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Marcellus Shale – What's it all about

Representative Quinn and members of the Majority Policy Committee, good morning. Range Resources is a leading developer of the Marcellus Shale in Pennsylvania. Since drilling the first Marcellus Shale well in 2004, our company has drilled nearly 300 horizontal Marcellus shale wells in Pennsylvania. We are committed to the safe and environmentally responsible development of Pennsylvania's natural gas resources. We appreciate the opportunity to offer testimony today concerning what the Marcellus Shale means to Pennsylvania and the Nation.

The Marcellus Shale is a thick layer of very fine mud that was deposited about 380 million years ago in a large inland sea extending from southern New York to Tennessee that we now refer to as the Appalachian Basin. Because the mud was deposited so slowly, the dead plankton, algae and other organisms that fell to the sea bottom resulted in a high fraction of organic material in the mud that later generated oil and gas. The Marcellus is one of several organic-rich black shales that underlie much of Pennsylvania, southern New York, eastern Ohio and much of West Virginia.

While organic shales like the Marcellus are the source rocks for much of the oil and gas produced around the world since oil was discovered in Pennsylvania 152 years ago, it has only been the past 10 years that industry pioneers have unlocked the key of producing natural gas from this source rock. Shale gas is a world-wide game changer. The enormity of this resource is staggering. Recent estimates of potentially recoverable reserves in the Marcellus Shale vary widely from about 80 trillion to 500 trillion cubic feet – just from the Marcellus – not including any of the other organic shale formations that lie above or beneath the Marcellus. Even those of us who have spent entire careers in the industry cannot process numbers this big. And these numbers are likely conservative. Ten years ago, the estimates of recoverable shale gas were near zero. Ten years hence, they will almost certainly be much larger. The Energy Information Agency of the U.S. Department of Energy recently assessed potential shale gas reserves in about half the world at nearly 7 quadrillion cubic feet, of which nearly 2 quadrillion cubic feet was in North America. That's about a 100-year supply at current consumption rates.

For the Nation, this enormous supply of natural gas offers the opportunity, for the first time in decades, to become much more energy independent, to reduce the 9 million barrels of oil that we import each day at a cost of nearly a billion dollars a day; and to displace much of the coal and oil we burn with a much cleaner, abundant and domestic natural gas.

For Pennsylvania, shale gas means many things. There are many reports about all the jobs being created by Marcellus drilling. Like estimates of gas reserves, there are wide variances in the estimates of jobs that have been created and will be created from shale gas development. While it may not be possible to agree on the number of jobs, a visit to areas where significant

drilling is occurring and discussions with local residents will certainly lead to the conclusion that the economic impacts are very significant. Economists at Penn State and elsewhere suggest that for every direct job in the industry, there are two indirect or induced jobs created in the Commonwealth.

There are probably a few Bucks County residents that own hunting or fishing camps in north central Pennsylvania and have received some of the incredible lease bonus and royalty payments. There may be some residents working for companies that supply the needs of the drilling industry in some way. For the most part, however, residents in Bucks County are not seeing the same economic impacts that are visible in Bradford, Tioga, Lycoming, Washington or other counties experiencing high levels of drilling. There are other benefits. Every Pennsylvanian who heats with natural gas has seen their gas bill decline in recent years, due largely to new gas production from the Marcellus and other U.S. gas shales. While crude oil prices nearly doubled between 2005 and 2011, natural gas prices have declined by 50%. Real natural gas prices have declined by about \$5 per million btu since 2008, amounting to savings for Pennsylvania gas consumers of over \$3 billion annually or about \$500 per year for an average residential consumer. Industrial and commercial natural gas consumers have seen the same reduction in gas prices. Lower natural gas prices have also driven down the cost of wholesale electric prices in Pennsylvania, resulting in savings to electric consumers of several billion dollars annually.

Another huge benefit of having abundant, reasonably priced natural gas here in Pennsylvania is the opportunity it creates for new manufacturing. There has already been a surge in new steel pipe manufacturing in the Pittsburgh region to meet supply needs of the shale gas industry. Much bigger than supply chain opportunities, however, is the opportunity for Pennsylvania's abundant, inexpensive and locally sourced natural gas from shale to attract new manufacturing business. Energy intensive industries such as metal processing, or industries that utilize natural gas as a feedstock for products such as plastics, fertilizer, and many chemicals can thrive in a low gas price environment. U.S. Steel has recently announced an initiative to convert much of its base steel making process to produce "direct reduced iron", a more efficient steel-making process that uses natural gas rather than coke (produced from coal). This is only possible because of abundant and reasonably-priced natural gas.

By the end of this year, Marcellus Shale developers will have invested about \$35 billion in Pennsylvania, most of that in the past two years. Pennsylvania's natural gas production has already increased from a pre-Marcellus level of about 0.5 billion cubic feet (bcf) per day, about one-quarter of our average natural gas consumption, to a present level of about 3 bcf per day, making Pennsylvania a net gas exporter. If capital investment continues in Pennsylvania's gas shales, we could easily produce 20 bcf per day, or more within 10 to 15 years, about one-third of current U.S. gas consumption.

