Natural Gas Drilling: 101

Adapted from presentation by Ed Ireland,
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City of Cedar Hill Informational Meeting

August 14, 2008

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Agenda

- Gas drilling basics
- Lease considerations
- Financial terms and royalties
- Tips for neighborhoods
- Resources

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Disclaimer

- The City of Cedar Hill does not lease nor provide advice about leasing private property for gas exploration and drilling. Information provided by the City addresses general issues related to gas drilling and mineral leases and is not intended to provide advice on any specific legal matter or factual situation.

Disclaimer

- This information is not intended to create and its receipt does not constitute a lawyer-client relationship. Recipients should not act upon this information without seeking professional legal counsel. Gas companies offering leases for gas exploration and drilling for privately owned minerals are not associated with or endorsed by the City of Cedar Hill.

Disclaimer in a 'Nutshale'

- To lease, or not to lease, is an individual decision
- The City of Cedar Hill is only providing information and is not making any recommendations
- The information being presented may, in no way, be construed as legal advice
- The City of Cedar Hill is not in the oil and gas business or receiving any funds from the industry

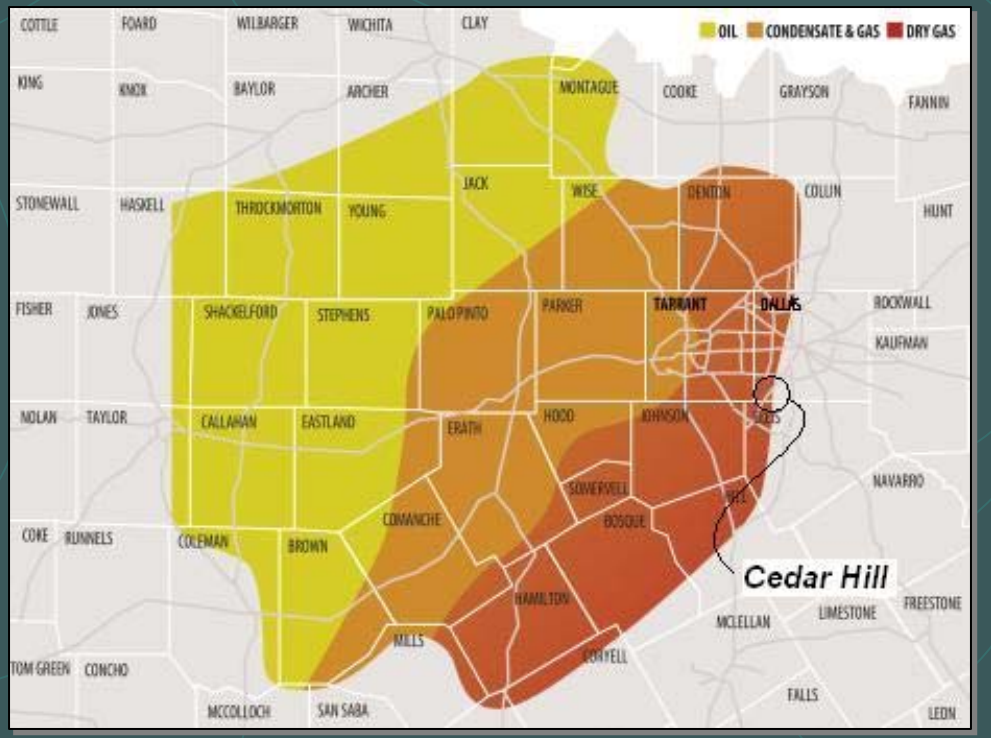
Gas Drilling Basics

The Barnett Shale

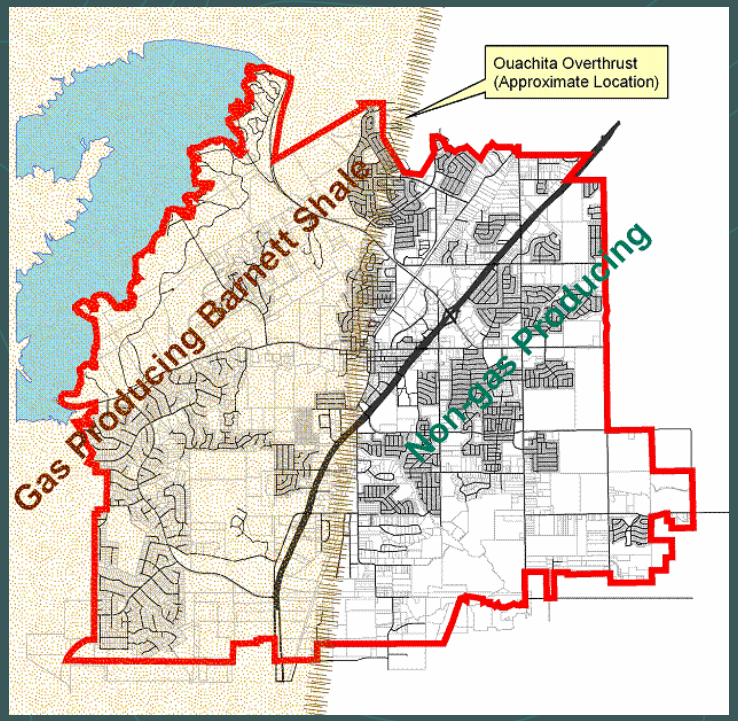
