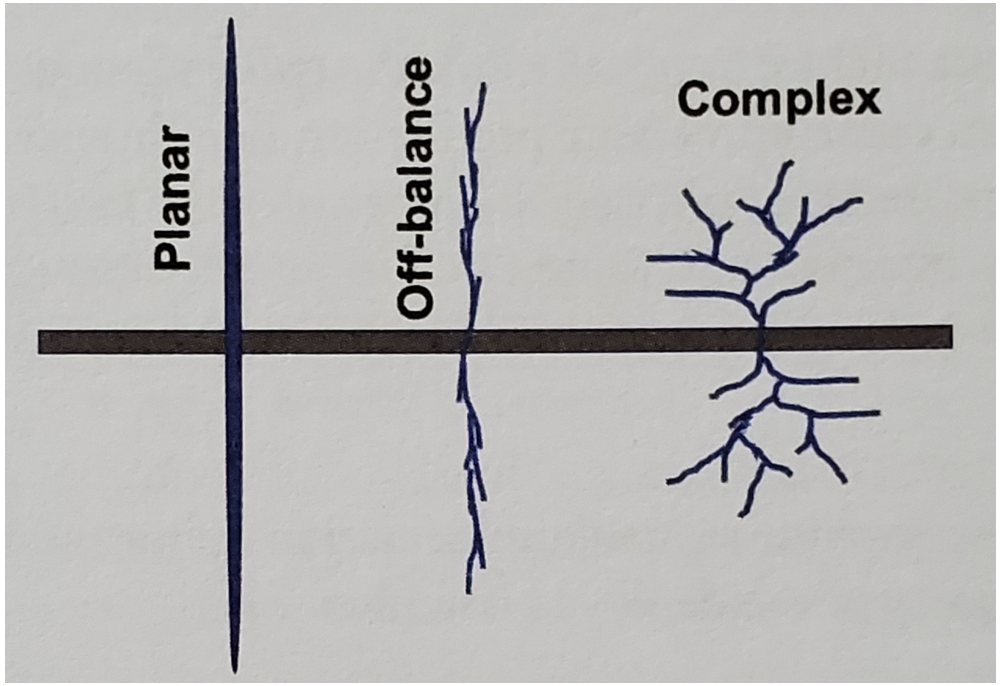
Converting P&A Candidates to P1 Reserves in Vertical Tight Gas Reservoirs

