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Committee on Oversight and Government Reform U.S. House of Representatives

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- Good morning.
- To the members of the House Committee on Oversight and Government Reform, I want to say "thank you" on behalf of Devon Energy Corporation for the opportunity to discuss hydraulic fracturing.
- Probably everyone in this room has heard of hydraulic fracturing by now. This common practice for completing natural gas wells has been around for 60 years, but until the last few years, very few people outside our industry were familiar with it.
- Although you've probably heard of fracking, you may not know about the tremendous role it has played in assuring that America has a clean, abundant and domestic source of energy for at least the next 100 years.
- This morning I hope to show you how it works, and the monumental impact it has made.
- But first, a quick geology lesson.



- With conventional oil and natural gas plays, the gas migrates from the source rock into a reservoir rock formation. From there it flows through pores and up the angle of the reservoir rock into a trap, which is a pocket in a high point of the reservoir layer.
- Our industry has produced from these traps for decades.
- The amount of recoverable natural gas from that well is limited by the size of the trap.
- However, two technological advances have forever changed the natural gas drilling.
- The first was hydraulic fracturing, which has been conducted more than 1 million times since the late 1940s.
  - This process allows us to fracture the source rock (shale). Sand keeps the fractures open while natural gas or oil flows to the wellbore.
  - I will discuss this in more depth in a few minutes.
- The second advancement is horizontal drilling, which allows us to capture gas from a much larger area of the source rock.
  - Horizontal drilling generally results in a far more productive well than a conventional well.
- In 2002, Devon coupled these two processes in the Barnett Shale in North Texas.
- The result has been shale play exploration not only in the U.S., but around the world.
- Now I'll show you where it all started.



- The origin of shale gas production can be found in the Barnett Shale of North Texas.
- Devon acquired its initial position with the acquisition of Mitchell Energy Group in 2002.
- Mitchell had been using vertical wells in a relatively confined geographic area.
- Devon acquired Mitchell with the idea of using horizontal drilling to greatly expand the geographic area over which the Barnett could be developed.
- By drilling horizontally through the Barnett Shale, Devon was able to contain the fracture better, which increased access to more shale and more gas. This dramatically expanded the number of viable drilling locations within the play.
- We also learned that by drilling horizontally, we were able to create a well that was about three times more productive than a vertical well.
- Horizontal drilling combined with light sand fracking was the key to unlocking the shale gas potential.
- Other producers moved in, and now this is the largest onshore gas field in the U.S.



- How dramatic is this development?
- Consider that just eight years ago, virtually every well drilled in the Barnett was a vertical well.
- Today, virtually every well drilled there is horizontal.
- One aspect of horizontal wells is that the initial production is dramatically higher than with vertical wells.
- And, production remains higher than with vertical wells for years thereafter.
- Both Devon and the industry have made technological improvements in the Barnett over the past few years.
- As a result, well performance has increased.
- Similar improvements have taken place in the other shale plays, as well.



- Which explains this graphic. As you can see, since 2003 the production of shale gas has soared.
- Today, shale gas production is approaching 20 Bcf a day.
- Production from shale is starting to make up a meaningful portion of the United States' natural gas supply.
- Even during the recession of 2009, when natural gas rig counts were down dramatically, year-over-year production increased by about 17 percent.
- What I hope you sense from this slide is the optimism we feel about production continuing to increase well into the future.



- Here you see more evidence of that optimism.
- In 2009, shale natural gas comprised 14% of the total U.S. natural gas supply.
- The federal government projects that share will continue to grow to an amazing 45% by 2035.
- Why is that?



- The EIA's projection is based on this reality: Shale is abundant in North America.
- Many of these shale basins are now being tested or developed for natural gas production.
- You've probably heard of some of the shale plays found within these basins:
  - The Marcellus, which covers parts of Ohio, New York and Pennsylvania;
  - The Haynesville in east Texas and west Louisiana;
  - We even have a couple in Devon's home state of Oklahoma: the Arkoma-Woodford and the Cana-Woodford.
  - In the Cana-Woodford alone, Devon has determined an estimated resource of 11 Tcf, which equates to a nearly 2 billion barrel oilfield. That figure includes only Devon's position in that shale play.



- Shale gas is beginning to have a meaningful impact on natural gas supplies.
- That newfound supply is reflected in the commodity prices we have seen since the end of 2008.
- Natural gas prices generally have remained between \$4 and \$6 per Btu since the beginning of 2009.
- Not only that, the EIA's price projections for the next 25 years are considerably lower than they were just two years ago.
- The black line illustrates the EIA's future projections as of 2009.
- The blue line shows price projections the EIA made last year.
- The red line shows what the EIA now thinks prices will look like through 2035.
- In its latest report, the agency credited the abundance of shale gas for its new projections.



- Natural gas now provides near-term and long-term supply stability.
- The development of shale natural gas prompted the Potential Gas Committee to report just last week that the U.S. now has more than a 100-year supply of natural gas.
- It is cheaper to produce and less susceptible to weather issues.
- And finally, recent pipeline upgrades means gas flows quickly to where it is needed.
  - Consider this: In the last two years, more than 8,000 miles of pipeline has been added in the U.S., primarily to take gas from shale plays to major markets.
- Now I'd like to tell you more about drilling shale gas wells, and specifically the 60-year-old process we use called hydraulic fracturing.