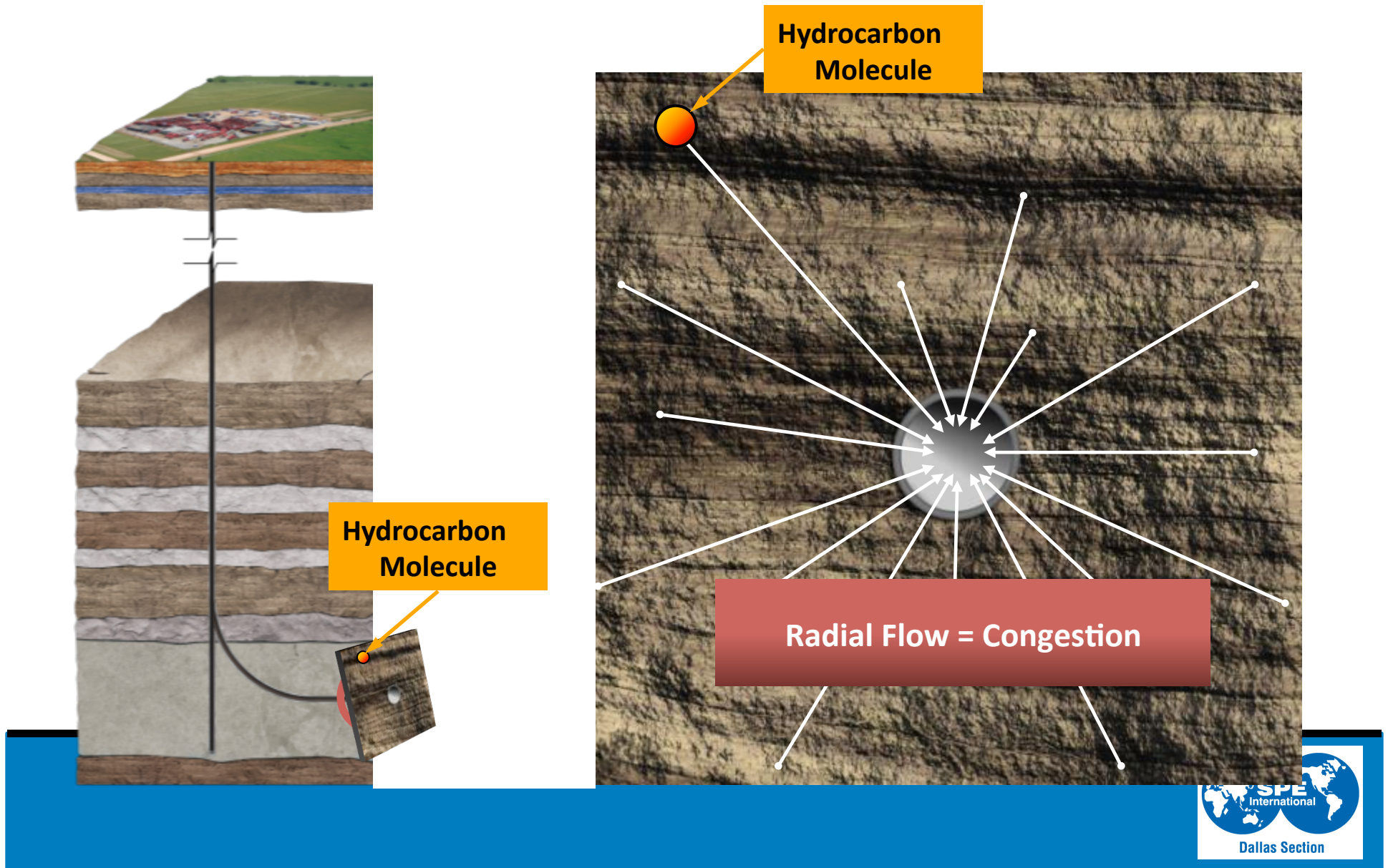
Why “Frac” a Well?

- Increase the **Rate** at which the well is capable of producing oil or gas
- Most “Unconventional Formations” **Require** hydraulic fracturing to be economic