Robert E Barba

Austin Phoenix Resources LLC

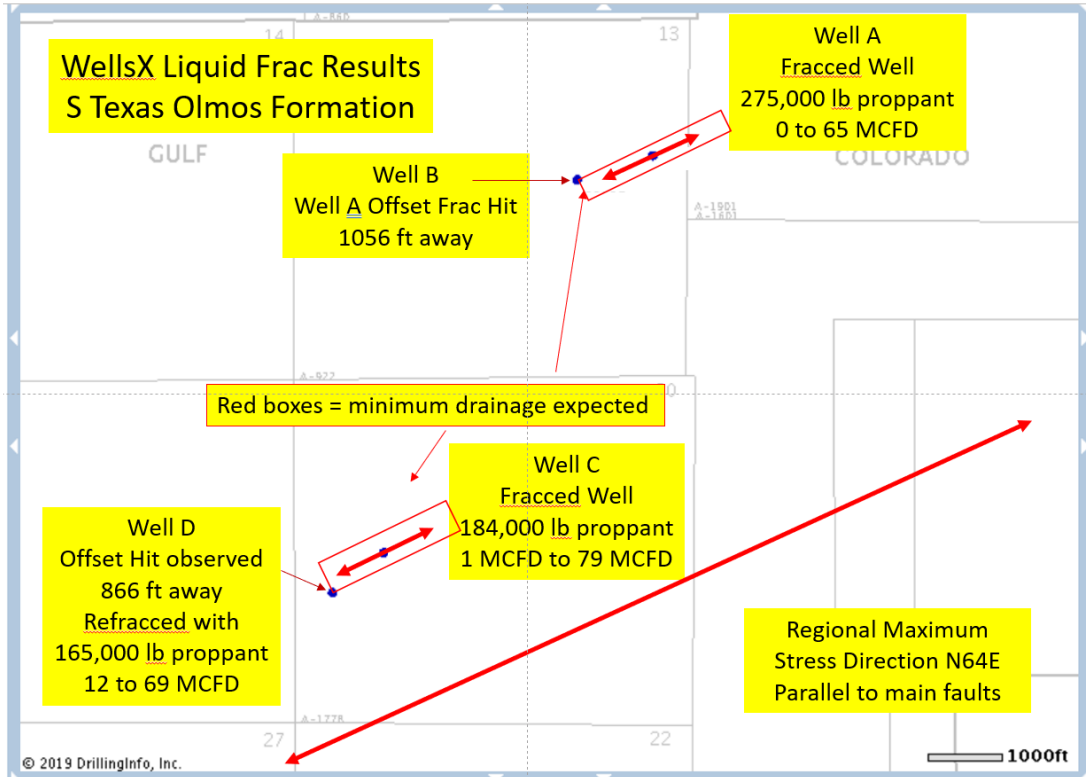
RBarba@Ausphx.com

Description / Image of the Product



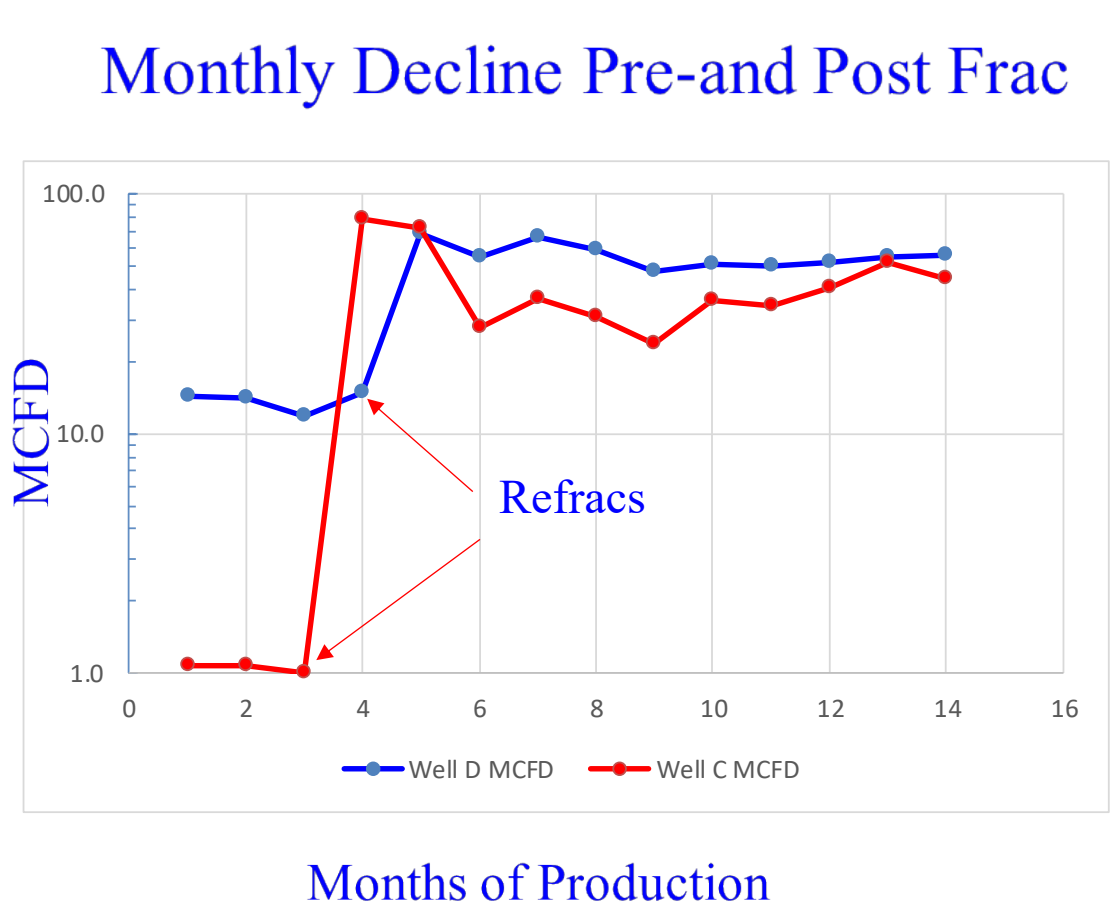
- WellsX patented “Liquid Frac” with a single 6 BPM pump truck
- Industrial by product for proppant, up to 10 lb/gal pumped to date and 450,000 lb total using water no FR
- Highly complex fracture network created with “hits” up to 1056 ft away
- 23 successful fracs pumped to date, with fresh, produced, or KCL water
- Frac “hits” suggest fracs are inbetween “complex” and “off-balance” (Daneshy 2003), not planar
- APR proposes to use mineral oil instead of water in gas reservoirs

Here are examples of successes



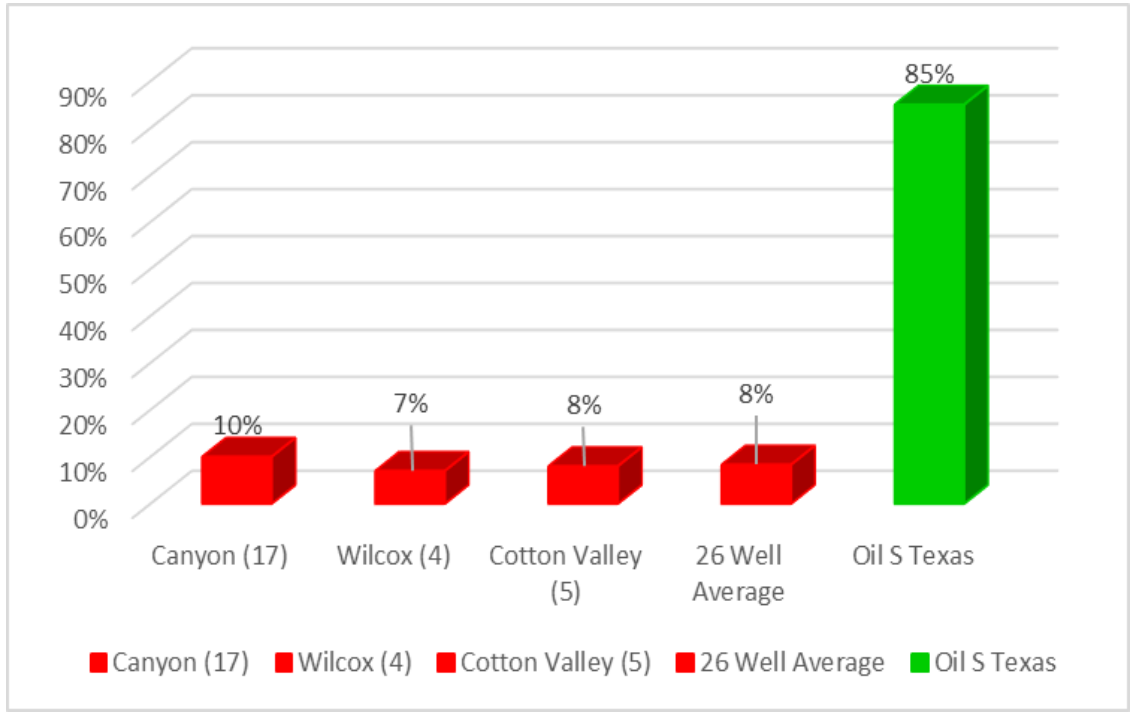
- Frac "hit" locations at a significant distance from the refracced wells
- Drainage areas comparable or superior to conventional planar frac results
- Water sensitive rock so results very pessimistic vs proposed oil based system, 10% recovery factor prior to water based refracs
- Mineral oil system proposed (C12 chain) environmentally friendly and recyclable, $2.25/gal currently