Pennsylvania is not the only shale gas opportunity, however. Even though the Marcellus may be one of the largest shale gas deposits in the world, there are others popping up seemingly every month – in places like Canada, Europe, Brazil, Argentina, South Africa, China, and the Middle East. One of Pennsylvania's newest competitors is Ohio, with the emergence of the Utica Shale. While the Utica Shale underlies much of Pennsylvania, it is attractive in Ohio

because it contains “wet gas” in eastern Ohio, meaning the gas contains higher levels of ethane, propane, butane and other “natural gas liquids” that command much higher prices than dry gas (almost pure methane) that comprises most of Pennsylvania’s Marcellus and other shale gas shales.

Pennsylvania to reap the tremendous economic benefits that can accrue from developing its shale gas shales, two things must happen: First, the companies developing the shale must do so in a safe and environmentally protective manner; and second, Pennsylvania must establish public policy that encourages the safe development and use of this resource.

As mentioned, Range Resources is very committed to safe and environmentally responsible development – it is our culture, from our CEO, John Pinkerton, to every one of our employees. We are far from the largest company involved in the Marcellus, but we are well known because of our commitment to doing it right, and our public outreach at every level from state and local elected officials, to landowners, to the public at large, particularly in areas where drilling is occurring. We have participated in hundreds of educational forums to explain the process of developing gas shale. We are engaged in the communities where we are drilling, through corporate giving, participation in community activities, and encouraging our employees to be active in local organizations. Many of the companies involved in developing Pennsylvania’s Marcellus Shale have similar views of their corporate responsibilities.

One of our biggest challenges as an industry is to overcome public perception that shale gas drilling could be a significant threat to Pennsylvania’s water, air and other precious resources. Shale development is a construction process, not unlike much other commercial construction in the Commonwealth. We move big machines around in fairly remote locations to conduct our work. Our activities are certainly not invisible, and are not zero risk. We firmly believe that through practical regulation and industry dedication, that this resource can be developed with lower total risk than other viable energy sources.

There have been nearly 4,000 Marcellus Shale wells drilled in Pennsylvania, mostly over the past three years. While there have been several high profile incidents, there have been no cases of stream degradation, no significant erosion and sedimentation problems (even during the recent flooding events of Hurricane Lee), and no actual health or safety issues have occurred off of the well pad. DEP has more than doubled the field inspection staff in the Bureau of Oil and Gas Management since 2008 to effectively regulate the new shale gas industry, and has worked closely with industry to assess and manage environmental risks. DEP has set high expectations for performance by drillers and has levied heavy fines for violations. The Governor’s Marcellus Shale Advisory Commission, comprised of stakeholders from state and local government, environmental groups, and the natural gas industry, recently completed a six-month project to “develop a comprehensive, strategic proposal for the responsible and environmentally sound development of the Marcellus Shale.” Many of the Commission’s 93 recommendations will hopefully be adopted by statute or regulation. Both the U.S. Department of Energy and Environmental Protection Agency are conducting risk assessments of shale gas development. The Department of Energy’s report is due in a matter of weeks. There are many questions on the industry. Range and other shale gas developers in Pennsylvania are highly

incented to do it right – to protect the environment and the residents of Pennsylvania – if we are to recover the massive investments already made in the Marcellus.

Another significant hurdle in Pennsylvania is a growing attempt by local governments to regulate natural gas development. While Pennsylvania's Oil and Gas Act contains strong language that preempts local government control, a 2009 Supreme Court ruling has blurred the line between what the Commonwealth can regulate and what is the domain of local government. The kind of comprehensive regulatory program necessary to effectively regulate such a highly technical industry can only be accomplished at the state level. Having a different set of rules in the 1,500 or more municipalities that are underlain by Pennsylvania's gas shales would simply not be effective in protecting the citizens and the environment of the Commonwealth or in providing a rational, predictable environment for the huge investment that will be required to develop the resource.

The charge of Pennsylvania's elected officials is to make sound, fact-based judgments about shale gas development and to adopt policies that encourage the safe and responsible development and use of this incredible resource, allowing the Commonwealth to reap the greatest economic benefit. As I mentioned, there is a rapidly growing list of competing opportunities for investment in shale gas, within North America and other continents. Pennsylvania's newest and closest competitor is Ohio. We will likely see some drilling rigs move from Pennsylvania to Ohio in the next year or two. Ohio will be a formidable competitor for natural gas investment, having already dealt effectively with a number of issues related to natural gas development. Governor Kasich has made it very clear that Ohio is open for shale business.

So, the race is on to attract new business. For Pennsylvania to compete effectively, we must adopt policies on taxation, regulation, litigation and other critical business issues that will foster new business.

Thank you for the opportunity to testify.