Sitting atop what geologists refer to as the Fort Worth Basin lies the Barnett Shale, a 600 foot thick layer of decomposed organic material deposited 300-320 million years ago that produced methane or natural gas. Believed to be one of the nation's richest natural gas deposits, the Barnett Shale spans a 17-20 county area estimated to contain 30 trillion cubic feet of natural gas.

The Barnett Shale

Experts suggest that it may be the largest onshore natural gas field in North America, covering approximately 5,000 square miles.



The Barnett Shale



The major portion of potential urban development is located beneath Tarrant and surrounding counties, about a mile underground. It has been there for these hundreds of millions of years waiting for engineers to develop a technology to extract economically.

Gas Drilling Issues

- Bonus
- Royalty
- Drill site location
- Surface usage
- Transportation costs
- Post production expenses
- Pooling
- Mortgage, insurance, property taxes

Facts to Consider

- Process takes a long time
- Difficult to get real information from leasing agents
- A lease is a legally binding document
- The fine print is there for a reason
- The terms are important as well as the price
- Urban leasing is different from rural

Landman or Broker

- Not the operator of the well
- Paid if leases are signed
- Not accustomed to ‘urban’ leases
- Think they have the right to drill
- Known to use high pressure tactics
  - “Hurry or you will be left out”
  - Often confuse the issue
  - Promise more than they can deliver

Leasing Contacts

- Four Sevens Energy
- Colt Exploration
- Turner Drilling
- Paloma
- Dale Resources
- Fort Worth Energy
- Western Production
- Continental
- PFM
- Davis
- Holland
- Mitchell