Here are examples of successes



- Relatively flat production no significant declines
- While treatments were economic due to low cost, volumes are not indicative of well's potential with oil based frac due to high smectite volume

This is our vision



Significant damage using water based fluids

- APR principals have evaluated thousands of tight gas wells across North America and identified substantial volumes of stranded gas (7x to 8x current cumulative recoveries in most of the fields)
- APR founded to economically recover the significant stranded gas in vertical tight gas fields
- Intended to use waterless frac technology, Gasfrac was intended to be the vendor

Team Members & Brief Bios

- **Bob Barba** 38 years experience as a petrophysicist and frac specialist
  - SPE Distinguished Lecturer on integrating wireline, testing, and pumping
  - Recognized authority on refracturing, delivered keynote address at the 2016 SPE Calgary Refrac Workshop "Refrac Treatment Optimization-Measure Twice Cut Once," teaching SCA refrac course Aug 19-20, 2019
  - May 2018 awarded the Formation Evaluation Award for the SPE Southwest North American Region (Permian Basin)
  - Evaluated several thousand tight gas well logs in all major US tight gas reservoirs, integrated wireline gas in place volumes with EURs

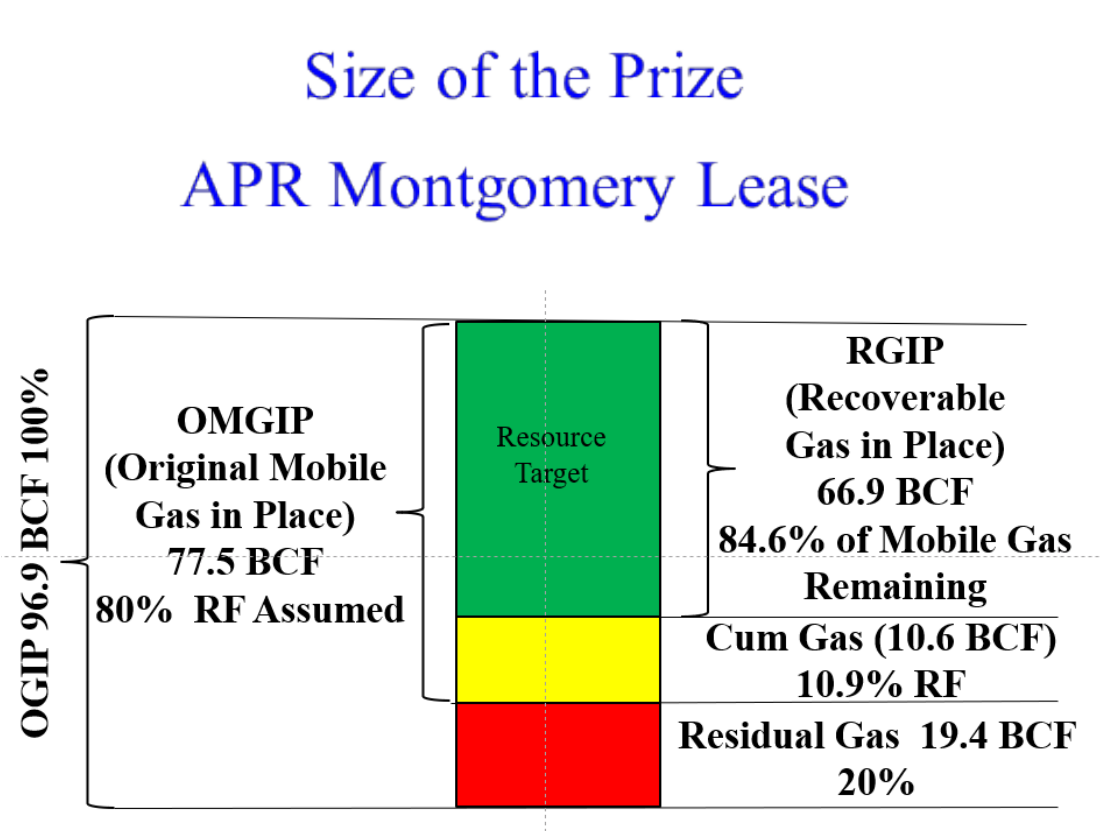
- **Richard Ganem** 43 years experience as landman, land manager, operator, and working interest investor
  - Recognized expert in land and contract issues and has served as an expert witness in the States of Louisiana, Oklahoma, New Mexico and Texas.
  - Operating company Caprock Producing LLC has had working interests in over 750 wells in Texas, Louisiana, Oklahoma, New Mexico, and Oklahoma
  - Caprock also has had mineral, royalty, and other trade interests in over 45,000 net acres in these states

This is who we are

AUSTIN PHOENIX RESOURCES LLC

- Extensive background in reservoir characterization and refracturing
- Estimated original gas in place for numerous tight gas reservoirs and identified significant recoverable resources in all studies
- Purchased 21 Canyon wells in 2013 to develop a program to access the stranded gas with refracs
- Significant field work done over last 6 years to narrow down the damage mechanism (capillary phase trapping)
- Over 10,000 declines analyzed in Ozona and Sonora Canyon fields
  - No successful refracs to date
  - No oil based refracs to date

