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MARCELLUS SHALE GAS

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

TO

EXAMINE MARCELLUS SHALE GAS DEVELOPMENT AND PRODUCTION IN WEST VIRGINIA

EAST CHARLESTON, WV, NOVEMBER 14, 2011

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MARCELLUS SHALE GAS

MONDAY, NOVEMBER 14, 2011

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
East Charleston, WV.

The committee met, pursuant to notice, at 10 a.m. on the 7th Floor Courtroom of the Robert C. Byrd Federal Courthouse, 300 Virginia Street, East Charleston, West Virginia, Hon. Joe Manchin presiding.

OPENING STATEMENT OF HON. JOE MANCHIN, U.S. SENATOR FROM WEST VIRGINIA

Senator MANCHIN. I'd like to call the hearing to order. I want to thank, first of all, all of you for being here, everybody. I appreciate it very much.

I'd like to introduce to you the staff that we have with us today. I'll introduce, first of all, my staff and our DC office staff and our West Virginia staff.

With me from DC I have Robert Diznoff. Robert is my Energy Council. Robert if you'll raise your hand in the front here. Robert is a Charleston native. So we're glad to have him. His law degree is from the University of Miami and he was born and raised in Charleston, West Virginia.

I have also here with me, Kelley Goes who is our State Director.

We've got Sara Payne. There's Sara, right over there, our Assistant Director.

Also Travis Mollohan. Travis is our Field Director.

With us from Washington from the staff as far as the Energy Committee, I have Allyson Anderson. She's our Senior Professional Staff. Allyson if you raise your hand there. Allyson has 5 years on the committee. She's a petroleum geologist. We're happy to have her.

Kelly Krye, where's Kelly? She just went. OK, Kelly just went down. She's our Science Policy Fellow. She's an oceanographer with a Ph.D., from Boston University.

Abigail Campbell, Abigail, there. Abigail is a Staff Assistant. She's finishing her master's degree in International Relations from the War College.

So I want to thank everybody for being here. Also with me I have as on the panel is Congressman Nick Rahall and Congresswoman Shelley Capito and Congressman David McKinley will join us shortly.

I'd like to welcome the members again of my colleagues from Congress. I'm glad that all of them are able to be with us today.

I would also like to thank all of the distinguished witnesses who have come to speak on the important issue of Marcellus Shale gas development in West Virginia. Of course, thanking all of you who have a stake in this issue from the business folks, our local community officials and constituents who have made time to be here today.

Today's hearing is an extension of the good work the U.S. Senate Energy Committee has been doing on the shale gas development. The purpose of the hearing is to examine Marcellus shale gas development and production in West Virginia. My friend, Chairman Jeff Bingaman, has held 2 natural gas hearings this year. So this is the third hearing of the full committee on an issue that is uniquely important to our State and region.

I'd like to thank Chairman Bingaman and Ranking Member Lisa Murkowski for allowing me to bring the work of the U.S. Senate Energy Committee to West Virginia. I cannot think of a more appropriate topic for my first field hearing. We all know that Marcellus shale gas could truly be a game changer for our great State. We are literally sitting on top of tremendous potential with the Marcellus shale. We need to work together to chart a path forward in a safe and responsible way that allows us to produce energy right here in America and create well paying jobs for hard working Americans.

Of course we also need to do all that we can to make sure that West Virginians are getting the jobs here in West Virginia because the people of our State should benefit from the natural resources we have. West Virginians are the hardest workers in the world. I've always said that we're not looking for a handout. We're looking for a work permit.

We've gathered experts here today to discuss how development in the Marcellus shale can help us rebuild America. I know there are a whole host of issues of great concern to folks around the State like how we can use all of our abundant natural resources like coal, timber and natural gas in a balanced way that does not endanger the health of our land and water and whether industry is treating residents fairly. To address the concerns I truly believe that we need a regulatory system in place that is really driven by the States with the Federal Government acting as our partner to effectively extract the natural gas and attract the billion dollar ethane cracker, plants for natural gas production and the jobs that they would bring to West Virginia.

I know our State legislators and working very diligently on this as we speak. That is why we need to explore today what we are doing in West Virginia. We are ready to assume the primary regulatory roles as we go forward.

We need to know are we prepared with the regulatory expertise and the resources to develop the Marcellus shale safely and responsibly. Do we have enough inspectors? Is our infrastructure able to bear the burden of new development? How can the Federal Government and the EPA act as our partner, not our adversary, in all of this?

Let me remind all of you that oil and natural gas exploration are not new to West Virginia. In fact, West Virginia is home to the very beginnings of petroleum exploration in the United States. Oil

and gas production in West Virginia actually began as an outgrowth of the salt industry in the 1800s.

At that time oil and gas had no real significance in our State. But salt makers would frequently hit oil and gas in their drilling. So much oil was diverted to the Kanawha River by salt manufacturers that it was known as Old Greasy to the boatmen.

It didn't take long for some industrious West Virginians, namely the Rathbone Brothers, to find the value in these salt byproducts. These brothers began an exploration in what became known as the burning springs oil field in the Great Kanawha Valley region. It was named this way because you could get a pretty good flame by throwing a lighted candle in the gas that escaped the site.

From these early beginnings in around 1859 the oil industry grew to peak production of 16 million barrels in 1900. Natural gas took off from there and West Virginia led the country in natural gas production until 1917. Natural gas output then went on the decline and picked back up in about 1970.

There have been booms and busts throughout the last 100 years in West Virginia. It's estimated that there are more than 150,000 existing oil and gas wells in our State whether they are still producing or not. But that doesn't compare to the potential volumes that could be produced here in West Virginia from the Marcellus shale. New technology like hydraulic fracturing and horizontal drilling are really giving us the tools to extract this vital resource.

Since 2005 drilling in West Virginia has really taken off. In 2009 we had about 51,000 producing wells in our little State. That number represents slightly more than 10 percent of all the producing wells in the country. That's a lot of wells. We are just getting started.

New permits are being issued all the time, 1,500 new permits in 2010 alone. This has remarkable potential for new jobs involving these drilling activities.

A recent report by NETL projects that developing shale gas in West Virginia would result in 17,000 additional jobs, $870 million generated from State and local taxes and $1.3 billion in direct payments to households through royalties and industry payroll. State officials here in West Virginia have estimated that we can expect more than 2,300 direct jobs from the construction of just one cracker plant to convert ethane, a byproduct of Marcellus drilling into ethylene, a chemical that is used as feedstock in the chemical industry.

Businesses investment in one plant would be at least $1.5 to $2 billion. Now that's a serious investment. The folks at the American Chemical Council have even more detailed projections.

That about $3.2 billion would also be invested in the downstream chemical facilities that would make products like dyes, paints, coatings and plastics. That investment would generate $7 billion in additional chemical industry output in West Virginia. The Council also estimates that about 12,000 jobs would be created in the chemical industry and throughout the supply chain in West Virginia moving us from 23rd largest chemical producing States to the 13th largest in the country.

The potential of Marcellus is truly remarkable. From an energy development standpoint we are at the cusp of something that could

help us reduce our dangerous dependence on foreign oil that threatens both our national security and our economic security.

It's so important that we develop our resources here at home rather than continuing to rely on countries that don't like us very much and perhaps wish to do us harm. We need an energy portfolio in this country that uses everything. I repeat everything. Natural gas and oil, coal, wind, solar, hydropower, geothermal, you name it, we need it. Marcellus has a large role to play in that.

But no matter how we move forward we have to do it right—in a way that balances our environment with our economy in away that creates jobs without damaging the health of our lands and our waters and most importantly our children. That allows the States to take the lead on regulating this tremendous resource. That's what we are looking at today.

With this in mind I'd like to give my Congressional colleagues a few minutes each to present some opening statements. I would ask that they keep their remarks to 3 minutes and that you are welcome to submit more lengthy remarks for the record.

So first we'll begin with Congressman Rahall.

STATEMENT OF HON. NICK RAHALL, U.S. REPRESENTATIVE, 3RD DISTRICT OF WEST VIRGINIA

Mr. RAHALL. Thank you. Thank you, Senator. I thank you, Senator Manchin, for the kind invitation to participate in today's hearing. Also I appreciate the courtesy extended to me by the Senate Committee on Energy and Natural Resources.

West Virginia, as we all know, is a State whose rich history is closely tied to our abundant supply of natural resources. Our State was once a major salt producer, and once a major oil producer. Our forest lands have produced billions of board feet of timber. We remain today one of our Nation's largest producers of coal.

Generations of West Virginians have benefited from that development, the hard labor of digging, drilling and dredging and logging. But in far too many instances the wealth derived from turning those raw materials into widely marketable, highly profitable goods has not gone to our own State residents, but to out of State interests. In that respect our history has been one of exporting opportunities.

Now we are confronted with yet another natural resource bonanza possessing vast potential to enrich our State and our people with natural gas sequestered in the Marcellus shale play. We have a chance now to change our historic profile. I believe we ought to make every effort, not just to simply live with Marcellus production, but also to ensure that we thrive from it.

We have to look no further than the last couple of decades of lawsuits, legal opinions, regulation and legislation related to surface coal mining to understand the complexity of the undertaking before us. But I believe that the lessons of our past can serve as a valuable guide to our future.

We must look ahead to both the benefits and the consequences of vast Marcellus drilling.

We must have the involvement and buy in of stakeholders from all corners and from every level of government.

We must consider all the environmental effects of drilling from the rights and well being of surface owners to the subsurface consequences of drilling methods to the effect on water quality and quantity to air emissions.

Just as importantly we ought to do all we can to ensure that the fullest measure of economic benefit remains in our State for current and future generations of West Virginians.

I'm all for promoting Marcellus development as long as it means a better life for our children and grandchildren. Our State legislature, as Senator Manchin has referenced, has been grappling for many months on this challenge. All indications are that tremendous progress is being made.

Today we'll have an opportunity to hear about that as well as the State wide permitting and oversight regime. I am looking forward to that testimony. It is no light task to create a comprehensive plan for development of the Marcellus formation. But I believe the task is well and properly placed in the hands of our State and local leaders and that there's every hope that their work will lead to a regime that sets a standard for the rest of the Nation to consider.

From my perspective as the lead Democrat on the House T and I committee, a committee with jurisdiction over our highways and waterways, as well as our water systems and pipelines, I'm interested in how the Federal Government can aid West Virginia in this venture to enable the preservation of our natural treasures, the creation of well paying jobs and the cultivation of a better, brighter future for West Virginia.

I again thank Senator Manchin and the committee. I look forward to today's witnesses.

Senator MANCHIN. Thank you, Congressman Rahall.

Congresswoman Capito, please proceed with your opening remarks.

STATEMENT OF HON. SHELLEY MOORE CAPITO, U.S. REPRESENTATIVE, 2ND DISTRICT OF WEST VIRGINIA

Ms. CAPITO. Thank you, Senator Manchin. I want to thank the Senate committee, Chairman Bingaman and Ranking Member Murkowski and certainly Senator Manchin for holding this field hearing to examine the Marcellus shale development and production in West Virginia.

I'm pleased to be here with my House colleagues, Congressman Rahall and Congressman McKinley should be here shortly. I'm happy to be here in front of a lot of friends in our State that are going to hear a lot of different perspectives whether it's regulators or scientists, engineers, about the vast potential that this holds for our State. We are seeing the economic development that a few years ago would have been unimaginable.

Many of you know that I'm from the Northern part of the State originally. My parents are still living in Glendale and Moundsville, Marshall County, which is sort of ground zero for a lot of the Marcellus shale development in our State. I travel there frequently. I can see it is palpable the economic development that's already occurring at the local level.

Just for instance and I'm not going to take more than my 3 minutes. But I took my mother to get her hair done. I was talking to the hair dresser. She told me that she had a well on her property.

I asked her if she was seeing anything from the Marcellus shale. She said, yes, I have a well on my property. I said, well are you going to Disney World, you know, like you've hit the big mother lode here? She said well, no, no. We're not really going to change our life, but we are going to put new carpet in the house.

[Laughter.]

Ms. CAPITO. I thought, well, she's going to buy that carpet from a local vendor. So that's going to be another job that's going to be created because of the development of the Marcellus shale on her property. It was, to me, it sort of framed out the way, as Congressman Rahall said, the development of this should be from the ground up so that everybody benefits, particularly those who live and work in that area.

This is an immense resource. Senator Manchin has talked about what the development and the jobs that can be created. WVU has estimated that up to 20,000 new jobs will be created in West Virginia by 2015. The opening of this resource has pushed the price of natural gas down allowing for lower electrical prices and heating costs. This plentiful supply makes West Virginia a very much more attractive place for non energy businesses to locate due to the availability of fuel to power their operations.

The byproducts of the Marcellus include ethane, propane and oil. The large amounts of the ethane can be converted by the cracker plants into ethylene and then used in a variety of ways, chemical and plastic production. So I'm not going to say if a cracker plant is built. I'm going to say when the cracker plant is built in West Virginia we will see billions of dollars of development. The construction of the plant alone would create thousands of construction jobs.

It is clear of the potential economic benefits of the Marcellus shale development. They are great. But there are legitimate environmental and transportation concerns associated with the gas production. West Virginia must make sure that we manage this resource responsibly in a way that not only allows the State to obtain the maximum economic benefit, but protects our clean air and water.

I look forward to the hearing. Thanks so much for the invitation to be here today.

Senator MANCHIN. Thank you, Congresswoman.

First of all let me say thanks to all of you for your remarks. When Congressman McKinley comes in we will give him the ability to speak before you all. But we're going to go ahead and get started with our first panel.

We have a Federal panel with us as our first panel. I'd like to introduce them to you.

We have Mr. Anthony Cugini from the National Energy Technology Laboratory here in Morgantown, West Virginia. Mr. Cugini is the official representative here today for the Department of Energy.