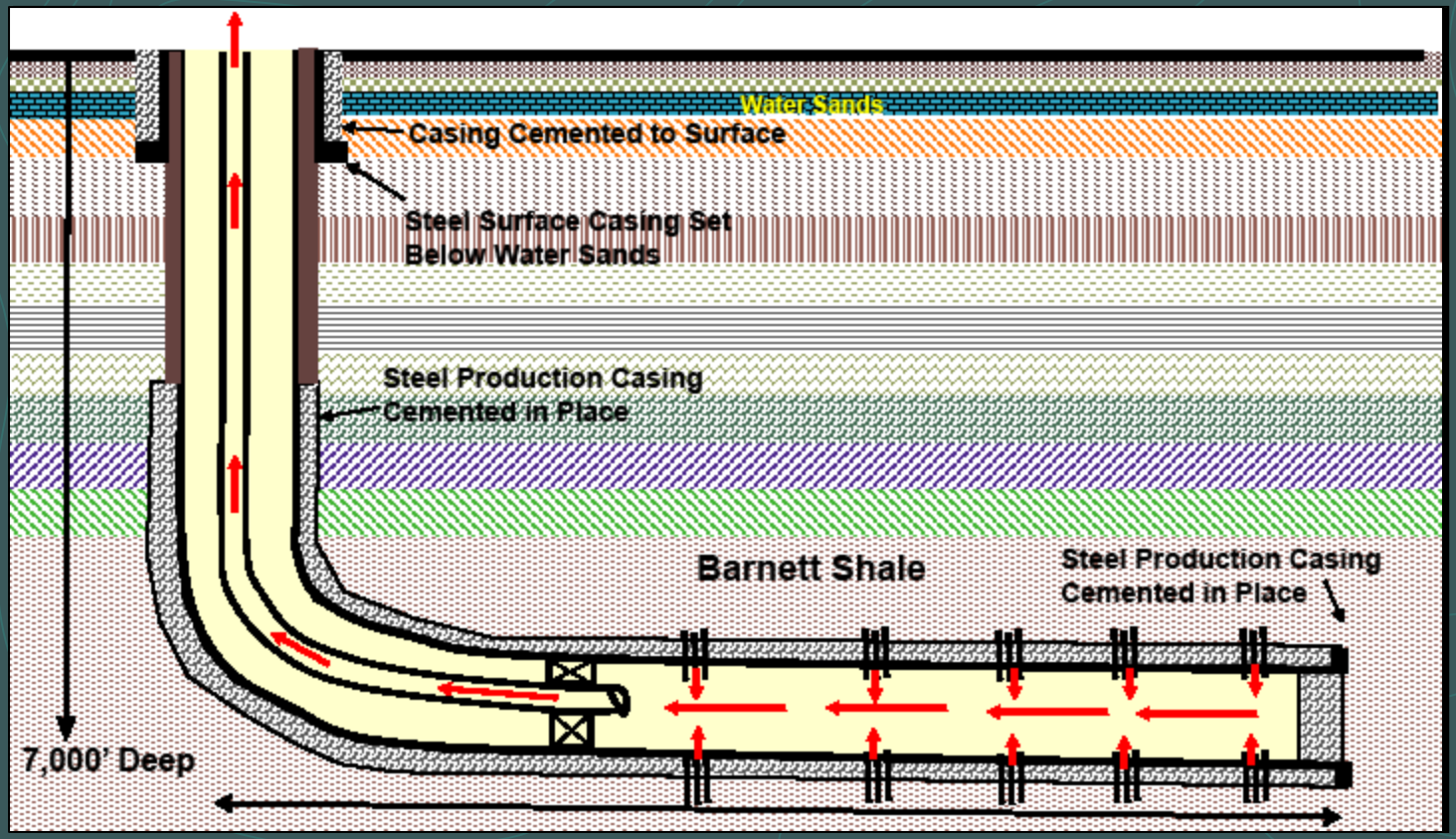
Definitions

- 1 mcf = 1 thousand standard cubic feet
- 1 mmcf = 1 million standard cubic feet
- 1 bcf = 1 billion standard cubic feet
- 1 tcf = 1 trillion standard cubic feet
- Standard cubic foot = the volume of one cubic foot of gas at 60°F and 14.7 psia
- Engineers estimate there are 30 tcf of natural gas in the Barnett Shale covering an area of over 5,000 square miles