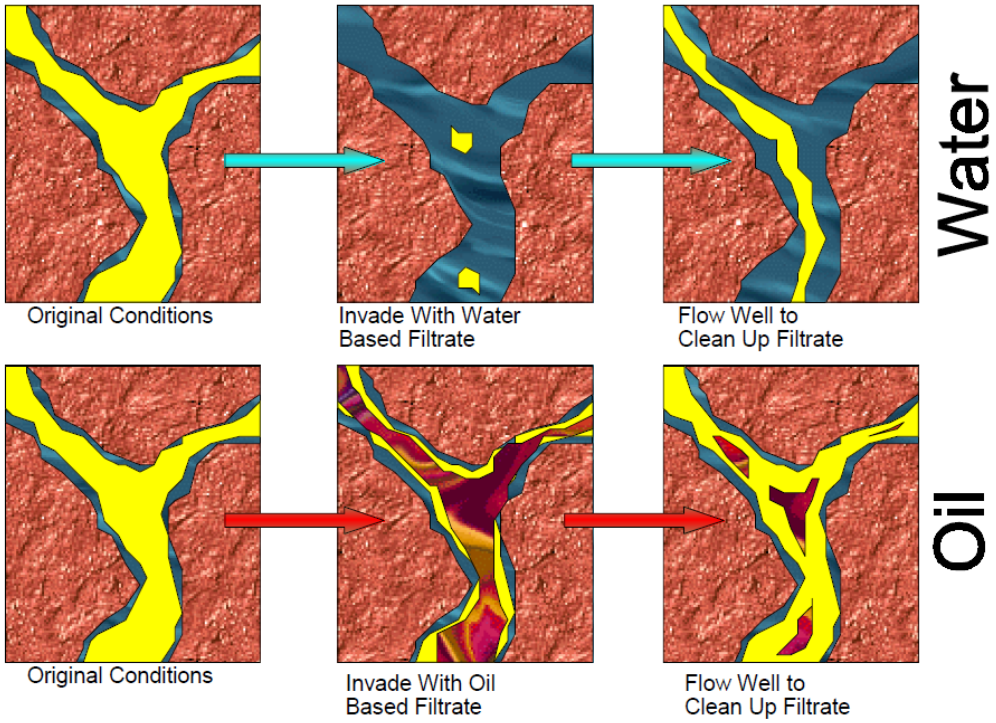
This is our mission



- 85K vertical tight gas wells in US
- Enormous volumes of stranded gas in all study areas, see example from APR leases in figure on left
- Application of oil based non-damaging frac fluids with the WellsX Liquid Frac system has the potential to recover these stranded reserves economically
- Assets are currently selling at a significant discount or P&A liability assumption

What we want to achieve

Figure 15 - Comparison of Water Based vs Hydrocarbon Based Phase Trapping in a Low Permeability Gas Reservoir

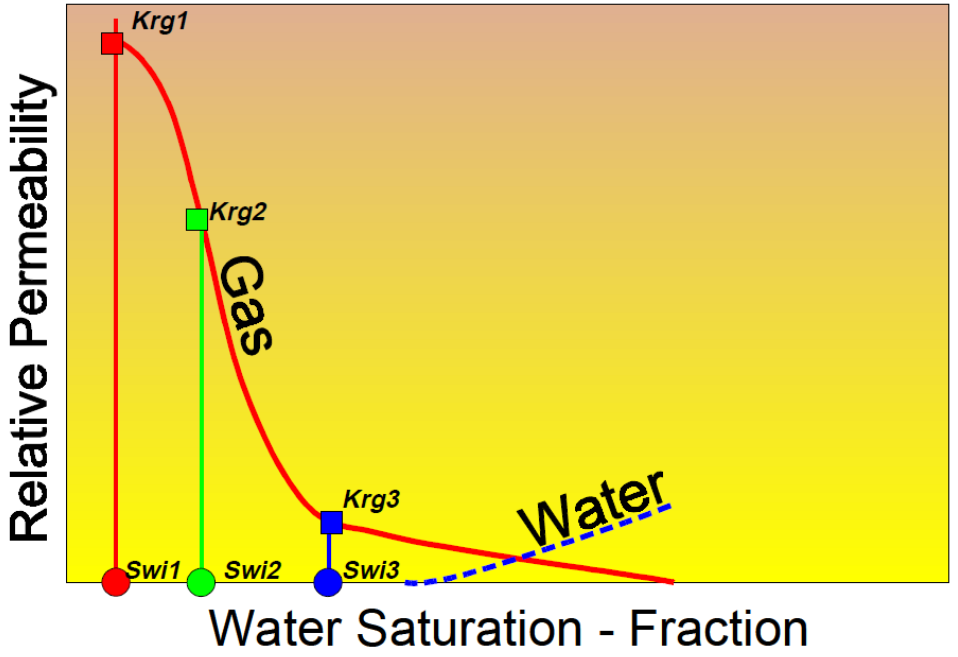


- Refracs inject into the pore space at a much higher differential pressure than original fracs
- Refracced zones have less energy than new wells
- Oil based frac fluids in water wet rock should preserve the original pre-exposure permeability (highest possible regained perm)