Our second witness will be Mr. Jon Capacasa, who is the Director of the EPA's Region 3 Water Protection Division based in Philadelphia, Pennsylvania.

Our third witness today is Mr. James Coleman, who is the Leader for the Energy Resources Program at the U.S. Geological Survey in Reston, Virginia.

I'd like to welcome and thank all of you for coming today. We appreciate it very much. If you could begin your remarks with a brief description for all the audiences of the role and function of each of your agencies and then each proceed into your oral testimony. The witnesses will have 5 minutes each.

Dr. Cugini, we'll start with you.

STATEMENT OF ANTHONY CUGINI, DIRECTOR, NATIONAL ENERGY TECHNOLOGY LABORATORY, DEPARTMENT OF ENERGY

Mr. CUGINI. Thank you, Senator Manchin.

The Department of Energy's mission is really implemented through the NETL and has 2 primary aspects, technology development and data compilation. We're not involved in regulation but really looking at trying to develop the technological data, etcetera, that can inform regulation and also provide technologies that can be commercialized and moved out to the industry. So with that I'd like to begin my oral testimony.

Again, Senator Manchin, Representative Rahall and Representative Capito, thank you for the opportunity to speak to you today about the U.S. Department of Energy's research efforts related to shale gas development. Shale gas production in the United States has grown dramatically during the past decade. Early success in the Barnett shale in Texas coupled with additional technological improvements has prompted producers to invest in similar plays in other areas across the country. The Energy Information Administration projects that shale gas production will continue to increase, growing almost 4 fold between 2009 and 2035 when it is projected to make up nearly half of total U.S. gas production.

The benefits of the current surge and expected expansion in natural gas production are many. Increases in business activity, employment, personal income, royalty payments and State tax revenues are being reported. Early projections of net job creation and incremental tax revenue vary in terms of impact, but they are universally positive.

However, as the level of drilling and production operations has increased concerns have been raised by members of the public about the potential negative impacts of shale gas development. Citizen concerns have included potential contamination of water supplies, road damage, air pollution, disturbances to echo systems, noise levels and fear that the activity will disrupt a rural lifestyle. It is within this context that State and Federal regulators are being called on to make important decisions that will influence our energy supply choices for many years.

The DOE provides data and analysis to inform these decisions and identify solutions to help enhance environmental protection and increase the benefits to communities and the Nation of shale gas development. As an objective source of scientific data DOE's

early contributions to the fundamental information about gas shales, tight sands and coal seams published in the 1980s had been credited with having played an important role in today's domestic natural gas supply growth. At present NETL is managing a multi-agency effort in collaboration with a major independent producer to acquire, analyze and publish environmental baseline data that can be used to quantify the net impact of Marcellus shale drilling and production activity on water, air and other valued resources.

NETL's collaborative efforts have resulted in a number of useful products related to gas shales.

For example NETL together with the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission developed FracFocus, a landmark, web based, national registry for disclosing the chemical additives used in a hydraulic fracturing process.

Similarly NETL has coordinated with States through the DWPC to develop and maintain the risk based, data management system, an online system that helps States streamline their oil and gas permitting processes.

In March 2011 President Obama directed Secretary of Energy, Steven Chu to form a subcommittee of the Advisory Board on Natural Gas to develop recommendations to improve the safety and environmental performance of hydraulic fracturing. The subcommittee produced a 90 day report on August 18, 2011 with 20 recommendations and is scheduled to submit a final report this month. In several cases the subcommittee recommended actions that DOE, through NETL, has already begun or has been doing. For example, funding for the risk based, data management system and the collection of air quality data such as being done at the Marcellus test site.

The Marcellus test site is an example of the holistic approach taken by the Department through NETL in the area of environmental base lining and risk assessment and an example that effective research coordination among Federal agencies. NETL is leading a joint industry, government research team to monitor key aspects of shale gas development through its life cycle. The research planning calls for 1 year of comprehensive environmental monitoring followed by the drilling of 2 horizontal wells by Range Resources-Appalachia in July 2012 at a well pad site in Southwestern Pennsylvania. This research project includes one of 2 perspective case studies for the U.S. EPA's ongoing study of the potential impact of hydraulic fracturing on drinking water resources.

Responsible development of shale gas resources provides a significant national opportunity for regional economic growth not only through drilling and production but also along the entire national gas value chain including natural gas liquids, ethane feed stock, chemical production and natural gas fired manufacturing processes. The role for NETL is to support the realization of these opportunities through solid science, objective data generation and analysis and effective efforts to accelerate the development of technologies that can help optimize the way we produce our natural gas resources in the most environmentally responsible manner possible.

This concludes my oral testimony. Thank you for the opportunity.

[The prepared statement of Mr. Cugini follows:]

PREPARED STATEMENT OF ANTHONY CUGINI, DIRECTOR, NATIONAL ENERGY TECHNOLOGY LABORATORY, DEPARTMENT OF ENERGY

Thank you for the opportunity to speak to you today about the role of the U.S. Department of Energy research efforts related to domestic shale gas resource and its development.

BACKGROUND

Shale gas production in the United States has grown dramatically during the past decade. Early success in shale gas production in the Barnett Shale in Texas, coupled with additional technological improvements, has prompted producers to invest in similar plays in other sedimentary basins. In addition to the Barnett in the Fort Worth Basin of Texas, the U.S. is now realizing production from the Haynesville shale in Louisiana and Texas, the Fayetteville shale in Arkansas, the Woodford shale in Oklahoma, the Marcellus shale in Pennsylvania and West Virginia, and the Eagle Ford shale in Texas. Other emerging natural gas shale plays such as the Utica shale in Ohio, as well as formations in Alabama and the Rocky Mountain states, are the scene of robust leasing and drilling activity.

The Energy Information Administration (EIA) at the Department of Energy (DOE) projects that shale gas production will continue to increase through 2035 in the Annual Energy Outlook 2011 Reference Case, growing almost fourfold from 2009 to 2035. While total domestic natural gas production increases from 21.0 trillion cubic feet in 2009 to 26.3 trillion cubic feet in 2035, shale gas production grows to 12.2 trillion cubic feet in 2035, when it is projected to make up 47 percent of total U.S. production—up considerably from the 16 percent share in 2009.

The EIA's estimate for technically recoverable shale gas resources in the Reference Case is 827 trillion cubic feet (Tcf). However, estimates of technically recoverable shale gas are certain to change over time as new information is gained through drilling, production, and technological development. A National Petroleum Council report published in September 2011 surveyed a wide range of producers and consultants opinions regarding domestic, technically recoverable shale gas volumes and reported a range from 700 Tcf to 1800 Tcf.[1] Further, estimates of the portion of this technically recoverable volume that is economically recoverable will certainly change, as energy supply choices are made and natural gas prices reflect those choices.

The benefits of this current surge and expected continued expansion in natural gas production are many. Increases in business activity, employment, personal income, and royalty payments and state tax revenues are being measured and estimated, and reported. Early projections of net job creation and incremental tax revenue vary in terms of impact, but they are universally positive.

However, as the level of drilling and production operations has increased, concerns have been raised by members of the public about the potential negative impacts of shale gas development. Citizen concerns have included: potential contamination of water supplies from hydraulic fracturing; increased road maintenance costs and risk of accidents due to increased truck traffic; increased emissions of air pollutants from diesel equipment or production operations; disturbances to ecosystems needed to support other economic activities such as hunting, fishing, and tourism; increased levels of noise from drilling, natural gas processing facilities, and compressor stations; and a fear that the drilling and construction activity will impact the lifestyle of rural America.

It is within the context of this rapidly changing resource picture and range of viewpoints that state and Federal regulators are being called on to make important decisions that will influence our energy supply choices for many years. The DOE provides data and analyses to inform those decisions and identifies technology solutions to help enhance environmental protection and increase the benefits to communities and the Nation of shale gas development.

THE DEPARTMENT OF ENERGY'S MISSION RELATED TO SHALE GAS

The Department of Energy's mission with regard to gas shale resource development activity, as implemented through the National Energy Technology Laboratory (NETL), has two primary aspects: technology development, and data development, compilation, and analysis to assess technical risks. DOE's technology development role includes helping to catalyze industry efforts to develop new technologies that can significantly reduce the potential for environmental impacts and improve the ef-

[1] NPC, "Prudent Development Realizing the Potential of North America's Abundant Natural Gas and Oil Resources", Page 1-39

ficiency of gas production, and providing critical support for nascent technology concepts that can help advance them towards commercial development.

The other aspect of DOE's role is in generating, compiling, analyzing, and reporting data that can be used by regulators to craft science-based regulations, and by industry and the public to assess risks and accelerate decision making related to resource development. As an objective source of scientific data, DOE's early contributions to fundamental baseline information about unconventional formations such as shales, tight sands, and coal seams published in the 1980s, has been credited with playing an important role in today's growth in domestic natural gas supply. Currently, NEIL is managing a multi-agency effort, in collaboration with a major independent producer, to acquire, analyze and publish environmental baseline data that can be used to quantify the net impact of Marcellus shale drilling and production activity on the air, water, land, flora, and fauna surrounding a western Pennsylvania drilling site. I'll speak more on this activity in a moment.

It is also important to note what DOE does not do. DOE does not regulate oil and natural gas exploration or production activities, or manage Federal lands and the mineral estate.

VALUE OF DEPARTMENT OF ENERGY WORK PRODUCTS

The value of DOE's oil and natural gas research may be seen in more efficient production of these resources with less environmental impact. This research can support environmental compliance or increase the efficiency of equipment designed to reduce environmental impacts. Development of new hydraulic fracturing flowback water treatment technologies increases the number of options available to operators. As one example, NEIL has partnered with a group led by West Virginia University to develop an on-site multi-media filtration system. Flowback water is the volume of fluid produced from a well in the short term whenever a well is "turned on" after being hydraulically fractured. Flowback is comprised mostly of the injected fluid and can be differentiated from produced water, which is fluid produced to surface along with natural gas over the life of a well.

Scientific data sourced by NEIL is valued as objective information by state regulators seeking information on which to base regulations that can enhance environmental performance and community safety without stifling economic development. These data are also valuable to producers, particularly smaller independents without the resources to carry out their own research that are looking for data to inform their exploration and production strategies and development choices. A number of popular DOE research products are online databases and decision-making tools that are used by both operators and regulators. Examples include the Risk Based Data Management System, FracFocus, the Produced Water Management Information System, and the Fayetteville Shale Decision Support System. Such tools, which would not be available without DOE support, and have already begun to play an important role in helping to mitigate problems associated with shale development. FracFocus has become an increasingly popular means for companies to voluntarily disclose the contents of fracturing fluids to myriad stakeholders.

HOW DOE ACCOMPLISHES ITS MISSION THROUGH RESEARCH

DOE accomplishes its mission in three ways: (1) through cost shared research with industry, academia and governmental agencies; (2) through on-site research at NEIL, including efforts through its regional university alliance; and (3) through strategic partnerships with other organizations.

Cost shared research is implemented via NETL open solicitations for research partnerships focused on topics where there is an appropriate opportunity to perform research that will yield a clear public benefit and that would not otherwise be carried out by industry. Cost share from an industry/academic partner is a minimum of 20 percent. NEIL manages such research, development and demonstration projects with funds provided by Congressional appropriations and by Federal offshore royalty revenues.

NETL also conducts on-site research on topics that are complementary to the extramural research undertaken via competitive solicitation. This research is carried out by Federal employees and support professionals working as part of NETL's Office of Research and Development and in partnership with researchers who are affiliated with the NETL Regional University Alliance (NETL-RUA). This alliance is an applied research collaboration that combines NETL's fossil energy expertise with the broad capabilities of five nationally recognized, regional universities: Carnegie Mellon University (CMU), Pennsylvania State University (PSU), the University of Pittsburgh (Pitt), Virginia Tech (VT), and West Virginia University (WVU).

Finally, NEIL forms collaborative partnerships with organizations whose missions are compatible with DOE's. For example, NEIL, with the Ground Water Protection Council (GWPC) and the Interstate Oil and Gas Compact Commission, developed FracFocus, a landmark web-based national registry for disclosing the chemical additives used in the hydraulic fracturing process on a well-by-well basis. Similarly, NEIL has coordinated with states through the GWPC to develop and maintain the Risk-Based Data Management System (RBDMS). The GWPC with DOE support has recently enhanced the RBDMS to track and record data related to hydraulic fracturing treatments.

DOE'S HISTORICAL ROLE IN GAS SHALE RESEARCH

The DOE first began research into shale gas in the late 1970s when fears of dwindling domestic natural gas supplies spurred researchers to examine alternative sources of natural gas in unconventional reservoirs such as Devonian shales, coals, and low permeability or "tight" sands. DOE recognized the need for research and development to characterize these resources and developing ways to produce them.

During the period from 1977 through 1992, through a suite of three programs focused on Eastern gas shales, Western gas sands, and methane from coal beds, DOE helped develop and stimulate the deployment of advanced exploration and production technologies for recovering new gas supplies from unconventional gas resources by increasing per well gas recovery efficiencies. NEIL employed a detailed resource characterization and technology development approach that geologically partitioned each natural gas resource and matched technology to geology to chart a path for resource development. More than 25,000 feet of oriented core and well log data from 35 cored shale wells provided the basic rock and geologic data used to prepare the first, publicly available estimates of technically recoverable gas from Devonian Shales in West Virginia, Ohio, and Kentucky.