Drilling Terms

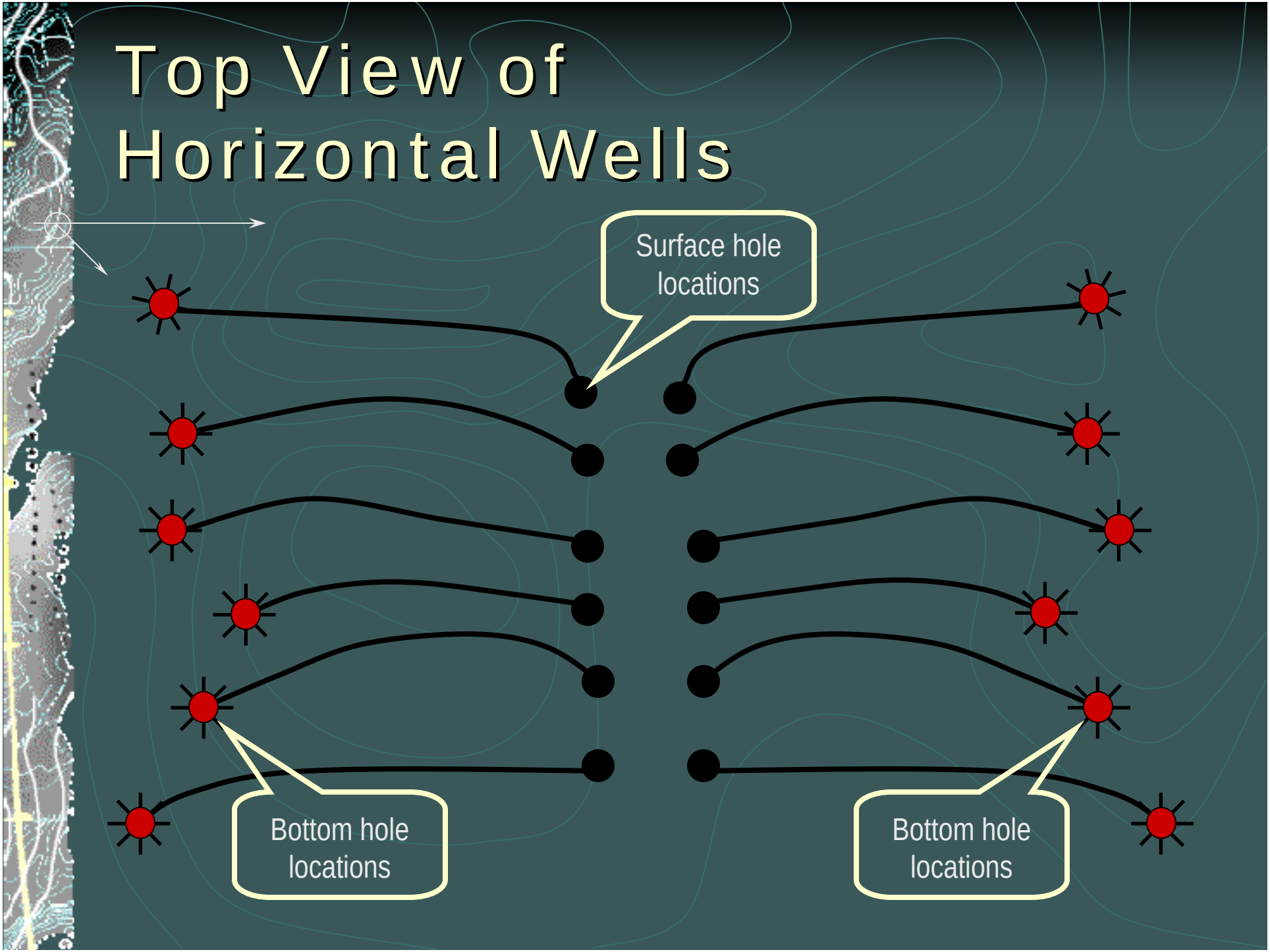
- Drill site – 2 to 4 acre area for drilling wells usually the ultimate site location for placement of surface equipment
- Lateral – horizontal drilling up to ± 5,000 feet from the drill site
- 8 to 12 wells with single laterals may be drilled from a drill site