What we want to achieve

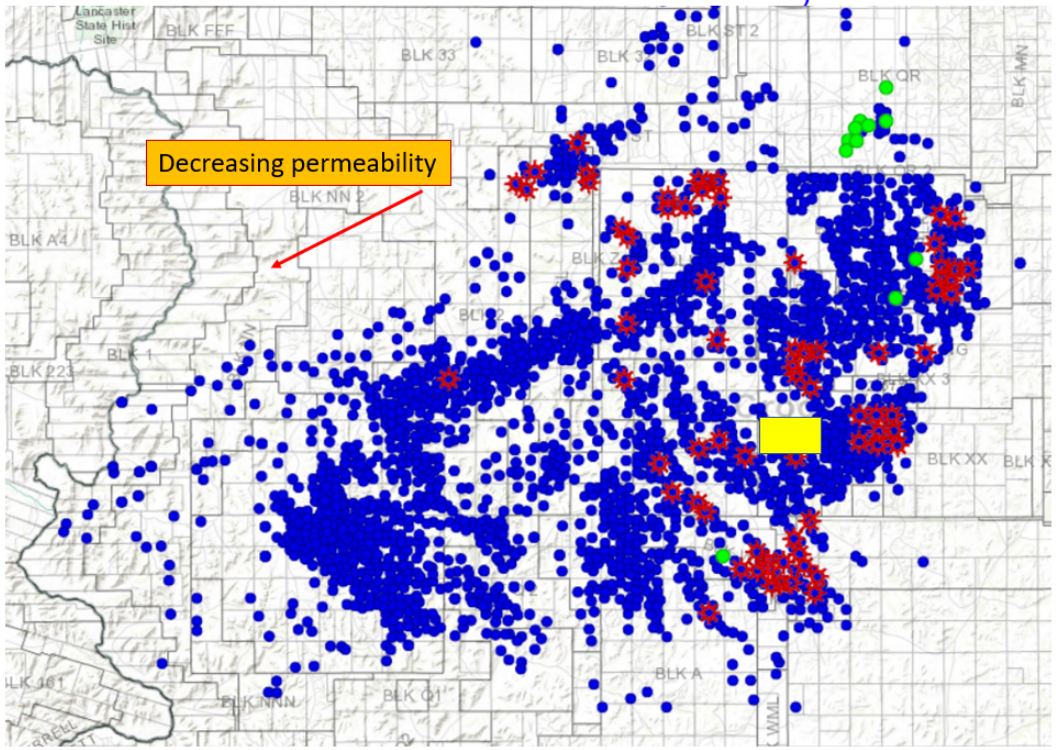
"Water? Never touch the stuff.

Figure 6 - Reduction in Effective Permeability to Gas as Swi Increases -Relative Permeability Basis



What we want to achieve (contd)

Condensate Production > 10,000 BO



Yellow shading = Eastern leasehold

- In the Ozona area significant condensate production occurs in the higher intrinsic perm areas
- With higher regained perm the area of significant condensate production should expand considerably
- Gas analysis indicates that the wells should produce 10 bbl of C6+ per MMCF of gas
- Average remaining gas in top candidates over 2.5 BCF
  - 25,000 BO potential condensate/well

This is our technology or process

Conventional Frac Spread

Wells X Frac Spread

The actual frac is characterized by having a proppant bed with a very high perm ullage at its top, such that reservoir fluid flows vertically in the proppant bed to feed the high perm ullage flowing back to the well bore