A couple of related and noteworthy milestones include:

- In 1986, DOE collaborated with industry to mark the first air-drilled 2000 foot long horizontal Devonian shale well in the Appalachian Basin. This well also marked the first recovery of core from a horizontal, air-drilled shale well and the first successful use of external casing packers in an air-filled wellbore, and was the first horizontal shale well to complete seven individual hydraulically fractured intervals.
- Early DOE leadership in the development of fracture mapping—techniques for using seismic responses to identify the orientation and extent of hydraulically created fractures. The Department began support of fracture mapping as related to geothermal resources and through a series of technology advancements has become commercial with a number of companies successfully mapping hydraulic fractures, including many in the major shale gas plays.

SEAB 90 DAY REPORT

In March 2011, President Obama directed Energy Secretary Steven Chu to form a subcommittee of his advisory board on natural gas to develop recommendations to improve the safety and environmental performance of hydraulic fracturing. The Subcommittee produced a 90-day report on August 18, 2011, with 20 recommendations, and is scheduled to submit a final report this month.

The recommendations support an approach that relies on increased measurement, public disclosure, and continuous improvement. The subcommittee specifically acknowledges the need for data-driven processes with increased transparency and the development of industry-wide "best practices."

In several cases, the Subcommittee recommended actions that DOE, through NETL, has already begun or has been doing. For example, funding for RBDMS, and to collect and publish emission data such as is being done at the Marcellus shale Test Site. The Subcommittee also recommended that state and Federal regulators develop an integrated water management system; NETL has been supporting the development of a planning and water management tool for several states, which could serve as a building block for the referenced integrated system. In addition, the Subcommittee recommended the continued funding and expansion of FracFocus.

Within available funds, NEIL also has planned research related to several topics highlighted by the Subcommittee: (1) basic research on the relationship of fracturing and micro-seismic signaling, (2) chemical interactions between fracturing fluids and shale, (3) development of "green" drilling and fracturing fluids, and (4) development of improved cement evaluation and tools for assuring casing and cementing integrity.

DOE'S "HOLISTIC" APPROACH TO ENVIRONMENTAL RISK ASSESSMENT

The Marcellus Test Site is an example of the "holistic" approach taken by the Department through NETL in the area of environmental baselining and risk assessment and an example of effective research coordination among federal agencies. NETL is leading a joint industry/government research project to monitor key aspects of shale gas development throughout its lifecycle. The research plan calls for one year of comprehensive environmental monitoring, followed by the drilling of two horizontal wells by Range Resources-Appalachia in July 2012 at a well pad site in southwestern Pennsylvania. Monitoring will continue through road and pad construction, drilling, and hydraulic fracturing, and for at least one year beyond the start up of subsequent production operations. This research project has been selected as one of the two "prospective case studies" for the U.S. Environmental Protection Agency's ongoing study of the potential impact of hydraulic fracturing on drinking water resources.

Comprehensive, scientifically acquired baseline environmental data from a well site prior to drilling and fracturing have not been rigorously acquired and analyzed. Pre-operation data are essential for quantifying environmental impacts and for ascertaining what portion of the post-development environmental footprint is due to current natural gas development operations versus that which may be due to past energy development activity or concurrent industrial, agricultural, or recreational activities. Accordingly, these two prospective studies will provide important reference points for discussions regarding the need for further research and the development of regulatory policy at both state and federal levels.

At the Marcellus Test Site, the NEIL lead team will be monitoring groundwater and surface water quality, and air quality; conducting soil gas surveys, hydraulic fracturing tracer studies, and electromagnetic induction surveys to identify any possible migration of natural gas, completion fluids, or production fluids. Quantifying potential risks and providing sound, unbiased and transparent scientific data is an important step in building a rationale, scientific approach to sustainable resource development. A Marcellus Test Site summary, which provides additional details of the research project, is being submitted for the record.

SUMMARY

In summary, NETL has a technology development role in helping to catalyze industry efforts to develop new technologies that can significantly reduce the potential for environmental impacts and improve the efficiency of gas production and in providing critical support for nascent technology concepts that can help advance them towards commercial development. NEIL also has a role in generating, compiling, analyzing, and reporting data that can be used by regulators to craft science-based regulations, and by industry and the public to assess risks and accelerate decision making related to resource development.

Responsible development of shale gas resources provides a significant national opportunity for regional economic growth, not only through drilling and production, but also along the entire natural gas value chain, including natural gas liquids, ethane feedstock chemical production, and natural gas-fired manufacturing processes. Increased domestic natural gas supplies have the potential to provide a significant source of transportation fuel, particularly for truck fleets.

The role for NEIL is to support the realization of these opportunities through solid science and objective data-generation and analysis and effective efforts to accelerate the development of technologies that can help optimize the way we produce our natural gas resources in the most environmentally responsible manner possible.

Thank you for the opportunity to speak with you this morning. I look forward to answering any questions that you may have.

ATTACHMENT.—DOE LEADS COLLABORATIVE EFFORT TO QUANTIFY ENVIRONMENTAL IMPACTS OF SHALE GAS DEVELOPMENT

DOE's National Energy Technology Laboratory (NETL) is leading a joint industry/government research project monitor key aspects of shale gas development throughout its lifecycle. The research plan calls for one year of environmental monitoring before any development takes place, followed by the drilling of two horizontal wells in July 2012 at a Range Resources-Appalachia well pad site in southwestern Pennsylvania. Monitoring will continue through road and pad construction, drilling, and hydraulic fracturing, and for at least one year of subsequent production operations. This research project has been selected as one of the two "prospective case studies" for the U.S. Environmental Protection Agency's (EPA) ongoing study of the potential impact of hydraulic fracturing on drinking water resources.

As an important step in EPA's Congressionally mandated study, seven sites were selected to help inform the assessment. These sites were selected following input from the public, local and state officials, industry, and environmental organizations and include five "retrospective case studies" that will examine areas where hydraulic fracturing has already occurred to identify possible impacts to drinking water resources. The two prospective sites include the NETL-lead research project in southwestern Pennsylvania and a second location in Louisiana's Haynesville Shale play.

The critical importance of the two prospective case studies cannot be overstated. This is because comprehensive, scientifically acquired baseline environmental data from a well site prior to drilling and fracturing have not been rigorously acquired and analyzed. Pre-operation data are essential for quantifying environmental impacts and for ascertaining what portion of the post-development environmental footprint is due to current natural gas development operations versus that which may be due to past energy development activity or concurrent industrial, agricultural, or recreational activities. Accordingly, these two prospective studies will provide important reference points for discussions regarding the need for further research and the development of regulatory policy at both state and federal levels.

The NETL-lead Marcellus research effort is part of the laboratory's unconventional fossil energy research program, a larger effort that is focused on developing technologies that enable environmentally sustainable development of oil and natural gas resources. NEIL will monitor air quality and surface water quality at the Range Resources-Appalachia site pre-and post-drilling to quantify the extent that these vital resources are impacted by shale gas production. Further, NETL will conduct soil gas surveys, hydraulic fracturing tracer studies, and electromagnetic induction surveys to identify any possible migration of natural gas, completion fluids, or production fluids.

A Range Resources-Appalachia well pad location in southwestern Pennsylvania is the site for an EPA Prospective Case Study as part of a NETL-led field based research initiative. NETL's Mobile Air Monitoring Laboratory will be used to measure air quality.

NETL will deploy its mobile air emissions monitoring equipment at the location to monitor up to 52 volatile organic compounds (VOC's), ozone, sulfur dioxide, nitrous oxides, particulates, specific ions (e.g., sulfate, chloride, bromide), and radon. Soil gas concentration measurements are also an important part of site characterization, because they can provide an indication of gas migration from depth even before drilling or hydraulic fracturing has begun. Stable isotope measurements are important for distinguishing between methane migrating from a productive formation deep underground and biological and atmospheric background methane concentrations.

NETL will also conduct surveys aimed at identifying improperly abandoned natural gas and oil wells based on the magnetic response of the buried remnants of well casing. This "gas well archeology" is often the only way to locate old, unrecorded wells that can be the source of communication between a shallow underground source of drinking water (USDW) and historical producing formations. Such antique wellbores should be located and properly plugged to address historical methane migration problems.

In addition, NEIL will coordinate a larger research team with specific tasks that includes the EPA and U.S. Geological Survey (groundwater monitoring), the U.S. Fish and Wildlife Service (wildlife acoustic monitoring), the U.S. Forest Service (landscape and soil monitoring), the U.S. Army Corps. of Engineers (regional stream water quality monitoring), the Pennsylvania State Department of Environmental Protection (terrestrial and aquatic systems monitoring), and the Pennsylvania Geological Survey (subsurface geologic monitoring).

This comprehensive, rigorously scientific collaborative effort among federal and state agencies and a natural gas producing company will provide valuable information that can be used to quantify the potential risks of environmental impacts from hydraulic fracturing during the development of shale gas resources. Quantifying potential risks and providing sound, unbiased and transparent scientific data is the first step towards building a rationale, scientific approach to regulating sustainable resource development.

Senator MANCHIN. Thank you, Dr. Cugini.

Now from Mr. Capacasa.

STATEMENT OF JON CAPACASA, DIRECTOR, WATER PROTECTION DIVISION, REGION 3, ENVIRONMENTAL PROTECTION AGENCY

Mr. CAPACASA. Good morning, Senator Manchin and Representatives Capito, Rahall and McKinley. I'm pleased to be here today to discuss EPA's role in ensuring public health and water quality are protected during shale gas extraction and production.

As you requested Senator, just briefly. Our mission, EPA's mission is to protect human health and the environment by working to ensure all Americans are protected from significant risks. At the core of our work is implementing some of the national environmental laws that were passed by the Congress for protecting air, water and land from pollution and making sure they are effectively implemented. Most EPA programs are managed by authorized States with oversight by EPA, but in some cases EPA runs them directly.

I'd like to proceed then into the oral statement.

Senator MANCHIN. Yes, sir.

Mr. CAPACASA. Natural gas can enhance our domestic energy options, reduce our dependence on foreign supplies and serve as a bridge fuel to renewable energy sources. While shale gas holds the promise for an increased role in our energy future, EPA believes it is imperative we access that resource in a way that protects drinking water sources and surface waters. We believe this important resource can be and must be extracted responsibly and safely in a way that secures the benefit for all. If improperly managed shale gas extraction may potentially result in impacts to public health or our water resources.

If we look at water issues across the entire shale gas production cycle they're—from water acquisition to waste water treatment and disposal, some of impacts on water resources may include stress on surface water and its uses and ground water supplies from the withdrawal of large volumes of water for drilling, the potential contamination of drinking water aquifers resulting from faulty well construction, degraded water quality due to challenges from—with managing and disposing of contaminated waste waters where contaminates could include organic chemicals, metals, salts and radionuclides.

The EPA has an important role to play along with the States in protecting water resources and in working with our Federal partners, our State partners to manage the benefits and risks of shale gas production and particularly using best science and technology available. To this end we're working with many stakeholders including the oil and gas industry, the public health community and the States to evaluate the potential public health and water quality issues. These actions are important pieces of the Administration's broader effort to ensure natural gas production occurs in a safe and responsible manner as laid out in the President's blueprint for a secure water future—secure energy future, excuse me.

Highlighting some of our research focus as was just mentioned at the direction of Congress the EPA launched a research study last year to better understand the potential impacts of hydraulic fracturing on drinking water resources. As part of that study we've engaged thousands of Americans across the country, who live in

areas where this activity occurs. When complete this peer reviewed research study will help us have a better understanding of the potential impacts of hydraulic fracturing on drinking water resources and the factors that lead to risks while reducing some of the scientific uncertainties about the impacts.

The draft study plan for this research study was reviewed by the EPA's Science Advisory Board and finalized just on November 3rd of this year. EPA plans to release 2 reports from the study, one in 2012 on some of the preliminary case studies that were done and some of the date that was collected and another report in 2014 which will provide additional information on the case studies that are being used and the scientific results as well there.

With regard to our authorities in this area let me give you some examples. While Congress specifically exempted selected oil and gas production activities from several environmental laws but a number of environmental protections continue to apply. Under the Clean Water Act the National Pollution Discharge Elimination System Program and the Drinking Water Act's Underground Injection Control Program are examples of authorities that States and EPA use to regulate certain oil and gas production activities.

Under these authorities EPA has a number of activities underway which I'd like to outline for you.

Under the Clean Water Act the EPA and authorized States including West Virginia have the authority to regulate waste water from oil and gas wells when they are discharged into waters of the United States or if they are discharged into sewer systems for publicly owned treatment works.

EPA produced a frequently asked questions document to assist State and Federal permitting agencies within the Marcellus region in how to address treatment and disposal of waste waters.

In addition most recently as part of the effluent guidelines planning process under the Clean Water Act, Section 304(m), EPA recently announced its intent to modify an existing oil and gas pretreatment standards to address proper waste water disposal into treatment works.

Separately under the UIC program, the Underground Injection Control Program, EPA is working to ensure permitting requirements are made clear for when diesel fuel is used as part of the process of the injection process. It's clarifying for States the proper permitting for those wells when diesel fuel is used.

We want to acknowledge the progress of West Virginia in updating its regulations to accommodate Marcellus shale drilling and fracturing operations. The West Virginia DEP filed an emergency rule related to the regulation of horizontal drilling in August of this year which will help protect water quality and quantity.

EPA will continue to provide input as needed to help in those processes through the appropriate State agencies.

In summary, EPA is committed to using its authorities consistent with the law and best available science to protect communities across the Nation from potential impacts to water quality and public health associated with natural gas production. Where we know problems exist, EPA will not hesitate to protect Americans whose health may be at risk. We will continue to work very closely and collaboratively with West Virginia officials who are on the front

lines of protecting water resources and regulating natural gas production activities.

Thank you for the opportunity to testify. I'd be happy to address some questions.