Side View of Horizontal Well

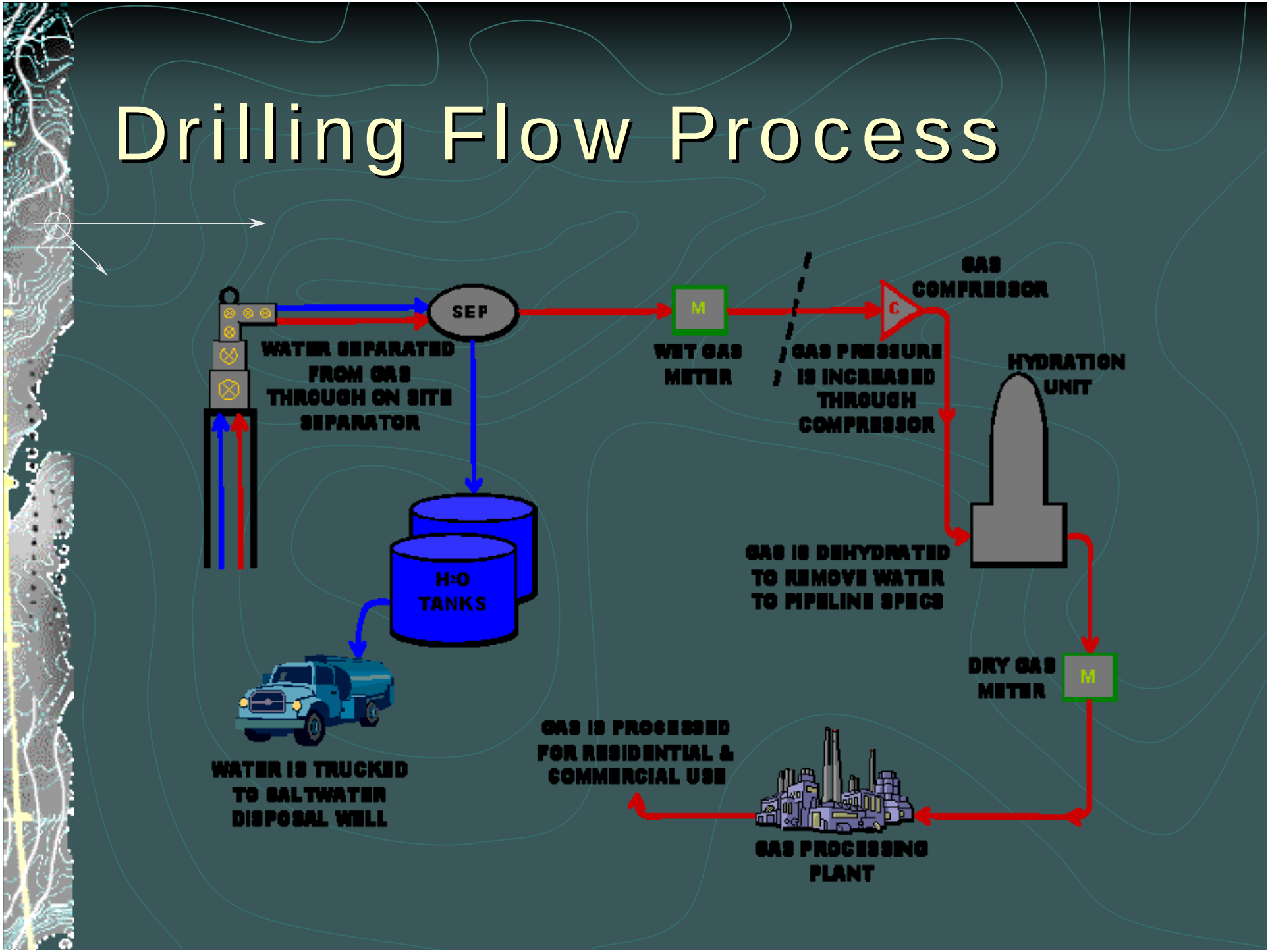


Usually < 5,000' in length

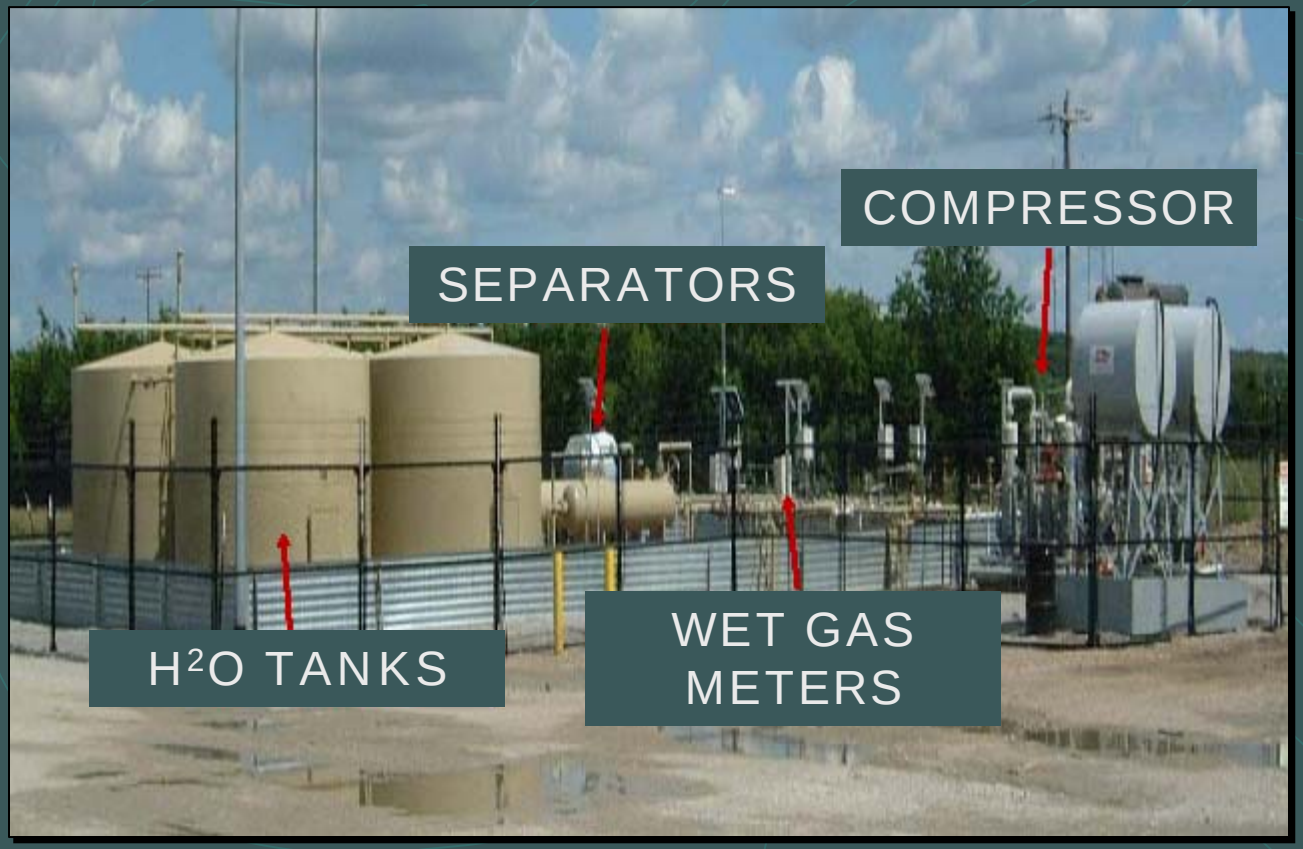
Top View of Horizontal Wells



Drilling Flow Process



Gas Well Surface Site

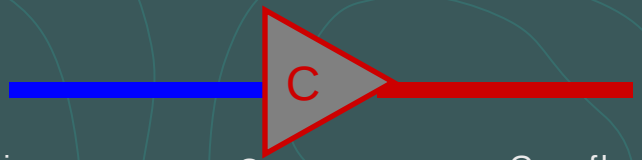


Water Storage Tank
at 100 yards

Compressors

- The two most common applications for compressors

Gas compressors are used to increase line pressure from the well to gathering or distribution lines. In this application compressors run 24 hours per day and for long periods. (20 years?)



Line pressure is 400 psig before compressor

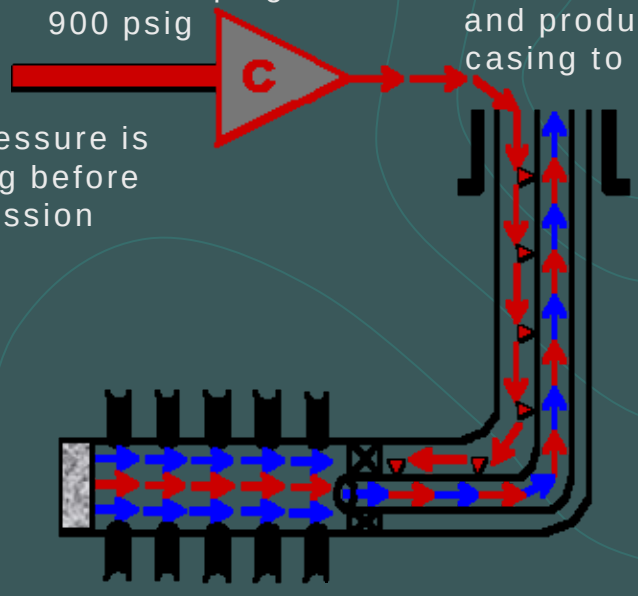
Compressor increases pressure to 900 psig

Gas flows 900 psig after compression

Gas compressors are used to gas lift water from wells. In this application compressors run 24 hours per day and for shorter periods. (<2 months)

Compressor increases pressure from 400 psig to 900 psig

Gas is injected at 700-900 psig between the tubing and production casing to lift water



Line pressure is 400 psig before compression

Relevant Facts

- Drilling time
  - 10 to 20 days per well
- Fracture stimulation time
  - 4 to 10 days per lateral
- Flowback time
  - approximately 21 days
- Gas production
  - over 20 years

Flowback

- Over 100,000 barrels of fresh water pumped during stimulation process
- Initial water is nearly fresh and as load is recovered water becomes more saline
- During flowback (± 21 days) a water truck will haul water from the drill site every 15-30 minutes around the clock

Water

- Fresh water zones are isolated from wellbore by cement and three strings of pipe. Producing gas zones are over a mile below the fresh water intervals. Contamination risk is low.
- Water pumped into wells is generally fresh and is from various sources.
- All produced water is trucked off of location and is disposed of in a commercially permitted salt water disposal well.