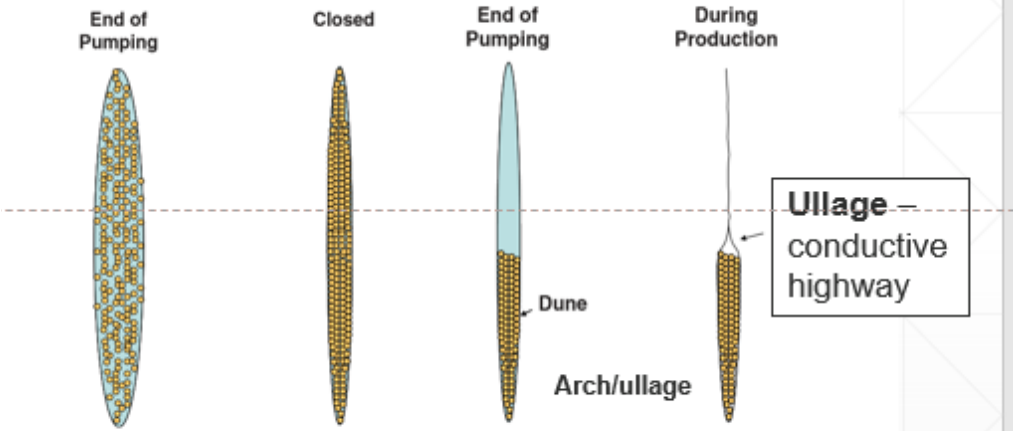


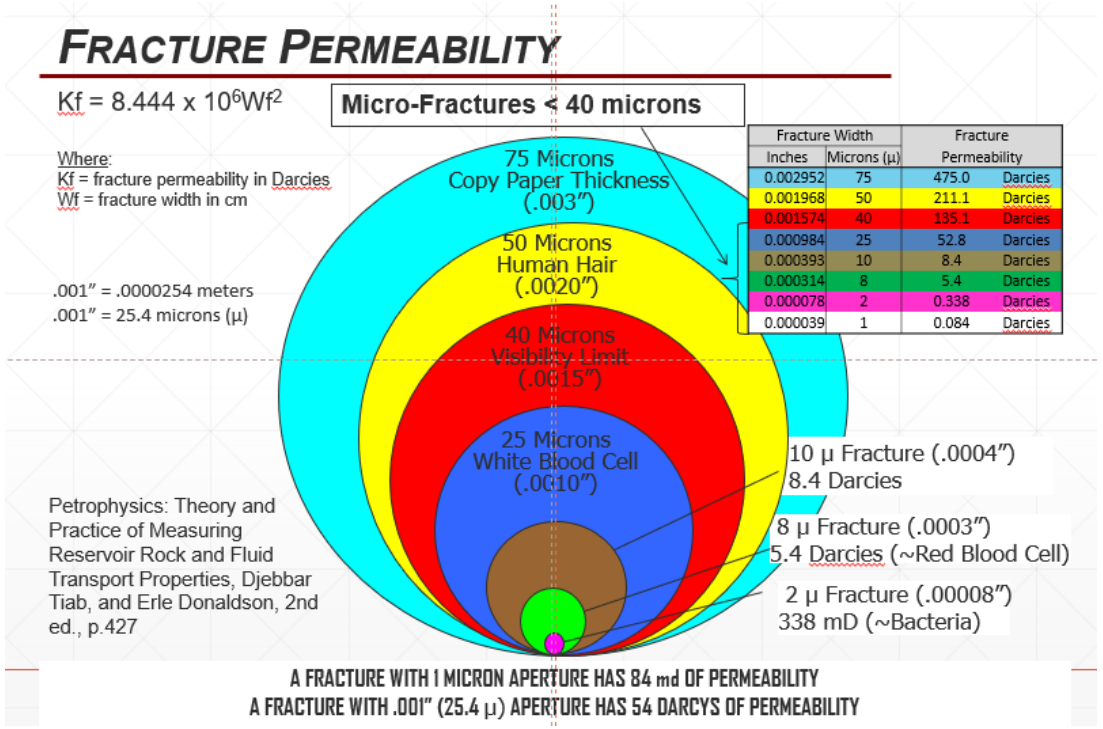
Fig. 1—Fracture geometry for perfect transport.

Fig. 2—Dune geometry.

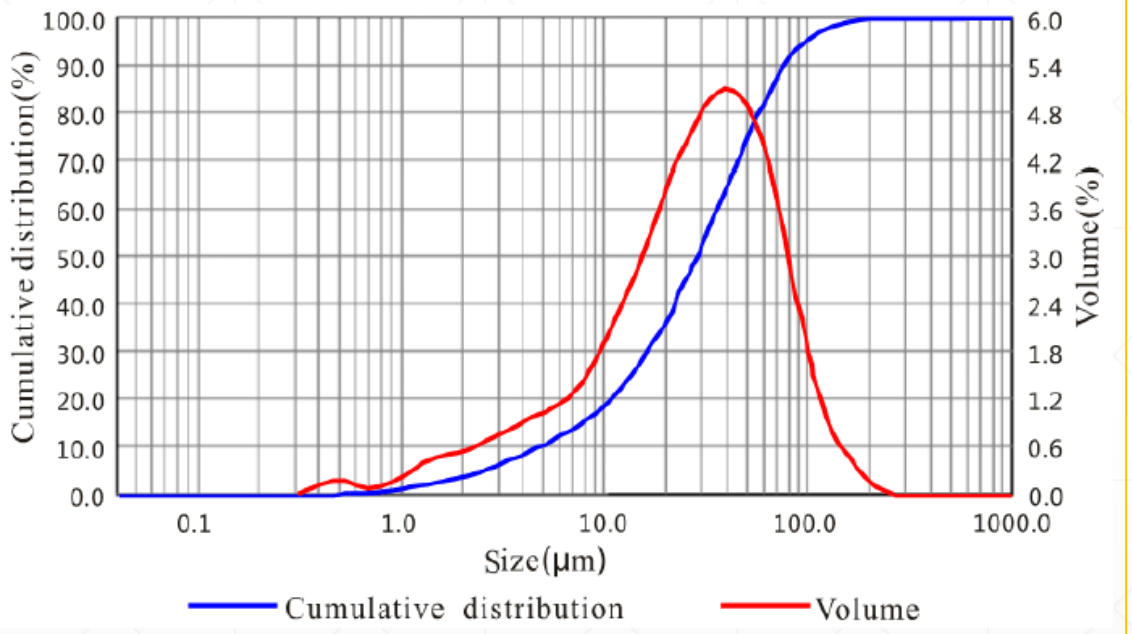
What the models predict

What you get according to Norm Warpinsky

This is our technology or process



Fracture Width		Fracture Permeability	
Inches	Microns (μ)		
0.002952	75	475.0	Darcies
0.001968	50	211.1	Darcies
0.001574	40	135.1	Darcies
0.000984	25	52.8	Darcies
0.000393	10	8.4	Darcies
0.000314	8	5.4	Darcies
0.000078	2	0.338	Darcies
0.000039	1	0.084	Darcies