[The prepared statement of Mr. Capacasa follows:]

PREPARED STATEMENT OF JON CAPACASA, DIRECTOR, WATER PROTECTION DIVISION, REGION 3, ENVIRONMENTAL PROTECTION AGENCY

Good morning, Chairman Manchin and Representatives Capito, Rahall and McKinley. I am pleased to be here today to discuss the EPA's role in ensuring that public health and water quality are protected during shale gas extraction and production activities.

Natural gas can enhance our domestic energy options, reduce our dependence on foreign supplies, and serve as a bridge fuel to renewable energy sources. If produced responsibly, shale gas has the potential to help improve air quality, stabilize energy prices, and provide greater certainty about future energy resources.

While shale gas holds promise for an increased role in our energy future, the EPA believes it is imperative that we access this resource in a way that protects drinking water sources and surface waters. As we listened to citizens at public meetings across the country last year, we heard the concerns many have for their families, their communities, and their water resources. We also heard from citizens who expressed how much their communities sorely need the income that could be gained from shale gas production.

We believe that this important resource can be—and must be—extracted responsibly and safely, in a way that secures its promise for the benefit of all. If improperly managed, shale gas extraction and production, including hydraulic fracturing, may potentially result in impacts to public health or our water resources. If we look at water issues across the entire shale gas extraction process, from water acquisition to wastewater treatment and disposal, some of the impacts on our water resources may include:

- stress on surface water and its uses and groundwater supplies from the withdrawal of large volumes of water used in drilling and hydraulic fracturing;
- potential contamination of drinking water aquifers resulting from faulty well construction and completion;
- compromised water quality due to challenges with managing and disposing of contaminated wastewaters, known as flowback and produced water, where contaminants could include organic chemicals, metals, salts and radionuclides.

The EPA has an important role to play in protecting water resources and in working with federal and state government partners to manage the benefits and risks of shale gas production. We must effectively address the potential impact of shale gas development on water resources using the best science and technology. To this end, we are working with stakeholders, including other federal s well as state agencies, the oil and gas industry, and the public health community, to evaluate and address the potential public health and water quality issues related to shale gas extraction. These actions are important pieces of the Administration's broader effort to ensure that natural gas production occurs in a safe and responsible manner, as laid out in the President's Blueprint for a Secure Energy Future. They are also consistent with the Secretary of Energy Advisory Board's recently released recommendations on steps to support the safe development of shale gas resources.

RESEARCH

At the direction of Congress, the EPA launched a study last year to better understand the potential impacts of hydraulic fracturing on drinking water resources. As part of this study, the EPA has engaged thousands of Americans across the country who live in areas where hydraulic fracturing is currently taking place. When complete, this peer-reviewed research study will help us better understand potential impacts of hydraulic fracturing on drinking water resources and the factors that may lead to human exposure and risks, while reducing scientific uncertainties about environmental impacts from those processes.

As part of this effort, the EPA has used information gathered during the many stakeholder outreach meetings the EPA held during development of the study plan. The draft study plan was recently reviewed by the EPA's Science Advisory Board and finalized on November 3, 2011. The EPA plans to release two reports, one in 2012 that will summarize existing data, intermediate progress regarding retrospective case studies, scenario modeling and laboratory studies; and one in 2014 that

will provide additional scientific results on these topics and report on prospective case studies and toxicological analyses.

EXAMPLES OF AUTHORITY TO PROTECT WATER RESOURCES

While Congress specifically exempted selected oil and gas production activities from several environmental laws, a number of environmental protections continue to apply. The National Pollutant Discharge Elimination System (NPDES) program of the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA)'s Underground Injection Control (UIC) program are examples of authorities that states and EPA use to regulate certain oil and gas production activities to protect public health and water quality. Under these examples of authorities, the EPA has a number of activities underway, which I would like to outline for you. Additionally, it is important to also mention, Section 1431 of the SDWA empowers the EPA to take action to protect human health from circumstances which may present an "imminent and substantial endangerment."

EXAMPLES OF ACTIVITIES TO PROTECT WATER RESOURCES

Under the NPDES program of the CWA, the EPA and authorized states, including West Virginia, have the authority to regulate wastewater from oil and gas wells when they are discharged into waters of the United States. In addition, discharges to publicly owned treatment works (POTWs) must comply with applicable federal, state, and local requirements. This year, the EPA produced a Frequently Asked Questions (FAQ) document to assist state and federal permitting authorities within the Marcellus Shale region in addressing treatment and disposal of wastewater from shale gas extraction.[1] The document covers oil and gas extraction, centralized waste treatment, acceptance and notification requirements for publicly owned treatment works, pretreatment, and stormwater. The FAQs have assisted the EPA and state personnel as we have worked with the regulated community to address shale gas extraction wastewater.

In addition, the EPA is developing guidance to help states address water quality issues related to Centralized Waste Treatment Facilities or POTWs that accept oil and gas wastewater. As part of its effluent guidelines planning process under CWA section 304(m), the EPA recently announced its intent to modify the oil and gas pretreatment standards to address proper wastewater disposal into POTWs. Under SDWA's UIC program, the EPA is working expeditiously to ensure the SDWA programmatic requirements related to hydraulic fracturing when using diesel fuels are implemented appropriately. The EPA is developing guidance to provide information on permitting wells that inject diesel fuels during hydraulic fracturing. With regard to flowback and produced water, we are coordinating with our state and tribal UIC Program co-regulators to ensure proper management of flowback and produced water disposed of via underground injection.

The state of West Virginia has been making progress in updating its regulations to accommodate Marcellus Shale drilling and fracturing operations. The West Virginia Department of Environmental Protection filed an emergency rule related to the regulation of horizontal drilling in August of this year, which will help protect water quality and quantity. The rule is in effect for 15 months. In addition, the West Virginia Legislature continues to work on legislation that would further regulate the industry. EPA is currently reviewing the emergency rule as well as the progress of the draft bill and we intend to provide comments to help inform the state process.

The EPA is committed to using its authorities, consistent with the law and best available science, to protect communities across the nation from potential impacts to water quality and public health associated with natural gas production activities. Where we know problems exist, the EPA will not hesitate to protect Americans whose health may be at risk.

We will continue to work collaboratively with West Virginia officials who are on the front lines of protecting water resources and regulating natural gas production activities. By managing potential environmental impacts and addressing public concerns, we are ensuring that natural gas production proceeds in a responsible manner while protecting public health and enhancing our domestic energy options. We believe that as a nation, we can provide for the safe and responsible development of this significant domestic energy resource whose use brings a range of other important national security, environmental and climate benefits.

Thank you for the opportunity to testify, I would be happy to answer any questions.

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[1] This document is available at http://cfpub.epa.gov/npdes/hydrofracturing.cfm

Senator MANCHIN. Thank you, sir.

I would like to also say that we've been joined by Congressman David McKinley. We want to thank him. He's been gracious enough to say that he will not go into his opening statements. He'll reserve that for his question period. Dave, we want to thank you for coming and being here.

Also, I'd like to say that Senator Rockefeller is represented very aptly by his State Director, Rocky Goodwin in the back there, I think. Rocky, we appreciate you being here and Senator Rockefeller's concern. He could not join me today but he told me, you know, that he's very interested in the outcome of these hearings.

So with that being said, we'll go to Dr. James Coleman.

STATEMENT OF JAMES L. COLEMAN, TASK LEADER, MARCELLUS SHALE GAS RESOURCE ASSESSMENT, U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

Mr. COLEMAN. Thank you, Senator Manchin and Congressman Rahall, Capito and McKinley, thank you for allowing this opportunity to talk about what the U.S. Geological Survey's work is in this vital area of natural resources.

The USGS has a long standing mission to understand the natural hazards and the natural resources of the Earth and to share that information and analysis with State and local governments, private citizens and really anyone who is interested in knowing more about the Earth.

Part of our work in doing so is captured in the statement that I would like to read now.

Thank you again for the opportunity to discuss what the U.S. Geological Survey's role in research relating to the Marcellus shale. My testimony today will focus on USGS work in studying, understanding and assessing domestic energy resources and specifically our recent resource assessment of the Marcellus shale.

I want to thank my colleagues here from DOE and EPA and acknowledge the work that they're doing collaboratively with us and other Federal agencies concerning the potential environmental and human health issues associated with the development of this significant shale gas resource.

USGS conducts scientific investigations and assessments of geologically based energy resources including conventional resources, oil, gas and coal, emerging resources such as gas hydrates, underutilized resources such as geothermal energy and unconventional resources including shale gas, shale oil, tight gas, tight oil, coal bed methane and heavy oil.

The mission of the USGS energy resources program is to understand the processes critical to the formation, accumulation occurrence and alteration of geologically based energy resources to conduct scientifically robust assessments of these resources and to study the impact of energy resource occurrence and/or production and use on both environmental and human health. The results from these scientific studies are used to evaluate the quality and the distribution of energy resource accumulations and to assess the energy resource potential of the Nation, exclusive of Federal offshore waters and the petroleum resource potential of the world.

The results from these studies provide impartial, robust, scientific information about energy resources that directly supports the U.S. Department of Interior's mission protecting and responsibly managing the Nation's natural resources. The USGS information is used by policy and decisionmakers, land and resource managers, other Federal and State agencies, the energy industry, foreign governments, nongovernmental groups, academia, other scientists and the public as a whole.

On August 23, 2011, the USGS released its new assessment of the gas and natural gas liquid resources in the Marcellus shale in the Appalachian Basin of the Eastern United States.

According to this assessment the USGS determined that the Marcellus shale contains a mean of approximately 84 trillion cubic feet of undiscovered, technically recoverable natural gas and 3.4 billion barrels of undiscovered, technically recoverable natural gas liquids.

These gas estimates are significantly more than the last USGS assessment of the Marcellus shale in the Appalachian Basin in 2002 which estimated a mean of about 2 trillion cubic feet of gas and about .01 billion barrels of natural gas liquids which is equivalent to 10 million barrels.

So you see there's a major increase in our assessment of both of those 2 commodities.

The significant increase in the undiscovered, technically recoverable resource is due to new geologic information, engineering data and technological developments since the 2002 assessment.

These new assessments are for technically recoverable oil and gas resources which are those quantities of oil and gas producible using currently available technology in industry practices regardless of economic or accessibility considerations. As such these estimates include resources beneath both onshore and offshore areas such as underneath Lake Erie and beneath areas where accessibility may be limited by policy and/or regulations. The Marcellus shale assessment covers areas in Kentucky, Maryland, New York, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia.

The Marcellus is one of several existing and potential shale gas reservoirs in the Appalachian Basin and other petroleum basins in the United States. The Marcellus shale extends over almost the entire State of West Virginia. The 3 assessment units known as AUs of the Marcellus are all present in West Virginia.

The estimated mean volume of Marcellus undiscovered resource potential for West Virginia calculates to approximately 563 billion cubic feet of gas for the Western margin Marcellus. That's in the Western portion of the State.

18,000 billion cubic feet of gas or 18 trillion cubic feet of gas for the interior Marcellus and that's in the middle portion of the State.

114 billion cubic feet of gas for the Foldbelt Marcellus in the Eastern portion of the State.

This sums to a total mean resource volume of 18,677 billion cubic feet of gas or approximately 18.7 trillion cubic feet of gas, of natural gas, in West Virginia.

So in conclusion and in summation, the USGS oil and gas resources assessment of 2011 for the Marcellus shale of the Appalachian Basin concluded that undiscovered, technically recoverable

volumes range between 43 and 144 trillion cubic feet of gas with a mean volume of 84.2. Of this amount West Virginia has an areal allocation mean volume of approximately 18.7 TCF or trillion cubic feet or approximately 22 percent of the total estimated resource.

Thank you for this opportunity to provide an overview of the recent USGS resource assessment of the Marcellus shale. I will be happy to answer your questions. Thank you.

[The prepared statement of Mr. Coleman follows:]

PREPARED STATEMENT OF JAMES L. COLEMAN, TASK LEADER, MARCELLUS SHALE GAS RESOURCE ASSESSMENT, U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

Mr. Chairman and Members of the Committee, thank you for the opportunity to appear here today to discuss with you the U.S. Geological Survey's role in research related to the Marcellus Shale. My testimony today will focus on USGS work in studying, understanding, and assessing domestic energy resources and, specifically, our recent resource assessment of the Marcellus Shale. I understand the Environmental Protection Agency is here today to discuss the potential environmental and human health issues associated with the development of this significant shale gas resource.

ROLE OF THE U.S. GEOLOGICAL SURVEY IN ENERGY RESOURCE ASSESSMENTS

The USGS conducts scientific investigations and assessments of geologically based energy resources, including conventional resources (oil, gas, and coal), emerging resources (gas hydrates), underutilized resources (geothermal), and unconventional resources (shale gas, shale oil, tight gas, tight oil, coalbed methane, and heavy oil). The USGS also conducts research on the effects associated with energy resource occurrence, production, and (or) utilization. The mission of the USGS Energy Resources Program is: (1) to understand the processes critical to the formation, accumulation, occurrence, and alteration of geologically based energy resources; (2) to conduct scientifically robust assessments of those resources; and (3) to study the impact of energy resource occurrence and (or) production and use on both environmental and human health. The results from these scientific studies are used to evaluate the quality and distribution of energy resource accumulations and to assess the energy resource potential of the Nation (exclusive of Federal offshore waters) and the petroleum resource potential of the world.

The results from these studies provide impartial, robust scientific information about energy resources that directly supports the U.S. Department of the Interior's (DOI's) mission of protecting and responsibly managing the Nation's natural resources. USGS information is used by policy and decision makers, land and resource managers, other federal and state agencies, the energy industry, foreign governments, nongovernmental groups, academia, other scientists, and the public.