Water

- No commercial disposal wells currently exist within the immediate area.
- Water injected into disposal wells is placed into brackish or saline zones well below fresh water intervals.

Lease Considerations
Quality of Life

- No drilling within residential zones or City parks
  - No drilling within 500 ft. of homes
- Zoning ordinance requires Conditional Use Permit (CUP) for drilling
  - Noise restrictions to 5 decibels above ambient
  - Restriction on truck traffic through neighborhoods
- No use of eminent domain (drill site or gas lines)

CITY ORDINANCES CAN CHANGE SO PUT IT IN YOUR LEASE

What you are signing?

- Most property deeds in older neighborhoods make no mention of mineral rights. Generally, unless mineral interests are withheld in conveyance, the mineral interest is conveyed with the surface.
- Some real estate agents are now requesting sellers to prove they own mineral rights and include language in the deed contract stating whether the mineral rights go with surface ownership or remain with the seller.
- Estimated cost for an attorney to document and prove ownership of the seller's mineral rights may be $1,000 - $2,000.

Financial Terms

- Bonus – cash paid to the mineral owner for signing a lease usually based on surface acreage.
- Royalty – A percentage of gross sales of gas produced.
- Subordination agreement – legal document issued to homeowner by a mortgage company that some energy companies require before they will release royalty checks to Lessor. There are almost always processing fees associated with securing this agreement.

Estimate of Royalty

Several factors go into estimating the amount of royalty you can expect to receive. Some factors include:

- Estimated recoverable gas and production profile per well
- Amount of acreage included in production unit and how many acres are pooled together per well
- Natural gas price
- Quality of gas
- Taxes

The Bottom Line

± $50 per month

before federal income tax

over 20 year period

Neighborhood Organization Bonuses

- Energy companies feel it is important to invest in the neighborhoods where they are drilling
- Many NOs have negotiated donations as high as $75,000 to use for playgrounds, schools, community centers and other quality of life improvements
- Make sure this is part of your negotiation

Neighborhood Tips Summary

- An average urban lot can expect to receive an estimated $30-$50 per month in royalties based on published production rates.
- In the State of Texas mineral rights take precedence over surface rights. Make sure surface use restrictions are ‘iron-clad’ to insure your property is not disturbed.
- Restrictions need to be in the lease. Ordinances may not be punitive enough to insure compliance.
- Ordinances and regulations can be modified through legislative change.

Neighborhood Tips Summary

- If your neighborhood elects to bargain collectively, make sure your lease includes quality of life bonuses
- Neighborhoods that have banded together have been successful in securing lease terms that protect their neighborhood
- Neighborhoods that have banded together have historically negotiated terms that are far more financially advantageous with higher bonuses and royalty as well as lower deductions and more favorable language

Gas Drilling Resources

- American Petroleum Institute Natural Gas Facts– Information about how natural gas is used and drilled.
- Barnett Shale Energy Education Council– Non-profit organization supported by eleven energy companies working in the area. Basic information about the gas deposit in our area including maps showing the limit of gas drilling sites.
- Fort Worth Star Telegram– Article featuring recent City activity in relation to gas wells and transmission lines with navigation bar linking to numerous neighborhood association blogs detailing opportunities, concerns and activities related to leasing and drilling near residential neighborhoods.
- Star Telegram Blog– Site of lease negotiation guides for different neighborhoods.
- Fort Worth League of Neighborhood Associations– Video presentation about basic gas well leas negotiation along with gas lease payment calculator.
- Zula B. Wylie City Library– City of Cedar Hill Current Regulations and Cedar Hill Zoning Code
- City of Cedar Hill website– Natural Gas Exploration web page.

Special Thanks

Barnett Shale
Energy Education Council