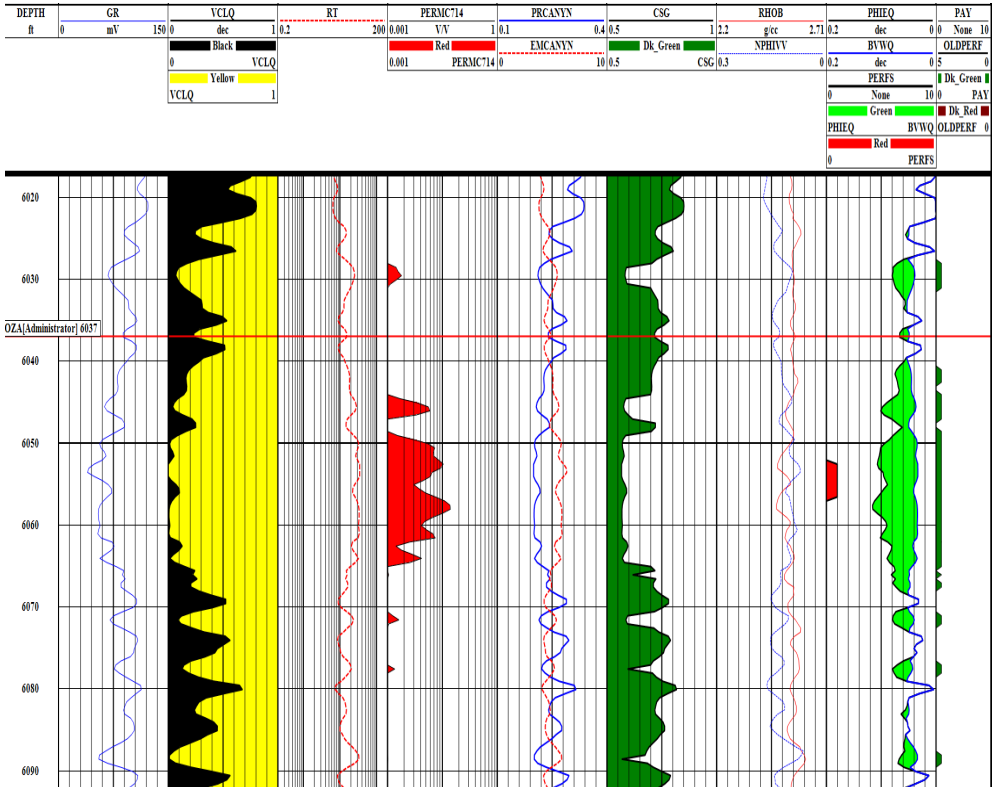
135 darcy average permeability for 40 micron average apeture

This is our technology or process

Safety & Environmental Benefits

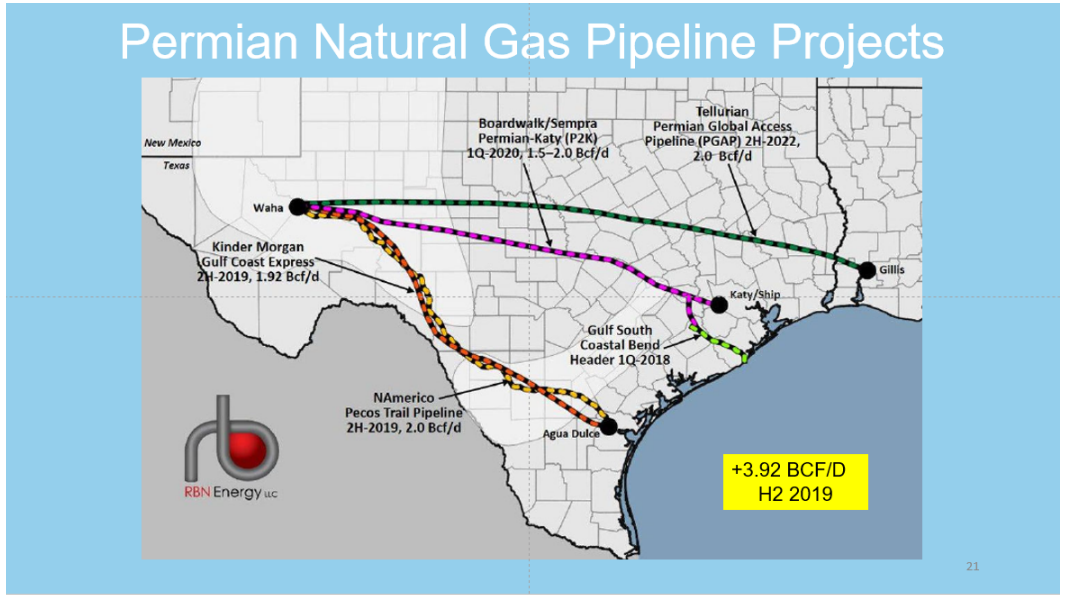
- With increased proppant densities we pump, we have:
  - Lower water requirements (0 for mineral oil)
  - Minimized equipment footprint on location
  - Reduction in road transportation exposure
  - Reduction in personnel required
  - Reduction in noise level
  - Reduction in carbon emissions
  - No chemicals used in treatment other than surfactants, no polymers used in fluids
  - Able to pump with filtered production water
  - Able to pump with 2% KCL fresh water
  - Mineral oil system (C12) no BTEX, used extensively in food products