It is important to note the distinction between the terms "resource" and "reserves." Resource is a concentration of naturally occurring solid, liquid, or gaseous hydrocarbons in the Earth's crust, some of which is, or potentially is, technically and (or) economically extractable. Reserves specifically refer to the estimated quantities of identified (discovered) petroleum resources that, as of a specified date, are expected to be commercially recovered from known accumulations under prevailing economic conditions, operating practices, and government regulations. Primarily, the USGS conducts assessments of undiscovered, technically recoverable oil and gas resources. The USGS also conducts select assessments of economically recoverable resources. These resources include coal in various basins of the United States and oil and gas in frontier areas such as Arctic Alaska. Economically recoverable resources are a subset of technically recoverable resources and are generally less than the technically recoverable amount.

2011 USGS MARCELLUS GAS SHALE ASSESSMENT

On August 23, 2011, the USGS released its new assessment (http://pubs.usgs.gov/fs/2011/3092/) of gas and natural gas liquid resources in the Marcellus Shale in the Appalachian Basin of the Eastern United States. According to this assessment, the USGS determined that the Marcellus Shale contains a mean of approximately 84 trillion cubic feet (TCF) of undiscovered, technically recoverable natural gas and 3.4 billion barrels of undiscovered, technically recoverable natural gas liquids. These gas estimates are significantly more than the last USGS assessment of the Marcellus Shale in the Appalachian Basin in 2002 (http://pubs.usgs.gov/fs/fs-009-03/

), which estimated a mean of about 2 TCF of gas and 0.01 billion barrels of natural gas liquids. The significant increase in the undiscovered, technically recoverable resource is due to new geologic information, engineering data, and technological developments since the 2002 assessment. This Marcellus Shale estimate is of unconventional (or continuous-type) gas resources, and significant technological developments in producing unconventional resources have been made in the last decade.

Since the 1930's, almost every well drilled through the Marcellus found noticeable quantities of natural gas. However, in late 2004, the Marcellus was recognized as a potential reservoir rock, instead of just a regional source rock, meaning that the gas could be produced from it. Improvements in drilling and completion engineering resulted in commercially viable gas production and the rapid development of a major, new continuous natural gas and natural gas liquids play in the Appalachian Basin, the oldest producing petroleum province in the United States.

This USGS assessment is an estimate of continuous gas and natural gas liquid accumulations in the Middle Devonian Marcellus Shale of the Appalachian Basin. The estimate of undiscovered natural gas ranges from 43.0 to 144.1 TCF (95 percent to 5 percent probability, respectively), and the estimate of natural gas liquids ranges from 1.6 to 6.2 billion barrels (95 percent to 5 percent probability, respectively). There are no conventional petroleum resources assessed in the Marcellus Shale of the Appalachian Basin.

These new estimates are for technically recoverable oil and gas resources, which are those quantities of oil and gas producible using currently available technology and industry practices, regardless of economic or accessibility considerations. As such, these estimates include resources beneath both onshore and offshore areas (such as Lake Erie) and beneath areas where accessibility may be limited by policy and (or) regulations.

The Marcellus Shale assessment covers areas in Kentucky, Maryland, New York, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. The Marcellus is one of several existing and potential shale gas reservoirs in the Appalachian Basin. In West Virginia and other states, operators may co-mingle production from one or more of these shale gas reservoirs with their Marcellus production. The USGS assessed the resource potential of the Marcellus only and did not include an assessment of potential future contributions from these other, co-mingled reservoirs.

The USGS worked with the Pennsylvania Geological Survey, the West Virginia Geological and Economic Survey, the Ohio Geological Survey, and representatives from the oil and gas industry and academia to develop an improved geologic understanding of the Marcellus Shale. The USGS Marcellus Shale assessment was undertaken as part of a nationwide project assessing domestic petroleum basins using standardized methodology and protocol.

THE MARCELLUS GAS SHALE IN WEST VIRGINIA

The USGS assessment process examines petroleum basins and assessment units (AU's), based on geologic features, not specific states. Assessment units are mappable areas with common geologic traits. The Marcellus Shale extends over almost the entire state of West Virginia. The three assessment units of the Marcellus Shale are all present in West Virginia as follows: the Western Margin Marcellus Assessment Unit (27% of area), the Interior Marcellus Assessment Unit (22% of area), and the Foldbelt Marcellus Assessment Unit (15% of area). By applying the allocated areal percentages for each of the AU's, the estimated mean value of Marcellus undiscovered resource potential for West Virginia calculates at approximately 563 billion cubic feet of gas (BCFG) for the Western Margin Marcellus AU; 18,000 BCFG for the Interior Marcellus AU; and 114 BCFG for the Foldbelt Marcellus AU, and thus a total mean resource of 18,677 BCFG or a little more than 18° TCF of natural gas in West Virginia.

CONCLUSION

The USGS oil and gas resource assessment of 2011 for the Marcellus Shale of the Appalachian Basin concluded that undiscovered, technically recoverable volumes range between 43.0 and 144.1 TCF, with a mean value of 84.2 TCF. Of this amount, West Virginia has an areal allocation mean value of approximately 18.7 TCF, or approximately 22% of the total estimated resource.

Thank you for this opportunity to provide an overview of the recent USGS resource assessments of the Marcellus Shale. I would be happy to answer your questions.

Senator MANCHIN. Let me thank each one of you for your testimony. Also we have some visuals up here that gives you a little bit

of an idea of the drilling that's been going on and the permitting that's been requested and required and what we're going through right here. So we'll have those for your viewing at any time.

So I want to thank you all. I'd like to start some questions for our witnesses. I will start, followed by Congressman Rahall, then Congresswoman Capito, then Congressman McKinley. We will be limited to 3 minutes per member. There's some extra time built in for maybe a possible second round of questions with each member able to ask one more question.

So with that I would like to start.

Dr. Cugini, I will just basically ask you, can you describe the interactions you've had with State and Federal regulators in helping to shape the factual science based regulations?

Mr. CUGINI. Yes, as I said our role really is not one of regulation but providing data and technology. We've been working very closely with groups like the EPA, USGS and others to develop the data and understanding of the resource available to us as well as providing information, as we said, through FracFocus and the risk based data management system to allow information sharing and knowledge of what are the best practices that could be applied.

Senator MANCHIN. Have you been involved with the State and Federal?

Mr. CUGINI. Yes, sir.

Senator MANCHIN. So you have been sharing information?

Mr. CUGINI. Yes, sir.

Senator MANCHIN. Also has anyone in NETL participated in the review of the emergency rules that are in place for West Virginia?

Dr. CUGINI. I have to admit, sir, I'm not 100 percent sure, but I can get back to you on that question.

Senator MANCHIN. If you would I'd appreciate it.

Dr. CUGINI. Sure.

Senator MANCHIN. Also, Mr. Capacasa, do you have an opinion of our emergency rules in West Virginia that we have in place now?

Mr. CAPACASA. I know we provided some informal comments behind the scene. It's a great step forward. Obviously I understand that it talks about water withdrawals and certain siting requirements. I believe they expire in 15 months. So certainly it would be good to build upon that and pull out a framework for the future. It's a good start.

Senator MANCHIN. There seems to be a nexus between, Dr. Cugini, NETL and EPA. Are you all sharing information to come to a unified conclusion of what needs to be done?

Mr. CUGINI. Technology wise, sir?

Senator MANCHIN. Yes.

Mr. CUGINI. I know we're very interested in, our staff, sir, are in communication frequently, very interested in sponsoring with the Department of Energy, kind of a technology forum in the next year or 2 to really make sure the best practices in this industry are shared with all operators.

Senator MANCHIN. You can see where our State regulators might get confused. They're hearing from NETL doing one set of research and findings, EPA doing another and no one seems to be on the same page. It really is only going to be cured if your 2 agencies are working as one.

Dr. Cugini, what's your opinion on it?

Mr. CUGINI. I think as Mr. Capacasa said, we've been sharing information quite a bit. We've been trying to provide those kinds of information as we go into the future. We will very likely hold joint workshops to share even further to make sure our technologies are dovetailing together.

Senator MANCHIN. Mr. Capacasa, you mentioned that your agency will not complete your EPA studies until 2012 and 2014?

In the absence of those studies and baseline data what would you recommend to communities where shale gas development is occurring? Is it safe? Should we continue? Do we have enough safeguards in place?

Mr. CAPACASA. I think that this is rapidly evolving industry, rapidly growing industry and States are moving, stepping up to the plate and putting requirements in place. They, obviously, as you mentioned, the oil and gas industry has been with us for over 100 years. I think this is kind of an unconventional industry now with shale gas and needs some new controls.

I think the States are doing a very laudable job enhancing the regulatory framework to meet the challenge, but clearly there's a role for communities to be involved and engaged and providing input to the States and EPA about the regulatory framework.

Senator MANCHIN. My time is up. I want to thank you for that. Now I will go to Representative Rahall.

Mr. RAHALL. Thank you, Senator Manchin.

Let me thank all of you for your testimony, of course.

Mr. Coleman, just as in an effort to learn a little more about the geological formation of Marcellus shale in West Virginia, there are different types of rock, are there?

Mr. COLEMAN. Yes, sir.

Mr. RAHALL. Maybe I'm wrong.

Mr. COLEMAN. There are basically 2 types of rock within the Marcellus shale. There's a shale rock made up mostly of mud. There's a limestone rock made mostly of limestone. You're probably familiar with both of those. They're quite common in West Virginia.

Mr. RAHALL. What is the karst rock formation?

Mr. COLEMAN. I'm sorry, the kurst?

Mr. RAHALL. Karst. Karst.

Mr. COLEMAN. Karst. Oh, I'm sorry.

Mr. RAHALL. Oh, that's right. I'm sorry.

Mr. COLEMAN. Karst is not really a rock, but it's a type of formation that occurs when ground water percolates or bubbles through limestone when it's near the surface. It creates caverns. It creates large openings within that rock as it's dissolved and the limestone is removed by water percolation.

Mr. RAHALL. Rather common?

Mr. COLEMAN. It's very common say in the Great Valley area of West Virginia and Virginia.

Mr. RAHALL. I'm sorry, which valley?

Mr. COLEMAN. The Great Valley, the Shenandoah Valley, the Great Valley of West Virginia over in the Eastern part of the State and in other areas where there's limestone near the surface. It is not a common phenomenon in areas where the Marcellus is near the surface.

Mr. RAHALL. The reason I ask that because there has been concern expressed by some in the counties to which you referenced in the southern part of the State. They're saying that that type of karst rock formation should prevent any fracking procedures from occurring in that region. Would you have a comment on that?

Mr. COLEMAN. Karst occurs, like I say, very near the surface within certainly a few hundred feet of the surface. Most Marcellus drilling will be done at several thousand feet below the surface. Now there's always a concern in areas that karst has developed, lots of aquifers, ground water supplies come out of karst aquifers.

But the Marcellus is at a depth much greater than the karst features in West Virginia, so I'm a little uncertain as to what the real question is about the concern about karst and Marcellus drilling.

Mr. RAHALL. I think they are worried that the chemical ladened drilling waters will infect the wells or underground water that finds its way into local waterways. So that's the main concern I'm hearing from them.

Mr. COLEMAN. I think that's a proper concern. But then lots of material at the surface could go into these karst aquifers. Just motor oil from changing your oil in your car, you know, it's lots of things that could infiltrate karst features near the surface.

But and for that matter, you know, any type of industrial or agricultural, chemical could get into the karst, sir.

Mr. RAHALL. Thank you.

Mr. COLEMAN. It becomes very difficult to clean up.

Mr. RAHALL. Thank you. Thank you, Senator.

Senator MANCHIN. Thank you, Congressman.

Congresswoman Capito.

Ms. CAPITO. Thank you.

Mr. Coleman, you described in your testimony, the assessment of how much is in the Marcellus shale. But there have been some talk that maybe the projections by some of those in the natural gas industry have been inflated. I don't have a perspective.

You said it's much greater than your last report. How would you respond to that comment?

Mr. COLEMAN. All the data that went into our assessment is publicly available data. The State of West Virginia provided data on its wells, Pennsylvania, Ohio and New York. So we operate with public data only. We do not have access to any of the private data that you may be alluding to that would have to say there's higher estimates there.

It is a real concern that we provide a very scientifically robust assessment using public data. So that's what we've attempted to do. I really have no information to say, to comment, on your point.

Ms. CAPITO. Thank you.

Let me ask you another. I know we're talking Marcellus, but we're hearing a lot about the Utica now. Is that supposed to be a larger find there?

Mr. COLEMAN. The Utica is a formation that lies beneath the Marcellus as much as several thousand feet. It extends much over the same area that the Marcellus extends. Its total petroleum potential has not been assessed by the USGS.

Ms. CAPITO. OK.

Mr. COLEMAN. But it's certainly a potential reservoir of concern because of its apparent potential.

Ms. CAPITO. Do you share data then with the EPA is that a pretty common relationship that you all have together—science?

Mr. COLEMAN. We're appropriate in where the—nexus if you will of energy and water come together, we try to share data as well as with NETL and some of the research work that's going on at the Marcellus test site. That's probably where we're sharing the most data with regard to the Marcellus.

Ms. CAPITO. Let me ask you, Mr. Capacasa, are there any documented cases where fracking fluid has actually gotten into publicly treated water or public water supplies?

Mr. CAPACASA. By public water supply you mean like a municipal?

Ms. CAPITO. Yes.

Mr. CAPACASA. I'm not aware of any of those but EPA, along with the States are currently assessing some situations where there are contaminants of interest, if you will, in private drinking water supplies. We haven't been able to make any conclusions yet of a connection. But it certainly deserves more inquiry and assessment because we've gotten a number of complaints. I'm sure the States have gotten a number of complaints.

But it really requires a lot of scientific rigor to conclude that one activity affected the other. Some of those analyses are still underway in various places around the country.

Ms. CAPITO. Let me ask you this. If the State of West Virginia and I know we've talked a lot about the legislatures working on this now. We're going to have testimony here and I've run out of time.