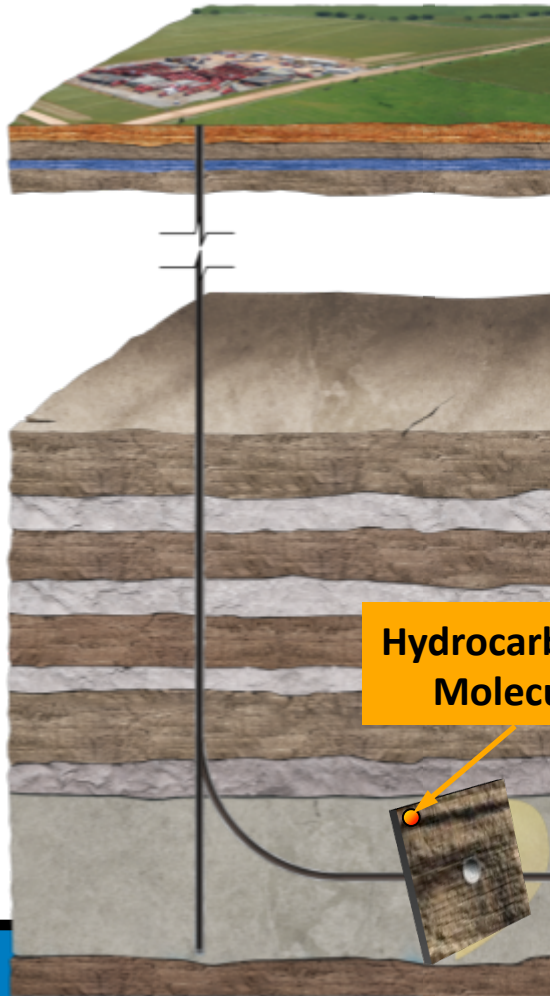
Why We Frac

Radial Flow

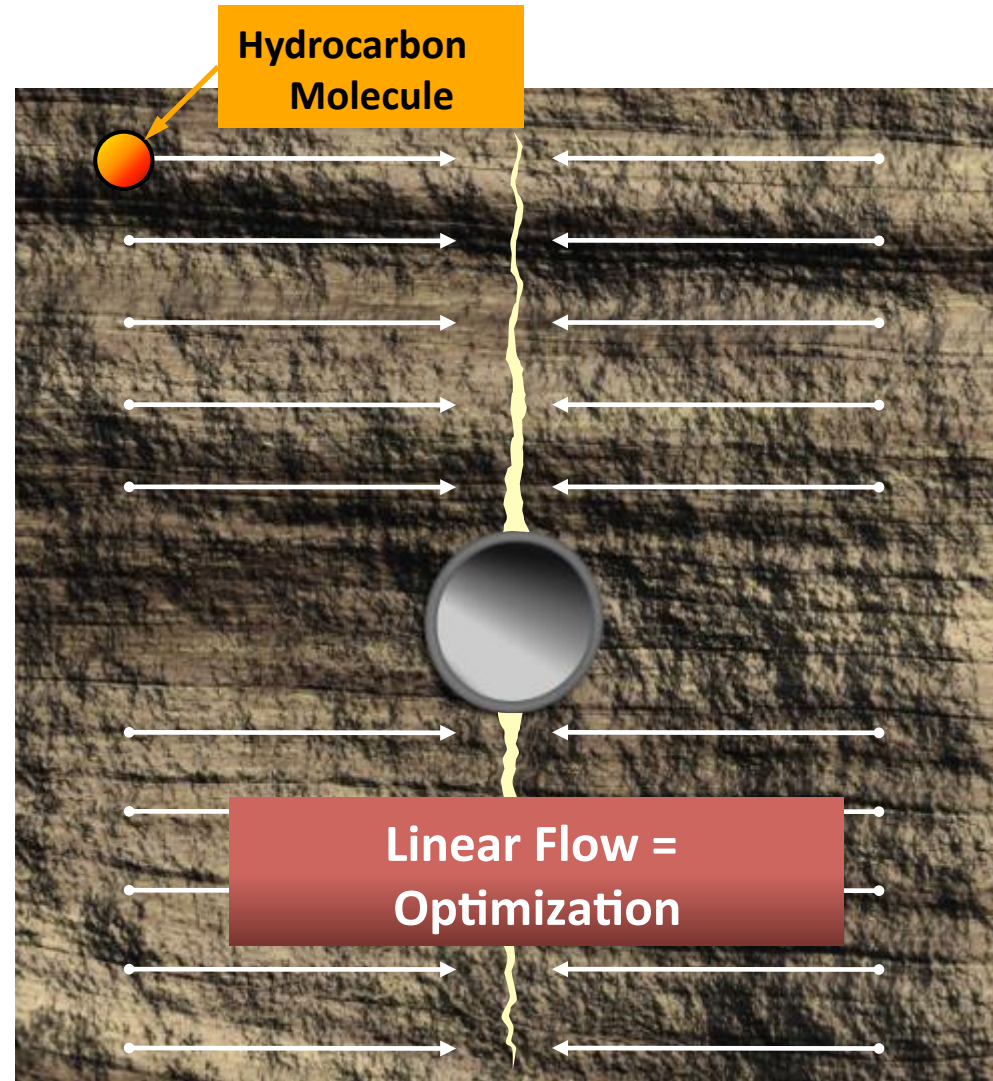


Why We Frac

Linear Flow



Hydrocarbon
Molecule



Hydrocarbon
Molecule

Linear Flow =
Optimization



Introduction to Hydraulic Fracturing