Short-term plan



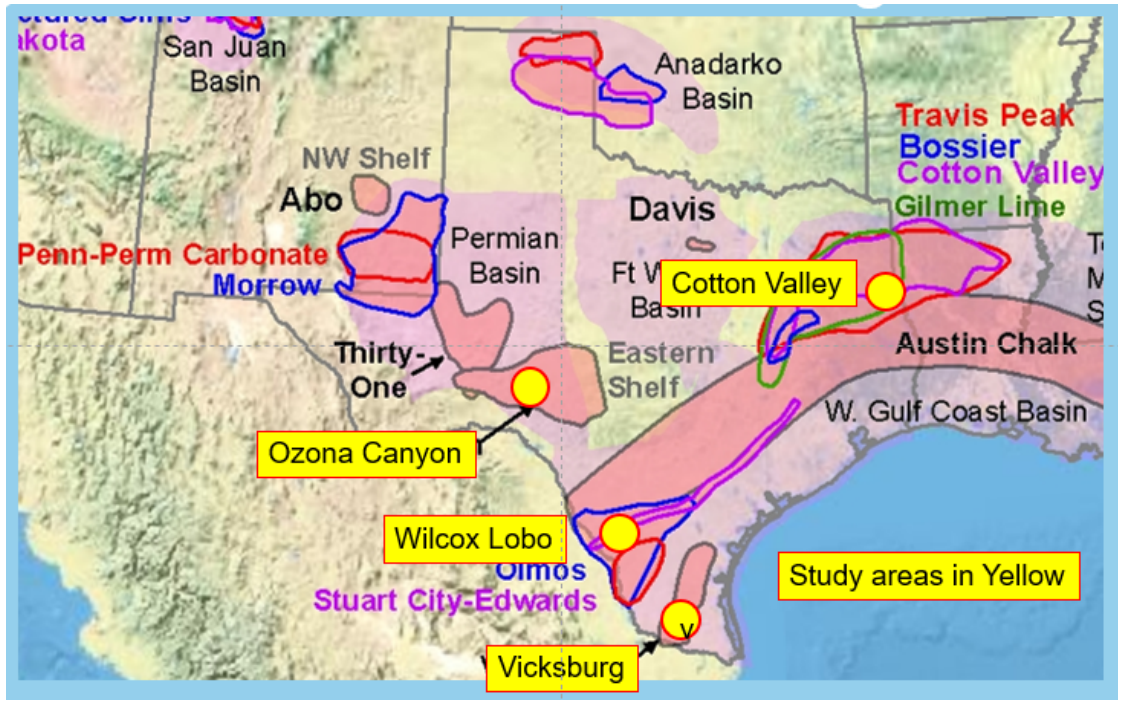
- Frac the “A” sand in the Montgomery 6D7 well (42-105-37632) (not previously fracced)
- C6+ yield 12 BBL/MMCF from test
- 327 MMCF remaining mobile gas, initial rate of 263 MCFD expected
- Expected condensate 3924 BO
- Test designed to determine if condensate production can be improved on a small scale
- With proof of concept larger treatments can be supported

Long-term plan



- If Waha shows stability after new lines in refrac 5 additional wells in the Canyon
  - If not move to better area with more stable prices (probably E or S Texas)
- If results are repeatable and economic at the expected price decks book P1 reserves behind pipe for all economic refrac offsets
- Expand to vertical tight gas areas with higher gas in place volumes and better market access

Our Market

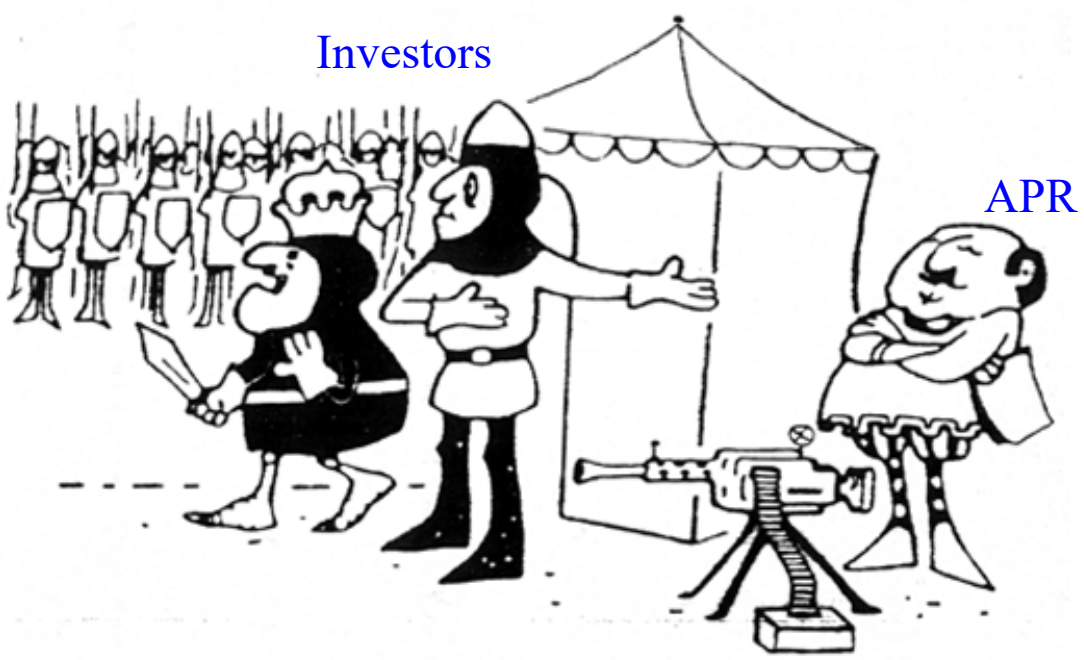


- 85K vertical tight gas wells in US
- Large percentage refrac candidates
- All areas studied have had the same issues as the Ozona Canyon
- Focus on areas with stable pricing and condensate production
- Assets are currently out of favor
- "Nature abhors a vacuum" – Gulf Coast exporters are salivating over Waha gas

SWOT Analysis

- Strengths: Candidate selection expertise, low cost process, huge inventory, small footprint and environmentally friendly, refrac behind pipe reserve booking
- Weaknesses: Current pricing in West Texas
- Opportunities: Condensate production increase, application in areas with high GIP and stable pricing, possible gas injection programs for shale parent well repressurization in West Texas
- Threats: Gas “bubble” persists over long term, condensate test key for Ozona although can apply elsewhere if conditions don’t stabilize

Action Steps



- Get partner to obtain better economies of scale
- Montgomery 6D7 test execute
- Expand to either offsets in Canyon or area with better market conditions
- Book behind pipe P1 reserves with repeatable economic process

More information

Making America's Old Gas Wells Great Again!

www.ausphx.com

Austin Phoenix Resources, LLC
3303 Northland Drive Ste 201
Austin, Texas 78731

Rbarba@ausphx.com 713 823 8602

Rganem@ausphx.com 432 638 9100