But my comment is—and maybe this will come up in some of the further testimony. The question is if the State of West Virginia does not legislate in this area does the EPA then come in and regulate in the absence of that legislation?

Mr. CAPACASA. No, I think that the actual drilling activity is exempted from Federal law. So you will not see EPA issuing drilling permits in the Marcellus area. It's exempted from Federal law so I don't think there's any risk of that happening.

Ms. CAPITO. Alright. Thank you.

Senator MANCHIN. Thank you, Congresswoman.

Mr. MCKINLEY. Thank you, Senator. Thank you for the opportunity to participate in this. I'm one of—I'm the new member in Congress. I'm one of just 2 engineers in Congress. So it makes it very interesting to debate and get involved in these subjects.

One of the first things we did was found the Marcellus shale, cofound the Marcellus shale caucus in the House so we could address this issue and much of what we're talking about here today.

But my question, if I could, Dr. Cugini. You and I have discussed previously and when we've met with WVU and you and your staff about ways of increasing the production from the Marcellus. Currently we're getting about 25 percent out of—or less than 25 percent out of any fracking operation. So it's looking for additional research to be able to get that if we're going to go to the expense of doing that.

In addition to that question I'd like for you to tell me a little bit more of what you just heard from Mr. Capacasa about the drilling operation. Is NETL doing research in finding ways to prevent any cross contamination from the fracking compound?

Mr. CUGINI. Thank you.

Mr. MCKINLEY. Both questions, please.

Mr. CUGINI [continuing]. Representative McKinley.

Let me start with the second part. As part of the research undertaken by NETL we have a comprehensive portfolio of activities that are in place to address this very issue. We're looking at really a lot of the water issues in characterizing baseline environmental signals at the Marcellus test site.

So the opportunity really presents itself there to look at those potential issues. Really the Marcellus test site gives us a really understanding and a good baseline activity for looking at that opportunity. We're also looking at things like fluid gas rock interactions and other types of activities. So looking at the technology associated with these types of issues we're really looking at those kinds of research opportunities.

Most of the research today, I will freely admit, is really targeting toward the environmental and safety issues. But there may be opportunity for looking at opportunities for further developing and enhancing drilling operations. While there's a little bit of work in that area, I would say the main focus is really looking at things like the environmental impact at this point in time.

Mr. MCKINLEY. I know that the President's budget had a reduction in funding for NETL. Is that going to have an impact or are there ways that we can help you restore some funding so that you can continue to do the proper research?

Mr. CUGINI. I guess I'll speak as a lab director. We can always ask for more funds. I think every national lab director would always ask for more funds.

But we feel pretty comfortable that our current budget allows us to meet the priorities of both the Department and the Office of Fossil Energy. Additional information about future levels of funding I think will really likely be announced in the context of the 2013 budget. I think there's some opportunities there looking.

I also believe in some of the 2012 appropriations that are underway. There's discussions about looking at funding opportunities.

Mr. MCKINLEY. Thank you. My time is expired.

Senator MANCHIN. We have time for one question from each of us up here to you all. So I'll start by asking the question and all 3 of you can chime in. But let's start with Mr. Capacasa.

As a Federal regulator for the region, I know you're out of the Philadelphia area. We have other States involved now with New York, Pennsylvania, everyone is taking a little different direction on this. How do you think we, as a State, as West Virginia is doing?

My concern is primacy. I think I've spoken to you all about that. I would like to see the States be able to maintain their primacy. But I'd like for all of you all to come together on a set of rules and regulations you think is needed, is reasonable and obtainable.

Then if we don't do our job, that's when I believe that, the EPA has the right to move, if they will. So I'm asking how do you be-

lieve that we, as a State, are doing with the emergency rules that we've done and also the efforts. We're going to hear from our second panel in just a minute. So if any of 3 of you could comment on that and hopefully you are working together on this.

Mr. CAPACASA. I certainly want to commend the State, West Virginia DEP for getting out front and dealing with the waste water disposal issues that were——

Senator MANCHIN. How does that rank with what Pennsylvania is doing?

Mr. CAPACASA. We spent—EPA has spent a lot of time in Pennsylvania because of some issues. Let's put it that way. We weren't quite sure where we——

Senator MANCHIN. Are we ahead of the curve on that one?

Mr. CAPACASA. We're ahead of the curve.

Senator MANCHIN. OK.

Mr. CAPACASA. Ahead of the curve, I think emergency rules dealing with the water withdrawals and I think one area I would encourage the State to spend some time in is the actual siting of well pads where we're seeing some situations where well pads are in the stream bank, roads are in the stream bank. I think spending some time on proper siting to avoid the stream, a stream, would be very important.

But the emergency rules are a great step. I think obviously you want to continue to enhance that.

Senator MANCHIN. Do you all set the rules or oversee basically how the well is drilled to make sure it's safe, the safety precautions are being taken so that aquifers and the things that the Congress, all of us, have had concerns about are not breached?

Mr. CAPACASA. EPA has casing its many requirements in our underground injection control program but those regulations don't apply directly to this drilling operation. But there's certainly a reference to be used for the proper casing of wells.

Senator MANCHIN. We'll be asking the same questions to our State panels too, but that's something you would work with them on?

Mr. CAPACASA. Exactly. We often convene a lot of the State and interstate organizations to share best practices and lessons learned.

Senator MANCHIN. Do you have a thought? Are you able to give us your thought process on primacy?

Mr. CAPACASA. The national environmental laws really are designed for the States to run them, the States to be authorizing. West Virginia is authorized for the Clean Water Act, the Drinking Water Act and we—the expectation is that you will, the State, will run those programs directly with our oversight.

Senator MANCHIN. Either one of you? Dr. Coleman or?

Mr. CUGINI. The only thing I would add to that is the SEAB report, the Secretary Energy Advisory Board, really kind of supports your kind of comment and highly supports sharing of information and best practices. So I think this is something that really we're all working and endeavoring to do.

Senator MANCHIN. Dr. Coleman.

Mr. COLEMAN. My point is exactly that. We're cooperating with these agencies through the SEAB process and contributing our appropriate sharing.

Senator MANCHIN. What happens if you all don't agree?

Mr. COLEMAN. I think we've agreed to agree. It's just what level of agreement is necessary I don't know. It's a progress report.

Senator MANCHIN. It's kind of hard for State to follow a pattern if you 3 are going different directions.

OK, I'm sorry, my time is up.

Congressman Rahall.

Mr. RAHALL. Thank you, Senator Manchin. Excuse me.

As we all know in West Virginia all hydraulic fracking/fracturing companies are required to list the chemicals they use for fracking on these drilling permits. However, the proportions that each company uses remains proprietary information. Do you have an opinion on rather those proportions should be released in an effort to allow States to better identify leaks and waste water treatment facilities to treat those leaks if they knew what proportions of particular chemicals were in the water?

Mr. CUGINI. I'll start off by just again referencing this SEAB report. That is one of the recommendations. I think industry has made a lot of progress in that area. So I think that's something that was a strong recommendation on the SEAB report.

Mr. CAPACASA. Certainly we would endorse as much transparency as possible in the permitting processes and in the operations. Whenever we get information from the companies about the constituents of the frack water, it's posted on our website pretty regularly.

Mr. COLEMAN. We are in the process of looking at samples that we've collected from these sites. It would be very helpful if we had what went into the ground so we can compare it with what we're getting coming out of the ground.

Mr. RAHALL. OK. Thank you.

Senator MANCHIN. Thank you.

Congresswoman Capito.

Ms. CAPITO. Quick question. When you talk a lot about the hope that we could secure a cracker here in our State or 2 or 3 or 4 or 5 and I'm curious about the transportation of the resource to these particular plants. Is that an aging infrastructure? Is that something that you all oversee in terms of the safety aspects of it—if you have an opinion on it?

Mr. CAPACASA. Certainly pipeline safety and pipeline integrity is very critical to protecting our environment. I know there are a couple other Federal agencies dealing with that issue. There's a Federal Pipeline Safety Administration, etcetera, and perhaps FERC has a role there. But it's not something that comes under our purview, but if you have any questions, I would be glad to follow up on them.

Ms. CAPITO. Alright. Does anybody else have a comment?

Mr. CUGINI. That doesn't fall under our purview. But the notion of these crackers is very valuable to the State.

Ms. CAPITO. Thank you.

Senator MANCHIN. Thank you, Congressman.

Congressman McKinley.

Mr. MCKINLEY. Thank you, again.

One of the things that we've heard in our hearings in Energy and Commerce in the House and also in our caucus has been the issue of primacy whether its State or Federal. We've listened very intently with what's happened in New York and Pennsylvania. I understand there's quite an issue there that they're fighting against the EPA over primacy.

So my question is who is going to set the standards? In this Constitution, in the tenth amendment, I'm just asking from the EPA. Where would we find in here, under the EPA, in the Constitution, does it have that provision that it would take primacy over addressing and coming up with the standards over the State? Can you share your opinion on that?

If you answered it before, I'm sorry. I didn't hear it.

Mr. CAPACASA. I'm sorry.

Representative, we're—you know, primacy is embedded in the national environmental laws. The national environmental law is really intended for the States to run them and be authorized. You mentioned Pennsylvania. Pennsylvania doesn't have pre-treatment primacy nor underground injection control primacy whereas West Virginia has the full suite of Federal delegated programs.

So we very much feel the States are out front on this issue. EPA has limited authorities to deal with the actual drilling of a Marcellus well. So I don't think you have any—there's no real concern with regard to us taking primacy for the well drilling. We've been exempted from that role.

Mr. MCKINLEY. What about through the fracking then, the whole operation?

Mr. CAPACASA. Obviously, you know, there are many operations that can impact on the environment including surface activities. So there are Clean Water Act authorities, Drinking Water Act authorities that come to play. But again, the States are authorized to be the primary primacy agent there with our oversight. The laws envision some continuing—

Mr. MCKINLEY. So is your conclusion then that the DEP is capable of doing this without your taking over?

Mr. CAPACASA. We're very confident in their abilities. I think it's important for us to maintain an ongoing oversight as well.

Mr. MCKINLEY. Thank you.

Senator MANCHIN. Let me just say I want to thank all of you for your testimony today. I want you to know that you are free to go at this time. I hope that you will stay and listen to the other, if you have time. We appreciate it. You're free to go.

What we're going to do is welcome our second panel and introduce our expert witnesses. I'd like to start with that at this time.

We have Mr. Kurt Dettinger is General Counsel for Governor Tomblin. Glad to have him here.

Mr. Randy Huffman, Cabinet Secretary of the West Virginia Department of Environmental Protection.

Also we have with us our Legislative Representatives and Cochairs, Mr. Tim Manchin, Delegate from the West Virginia House of Delegates.

Mr. Doug Facemire, State Senator of District 12 in the West Virginia State Senate.

Thank all of you for being here.

You each will have 5 minutes to give your oral remarks.

Mr. Dettinger, if you could get the panel started, we'd appreciate it.

STATEMENT OF G. KURT DETTINGER, GENERAL COUNSEL, OFFICE OF THE GOVERNOR, CHARLESTON, WV

Mr. DETTINGER. Thank you. My name is Kurt Dettinger and I'm General Counsel to Governor Earl Ray Tomblin. I'd like to thank Senator Manchin and Representatives Rahall, Capito and McKinley for inviting me to this hearing this morning. I'm honored to deliver testimony on behalf of the Governor.

West Virginia has always emphasized its natural resource industries as important and valuable assets to its citizens. Our coal miners have a long history of supplying the energy that powers our great Nation. Governor Tomblin is confident that West Virginia energy will play a prominent role in leading America out of its current economic doldrums.

Traditionally the coal industry has been the backbone of West Virginia's energy portfolio and has been a key component in our economy. Recently, however, West Virginia's energy portfolio has expanded due to production of natural gas in the Marcellus shale. With the advancement of drilling technologies, unconventional gas reserves such as the Marcellus shale are being developed in West Virginia. As a result of the discovery of these reserves and advances in drilling technology, West Virginia natural gas has the potential to play a vital role in achieving energy independence in the United States.

Development of shale gas plays like the Marcellus presents tremendous economic opportunities for West Virginia. We must seize upon these opportunities and we must do so in a manner that ensures that our children and grandchildren will be able to enjoy our majestic mountains, precious streams and rivers and bountiful wildlife for generations to come. In other words, we, as policymakers must strike an appropriate balance between embracing and promoting growth in our burgeoning natural gas industry in protecting the environment and our most important asset, our citizens.

Over the past year, Governor Tomblin has done just that.

First, by issuing an executive order number 1–11 Governor Tomblin formed the West Virginia Marcellus to Manufacturing Task Force to position West Virginia to attract ethane cracker investments to our State. The task force has made significant progress in its work to provide Governor Tomblin and his administration with the information and tools necessary to competitively recruit and negotiate with international petrochemical companies interested in building ethane crackers in our region.

The economic development opportunities presented by crackers are astounding. For example, construction of a single cracker is projected to create up to 10,000 construction jobs and between 500 and 1,000 permanent operational jobs depending on the size of the cracker. Capital investment with construction of a cracker is likely to exceed $2 billion.

Furthermore, according to the American Chemical—Chemistry Council, as Senator Manchin mentioned, if a cracker is constructed

in West Virginia an additional $3.2 billion would likely be invested in downstream chemical facilities which is projected to translate into approximately $7 billion of additional chemical industry output and 12,000 new jobs. These opportunities are indeed stunning. They represent transformational opportunities for West Virginia to rejuvenate and revitalize our chemical manufacturing industry.

Governor Tomblin and his Administration maintain regular contact with petrochemical investors and are doing everything possible to attract these investments to West Virginia.

Shortly after forming the task force, Governor Tomblin also recognized the need to adopt additional environmental regulatory rules governing Marcellus shale production and to create regulatory certainty within the West Virginia natural gas industry. Our citizens deserve to know that their government is responsibly regulating Marcellus shale production. Likewise, companies investing hundreds of millions of dollars in natural gas drilling programs also deserve to know the rules by which they must operate and that these rules will be consistently applied after their investments are made.

Accordingly Governor Tomblin issued executive order number 4-11 this past summer ordering the West Virginia Department of Environmental Protection to promulgate additional rules governing the development of the Marcellus shale. Unlike the United States Environmental Protection Agency's regulatory approach to coal mining, Governor Tomblin's emergency rules were not punitive. Rather Governor Tomblin's emergency Marcellus rules were tailored to address legitimate environmental concerns and were premised on objective scientific goals.

Now that these rules are in place Governor Tomblin looks forward to working with the West Virginia legislature over the coming weeks, months and years to pass comprehensive Marcellus shale regulatory legislation that enjoys broad support from leadership in both Houses of the legislature. The West Virginia Department of Environmental Protection, the natural gas industry and other affected stakeholders including the environmental community, surface centers, mineral owners, the Farm Bureau, local government and others. No one party will unduly suffer at the expense of another and no one interest group, no matter how vocal, will dictate the policy of the State of West Virginia.

To close, Governor Tomblin will continue down the path that he started nearly a year ago. A path that will seek to maximize the economic opportunities presented by development of the Marcellus shale while at the same time taking the necessary steps to ensure that West Virginians and our environment are protected by reasonable regulations that require natural gas producers to responsibly develop our natural gas reserves.

Thank you for the opportunity to present today.

[The prepared statement of Mr. Dettinger follows:]

PREPARED STATEMENT OF G. KURT DETTINGER, GENERAL COUNSEL, OFFICE OF THE GOVERNOR, CHARLESTON, WV

Good morning. My name is Kurt Dettinger and I am Governor Earl Ray Tomblin's General Counsel. I am honored to appear before this Committee and offer testimony on behalf of the Governor, who regretfully is unable to participate in today's hearing.

West Virginia has always emphasized its natural resource industries as important and valuable assets to its citizens. Our coal miners have a long history of supplying the energy that powers our great nation. Governor Tomblin is confident that West Virginia energy will play a prominent role in leading America out of its current economic doldrums.

Traditionally, the coal industry has been the backbone of West Virginia's energy portfolio and has been a key component in our economy. Recently, however, West Virginia's energy portfolio has expanded due to production of natural gas from the Marcellus Shale. With the advancement of drilling technologies, unconventional gas reserves, such as the Marcellus Shale, are being developed in West Virginia, throughout the Appalachian Basin and across the United States. As a result of the discovery of these reserves and advances in drilling technology, West Virginia natural gas has the potential to play a vital role in achieving energy independence in the United States.

Development of shale gas plays, like the Marcellus, presents tremendous economic opportunities for West Virginia and other states. We must seize upon these opportunities. We must do so in a manner that ensures that our children and grandchildren will be able to enjoy our majestic mountains, precious streams and rivers and bountiful wildlife for generations to come. In other words, we, as policy makers, must strike an appropriate balance between embracing and promoting growth in our burgeoning natural gas industry and protecting the environment and our most important asset—our citizens.

Over the past year, Governor Tomblin has done just that. By issuing Executive Order No. 1-11 and Executive Order No. 4-11, Governor Tomblin has taken bold steps to promote value-added economic opportunities derived from the liquids-rich Marcellus Shale gas and to require the West Virginia Department of Environmental Protection to promulgate emergency regulatory rules pertaining to Marcellus Shale production.

I will examine each order in turn. First, by issuing Executive Order No. 1-11, Governor Tomblin formed the West Virginia Marcellus to Manufacturing Task Force (the "Task Force"). The primary goal of the Task Force is to position West Virginia to attract ethane cracker investments within our borders. The Task Force is comprised of natural gas production and transportation executives, chemical manufacturing executives, organized labor interests, intermodal transportation experts, environmental advocates and economic development professionals. The Task Force has made significant progress and its work has provided Governor Tomblin and his administration with the information and tools necessary to competitively recruit and negotiate with international petrochemical companies interested in building ethane crackers in our region.

The economic development opportunities presented by ethane cracker development are astounding. For example, construction of a single cracker is projected to create approximately 10,000 construction jobs and between 500 and 1,000 permanent operational jobs, depending on the size of the cracker. Capital investment associated with construction of a cracker is likely to exceed $2 Billion, and could amount to as much as $5 Billion invested in West Virginia. Furthermore, construction and operation of a single cracker alone could result in economic activity amounting to tens of billions of dollars in West Virginia over a 25-year period. Specifically, it can reasonably be expected to drive a reemergence of the manufacturing sector of our economy.

According to the American Chemistry Council, if a cracker is constructed in West Virginia, an additional $3.2 Billion would likely be invested in downstream chemical facilities that utilize polyethylene to make products like plastics, dyes, paints and coatings. The revitalization of our chemical manufacturing industry is projected to translate into approximately $7 Billion of additional chemical industry output and 12,000 new jobs in the chemical industry and throughout the supply chain in West Virginia. Such developments would elevate West Virginia from the 23rd largest chemical-producing state to the 13th largest chemical-producing state in the nation.

These opportunities are indeed stunning—they represent transformational opportunities for West Virginia to rejuvenate and revitalize our chemical manufacturing industries. Governor Tomblin and his administration officials maintain regular contact with petrochemical investors and are doing everything possible to attract these investments to West Virginia.

Shortly after forming the Task Force, Governor Tomblin also recognized the need to adopt additional environmental regulatory rules governing Marcellus Shale production and to create regulatory certainty within the horizontal drilling segment of the West Virginia natural gas industry. Our citizens deserve to know that their government is responsibly regulating Marcellus Shale drilling activity. Companies investing hundreds of millions in capital in natural gas drilling programs in West Vir-

ginia also deserve to know the rules by which they must operate, and that these rules will be consistently applied after their investments are made. Accordingly, Governor Tomblin issued Executive Order No. 4-11 this past summer, ordering the West Virginia Department of Environmental Protection to promulgate additional rules governing development of the Marcellus Shale. These additional regulatory measures focus on responsibly and proactively addressing potential adverse environmental impacts to our natural water supplies and surface lands associated with horizontal drilling techniques.

Unlike the United States Environmental Protection Agency's regulatory approach to coal mining, Governor Tomblin's emergency rules were neither punitive nor based on fear or political ideology. Rather, Governor Tomblin's emergency Marcellus rules were tailored to address legitimate environmental concerns and were premised on objective, scientific goals. Now that these rules are in place, Governor Tomblin looks forward to working with the West Virginia Legislature over the coming weeks, months and years to pass comprehensive Marcellus Shale regulatory legislation that enjoys broad support from leadership in both houses of the Legislature, the West Virginia Department of Environmental Protection, the natural gas industry and other affected stakeholders, including the environmental community, surface owners, mineral owners, the farm bureau and local governments. No one party will unduly suffer at the expense of another and no one interest group, no matter how vocal, will dictate the policy of the State of West Virginia. Governor Tomblin is steadfast in his commitment to do what is best for the State of West Virginia.

To close, Governor Tomblin will continue down the path he started nearly a year ago—a path that will seek to maximize the economic opportunities presented by development of the Marcellus Shale, while at the same time taking the necessary steps to ensure that West Virginians and our environment are protected by reasonable regulations that require natural gas producers to responsibly develop our plentiful gas reserves. This multi-tiered approach will guide Governor Tomblin's policymaking efforts regarding development of the Marcellus Shale in West Virginia.

Thank you.

Senator MANCHIN. Secretary Huffman.

STATEMENT OF RANDY C. HUFFMAN, SECRETARY, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, CHARLESTON, WV

Mr. HUFFMAN. Thank you, Senator Manchin. I appreciate the opportunity to be here today and Representatives Rahall, Capito and McKinley, thank you for coming.

The Department of Environmental Protection's 2 primary roles one is that we're responsible for enforcing the State's environmental rules which include regulating the chemical manufacturing industries as well as our mineral extraction industries. We also have a very robust reclamation, remediation and infrastructure program that we conduct at the State level.

I appreciate the opportunity to address the panel. I'll start by saying that the advancement of unconventional natural gas extraction has drastically changed America's energy future and with it the regulatory landscape. West Virginia, like other energy producing States, takes its duty to protect the environment seriously. DEP and its Office of Oil and Gas oversee the permitting, drilling, completion and production of every oil and gas well in the State.

With that authority comes the responsibility to promote economic growth and the development of the State's natural resources. The primary factor in maintaining a proper balance is the recognition that West Virginia is in the favorable position of being proactive rather than reactive.

West Virginia has a long history of regulating oil and gas activity and it has overseen the practice of hydraulically fracturing wells for decades. However, the practices associated with unconventional extraction brings unique concerns from an environmental perspec-

tive. The larger scale associated with the process leads to environmental issues such as water management and surface disturbances and safety issues such as design, site stabilization and drilling practices. West Virginia recognizes that as unconventional extraction increases so do DEP's regulatory duties.

Senator Manchin, in 2010 while you were Governor, you directed the DEP to form a task force to review West Virginia's oil and gas regulatory program. Environmental groups, land owners, members of the public, industry representatives and other State and local agencies had a seat at the table. What developed from the discussions by that group was a wide ranging bill, proposed legislation, designed to address most of the concerns raised by the task force members. While that bill did not pass, it initiated a robust debate on the matter which continues in the legislature currently.

Governor Tomblin recognized the importance of addressing the immediate environmental concerns and in July of this year issued an executive order directing us to promulgate an emergency rule. That rule which went into effect on August 29th, addresses water management, surface disturbance, site stabilization, casing standards and public notice procedures. In addition the emergency rule mandates that all drill cuttings and drilling mud from an unconventional well site must be disposed of in an approved solid waste facility unless the company can prove that its onsite methods will be protective of the environment.

Prior to the actions I've already mentioned DEP developed some policies and tools designed to address some of the issues surrounding water use and disposal. West Virginia has been commended for DEP's development of a water withdrawal guidance tool on the agency's website that provides timely data for operators to follow when withdrawing surface water. Back in 2009, well ahead of EPA's guidance release the past March, DEP West Virginia restricted POTWs, publicly owned treatment works from accepting drilling waste water. Currently the only acceptable methods of waste water disposal are underground injection control wells and the recycling or reuse of the water.

While the Office of Oil and Gas has been addressing policy and regulation matters it has been dealing with the dramatic shift in work load associated with permitting. The total number of well work permits issued has dropped from a high of more than 2,300 in 2007 to 508 in 2010. But the number of horizontal permits has gone from zero in 2006 to 430 in 2010. This shift in the permitting load has caused a huge loss of revenue for DEP, but a huge increase in the work load of the Office of Oil and Gas permit staff which consists of 2 full-time permit writers and a supervisor. We're confident a funding mechanism will be including in the proposed legislation which will enable us to obtain the resources necessary to continue operating an effective regulatory program.

As our esteemed representatives at the Federal level it is important for you to know that we at the State level believe the Federal Government does have a role to play. In fact, the influence of the Nation's 3 major environmental regulations are already in place and underpin the regulatory scheme through the Clean Water Act, the Clean Air Act and the Safe Drinking Water Act. Also, Federal agencies are in a position to undertake research and provide reli-

able data on controversial topics such as radioactivity. They can also recommend best management practices and technological advances.

Recommendations such as these could prove valuable as States evaluate the needs of their regulatory programs. However, because of the differences from State to State anything beyond that may prove to be ineffective. Certainly we do not believe the role of Federal agencies includes perpetuating the myth that States are incapable of or ineffective at regulating this industry.

In closing West Virginia has played a proud role in this Nation's energy history and we anticipate maintaining a prominent role in our Nation's energy future. The opportunity presented by unconventional extraction carries with it unique concerns and challenges. As it has done in the past, West Virginia will continue to answer the regulatory call associated with oil and gas activity.

Mineral development including unconventional extraction does not have to come at the expense of our State's other natural resources. In West Virginia, it will not.

Thank you.

[The prepared statement of Mr. Huffman follows:]

PREPARED STATEMENT OF RANDY C. HUFFMAN, SECRETARY, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, CHARLESTON, WV

The State of West Virginia and its Department of Environmental Protection (DEP) appreciate and welcome the opportunity to address this committee. The advancement of unconventional shale gas extraction has drastically changed America's energy future, and with it the regulatory landscape. West Virginia, like other energy producing states, takes its duty to protect the environment seriously. DEP and its Office of Oil and Gas (OOG) oversee the permitting, drilling, completion, and production of every oil and gas well in the State. With that authority comes the responsibility to promote economic growth and the development of the State's natural resources. The primary factor in maintaining a proper balance is the recognition that West Virginia is in the favorable position of being proactive, rather than reactive.

Unconventional extraction, along with its potential, brings unique concerns. In order to establish a stable and predictable regulatory climate, all parties must be allowed a seat at the table. As part of West Virginia's oversight of the Marcellus Shale activity, participation of environmental groups, land owners, other state and local agencies, members of the public, and the industry all play a key role in robust regulation. West Virginia, through its ability to foster its relationships with and manage these competing interests, is in a naturally advantageous regulatory position. In the summer of 2010, then Governor Joe Manchin III ordered DEP to form a taskforce comprised of members of those groups to review West Virginia's oil and gas regulatory program with an eye toward developing comprehensive legislation to regulate this burgeoning industry. That group worked hard and was successful in developing a wide-ranging bill to address most of the concerns raised by its members and their constituents. While that bill did not pass, it created the impetus to have a robust debate on the matter, which is continuing in the Legislature.

West Virginia recognizes that, as unconventional extraction increases, so do DEP's regulatory duties. The practices associated with unconventional extraction are not new. For example, in West Virginia's long history of regulating oil and gas activity, it has overseen the decades-old practice of hydraulically fracturing wells. What is unprecedented with unconventional extraction is the scale of both the surface disturbance and the water use, and with that increased scale come environmental issues, such as water management and surface disturbance, and safety issues, such as well design, site stabilization, and drilling practices. Governor Earl Ray Tomblin recognized the importance of these issues, and on July 12, 2011, he issued an Executive Order directing the DEP to promulgate an emergency rule to address these and other matters surrounding horizontal well development, including erosion and sediment control, casing standards, and public notice procedures.

In addition, West Virginia has been commended for DEP's development of a water withdrawal guidance tool. This tool is available on the DEP's website and provides timely data for operators to follow when withdrawing surface water. This tool is con-

stantly being updated to provide the most accurate data to both operators and regulators so that both can take the steps necessary to protect this vital natural resource. It will be invaluable in implementing the water management plans that are a central component of the emergency rule, which went into effect on August 29, 2011.

West Virginia also restricted publicly owned treatment works from accepting wastewater in 2009, well ahead of EPA's guidance of March 2011. Currently, the only acceptable methods of wastewater disposal in West Virginia are underground injection control (UIC) wells, which West Virginia regulates, and the recycling or reuse of water, which is strongly encouraged. The emergency rule mandates that all drill cuttings and associated drilling mud from an unconventional well site must be disposed of in an approved solid waste facility, unless the operator can prove to the satisfaction of DEP that its on-site management of those materials will be protective of the environment. West Virginia currently has one permitted facility that is entirely dedicated to wastewater treatment for reuse, and is working with other operators to develop similar facilities, both centralized and on-site.

Other policies implemented by DEP to complement the rule are enhanced casing and cementing standards for horizontally drilled wells and stringent standards for well site safety plans. West Virginia's Division of Highways also has policies in place that require operators to repair and maintain roads.

The upswing in unconventional extraction has had a dichotomous effect on the permit load in the Office of Oil and Gas. The number of well work permits issued has dropped, from a high of 2,391 permits issued in 2007 to 508 in 2010, but the number of horizontal permits has shot from zero in 2006 to 430 in 2010. In other words, 85% of the permits issued by the Office of Oil and Gas are now horizontal, unconventional well work permits. This shift in the permitting load has caused a huge loss of revenue for DEP but a huge increase in the workload of the OOG permit staff. OOG has a small staff—less than 30 total—and 19 members of that staff are in the field. The permitting staff consists of two full-time permiters and their supervisor. DEP believes that the West Virginia Legislature, which is currently working on a comprehensive bill to regulate unconventional drilling activity, will include a funding mechanism in its legislation that will enable the OOG to hire the amount of staff necessary to implement a robust regulatory program.

While there is no aspect of unconventional extraction that is beyond West Virginia's reach, that does not mean there is no role for the federal government to play. However, such a role does not include contributing to the myth that states are incapable of or ineffective at regulating oil and gas activity. First and foremost, the federal government ultimately oversees the Clean Water Act, the Clean Air Act, and the Safe Drinking Water Act, all of which play a role in oil and gas regulation, but all of which are primarily implemented by the states. Federal agencies are also in a position to undertake research and provide reliable data on controversial topics, such as radioactivity, and to recommend best management practices and technological advances in hydraulic fracturing and well design and construction. Recommendations could serve as an invaluable resource as states evaluate the needs of their regulatory programs, but anything beyond recommendation may prove to be ineffective and tumultuous considering the independence and asymmetry of state regulatory programs. The best way to ensure this undesirable effect does not come to fruition is to continue engaging the states, rely upon them for an accurate depiction of their regulatory capacity and efficacy, and trust that no state considers environmental protection an ancillary concern.

West Virginia has played a proud role in this nation's energy history, and we anticipate maintaining a prominent role in our nation's energy future. The opportunity presented by unconventional extraction carries with it unique concerns and challenges. As it has done in the past, West Virginia will continue to answer the regulatory call associated with oil and gas activity. Mineral development, including unconventional extraction, does not have to come at the expense of our State's other natural resources, and in West Virginia, it will not!

Senator MANCHIN. Thank you.
Delegate Manchin.

STATEMENT OF TIM MANCHIN, DELEGATE, WEST VIRGINIA LEGISLATURE, FAIRMONT, WV

Mr. MANCHIN. Welcome, Senator Manchin, Congressman Rahall, Congresswoman Capito and Congressman McKinley. Thank you for

the opportunity to outline the West Virginia Legislature's efforts to address issues raised by Marcellus development.

Our efforts began 3 years ago with Water Resource Committee hearings and a House bill to prevent water withdrawals from sensitive streams and to require record keeping for what went in the ground, what came out of the ground and how it was disposed of. Although written with great assistance from EQT, much of the industry opposed the bill leading to its failure, although its substance was ultimately incorporated into Governor Tomblin's emergency rules.

However many areas for legislative action have been identified and proposed bills addressing those issues failed in the 2011 legislative session. As a result the Joint Legislative Committee on Marcellus was formed to formulate and agree on a bill to be presented with a call for a special session. The House members immediately scheduled public hearings at which over 750 citizens appeared and more than 250 offered comments.

Using S. 424 as a draft the House members met on their own time to author more than 25 amendments to protect the environment, surface owner rights and even the industry. The committee has met every month since July for approximately 4 to 6 hours with many more hours in outside discussions.

The committee has now adopted 30 amendments dealing with broad areas such as increasing well permit fees to increase the number of inspectors and taking the burden off the taxpayers.

Increasing the minimum distance from a gas well to a dwelling from 200 to 625 feet.

Increasing the individual and public notice requirements through website notification and other means.

Providing for public comment periods and in limited circumstances public hearings.

Increasing set back distances from public water intakes and trout producing streams.

Providing a rebuttable presumption and water supply replacement in the event of contaminated water wells.

Increasing pre-drilling water testing.

Requiring independent reviews of DEP agency efficiency.

Tightening requirements for reclamation.

Tightening requirements on disposal of drilling waste.

Increasing bonding.

Requiring studies of the need to regulate noise, air and light pollution which is an area in which we could certainly use Federal resources and assistance.

Increasing permit considerations.

Incentivizing the use of surface owner agreements.

Taking special precautions, Congressman, to be taken in the Karst formation drilling efforts.

But most importantly, the adoption of strict and specific well casing and cementing standards with appropriate inspection to provide the greatest protection of our underground water that is possible in an effort to restore the public's confidence in the industry.

Finally, West Virginians have and will experience inconveniences of road destruction and congestion as well as inevitable environ-

mental damage. It can't be helped. Industry has touted that this is a small price to pay for the good paying jobs we will receive.

However Wetzel County which has been inundated with numerous wells has the highest unemployment in the State while the hotels are full of out of State gas drilling employees. Our people want to know where are the jobs. The Joint Committee has heard them and has adopted a job reporting requirement to obtain accurate information about the number of in State and out of State employees with their respective aggregate income.

The industry needs to treat West Virginians and our beautiful hills with the same respect and courtesy they would show for a long term business partner. The industry needs to sit down and negotiate a good deal for both sides. While some members of industry have done so, many have not.

By Wednesday I expect the proposed bill will be voted out of our Joint Committee. The challenge will then pass to the entire legislature. We will have the opportunity to prove to the U.S. Congress and to the rest of the country that we have the political will and fortitude to protect our land owners and our environment while still providing a balanced, common sense, regulatory system in which the Marcellus industry can flourish. Thereby providing our Nation with a viable alternative to oil and an opportunity to break our dependence on foreign oil and the disastrous consequences it inflicts upon our economy.

For now we are optimistic of the bill's chances for passage. However if the industry uses its vast arsenal of lobbyists and other means to delay or defeat a meaningful bill, you won't have to come back here to hear about it because I'll be coming to Washington to ask for your intervention to protect our citizens and our beloved West Virginia hills. Thank you.

[The prepared statement of Mr. Manchin follows:]

PREPARED STATEMENT OF TIM MANCHIN, DELEGATE, WEST VIRGINIA LEGISLATURE, FAIRMONT, WV

INTRODUCTION

The emergence of the horizontal drilling methods along with the development of new shale fracturing techniques have generated a boon for gas drillers and a potential windfall for mineral owners in the Marcellus shale region, and a potential huge influx of severance taxes and associated economic benefits for the state. West Virginia stands to gain greatly from the development of Marcellus shale gas including benefitting from the jobs and taxes associated from development of these wells, corresponding distribution infrastructure, and hopefully post production industrial uses. However, the boon does not come without costs and impacts to the state and its citizens and environment in the communities where these operations are being undertaken. We have been hearing from impacted citizens and other citizens from across the state who anticipate what the future holds as this new activity appears where they live in this state. These citizens have been letting us legislators know in a loud and clear voice that they expect us to fairly regulate these activities and also represent the vast numbers of citizens in this state who are or will be directly impacted by this emerging industry.

This new drilling process has not been experienced before in West Virginia and the regulatory scheme for traditional drilling methods is clearly insufficient to address the impacts to local communities, the environment, infrastructure and regulatory enforcement. The moving target of emerging technologies has caused a steep learning curve for regulators and lawmakers who have been trying to sort through this important issue. I have been frustrated by the unwillingness of the industry, with the exception of a few, to be forthcoming in developing this regulatory scheme. The West Virginia Oil and Natural Gas Association and Independent Oil and Gas Association of West Virginia have been disappointing in their failure to engage in

constructive dialog regarding the issues raised by this our efforts to reach reasonable solutions to the problems these new operations present to our state. This has been a two year process of attempting to forge a reasonable regulatory program while being sensitive to impacts of these proposals to the gas industry, surface owners, local communities and for the broader interests of the state of West Virginia.

This testimony is intended to provide this Committee a brief history of the efforts undertaken by the West Virginia Legislature the last two years to develop a regulatory scheme and my commentary regarding the issues under consideration by the Joint Select Committee on Marcellus Shale.

I. 2010 INTERIMS AND 2011 REGULAR SESSION

A. 2010 Legislative study

During 2010, a study was undertaken and legislation was drafted by a Subcommittee of the Joint Judiciary Committee of the West Virginia Legislature. The Subcommittee proposed legislation for consideration during the 2011 Regular Session to provide a regulatory scheme for these large drilling operations. The bill also addressed local concerns by addressing protections for surface owners, local environmental impacts and protection of roads. This bill was recommended for introduction in December 2010 and introduced on January 26th, 2011 [H.B.2878].

B. Department of Environmental Protection [DEP] proposal

The DEP held a series of meetings with interested parties through the summer and fall of 2010 and developed its own legislation which was introduced on February 2nd, 2011. This bill [S.B. 424 & HB 3048] addressed several regulatory aspects of horizontal drilling and water use. The bill provided new specific regulations but did not address items outside of the DEP's regulatory duties, and things such as providing protections for local land owners and consideration of local impacts were not addressed. This bill was generated without input, participation or coordination with the Legislature.

C. 2011 Regular Session

After several public meetings and hearings by the Judiciary and Finance Committees, and considerable work by a subcommittee of the House Judiciary Committee, HB2878 was reported out of both the House Judiciary and House Finance Committees with overwhelming support. However, the bill was not advanced on the House Floor for a vote on third reading.

The Senate Committee on Mining and Industry jettisoned the DEP proposal contained in S.B.424 and generated a committee substitute which established minimum regulatory standards and did not address several of the issues of the House proposal. As a result it became quickly apparent that there was much disagreement between the two houses as to what a final bill should look like. S.B.424 was reported out of the Senate but did not pass the House prior to adjournment.

Summary of differences between the House and Senate proposals at the end of the 2011 Regular Session:

House and Senate versions both addressed:

Requiring road maintenance agreements with Dept of Highways;
Special requirements for construction of large marcellus impoundments;
Increased notice to property owners;
New permitting and regulatory program created in new Article 6A;
Providing that local governments are preempted by the state law, except for traditional zoning regulation; and
Extending current public comment process 15 days for all wells, to 30 days for Marcellus wells.

PERMIT FEES: Senate permit fees of $5,000 for first and $1,000 for subsequent wells on same pad. House directed the DEP by rule to establish permit fees for horizontal shallow wells.

Senate version applied to all horizontal wells, while House applied to "horizontal shallow wells that use 210,000 gallons or more of water."

Both versions required soil and erosion management plans. The Senate draft required a safety plan for drilling operations be adopted, while the House required a study and report on safety concerns. Both versions established large impoundment construction and management requirements. Several differences existed in the two versions relating to impoundment requirements.

Senate Water protections:

Rebuttable presumption for water rights civil actions within 1,000 feet of the well site;

Provide protections for karst formations;

Require a water management plan if the well uses more than 210,000 gallons of water; and

Require study of whether rules need to be developed for greater regulation of water use and management.

House Judiciary/Finance amendment to SB424:

House Committee Water protections:

Well prohibited within 1,000 feet of a well or public water intake;

No well within 100 feet of a water course or wetland; and

Mandatory water management plan requirements, applicable to all shallow horizontal wells, with specific water withdrawal and frack water management requirements.

Requirements that the DEP consider well impact to public resources such as parks, wildlife areas, scenic rivers, and historic places. Special requirements provided for drilling near high quality naturally occurring trout streams.

House provided special requirement for well construction inspections to assure proper cementing of well casings has been verified.

Additional House provisions:

Prohibiting construction of a drilling pad on a surface owner when pooling agreements are utilized without surface owner consent.

Reporting to the Legislature from DEP and state universities to see if further regulation is needed for: worker safety standards for these large operations; whether radiation is being released into the fracking water during the drilling process; whether there are new air pollution problems associated with these drilling operations; whether enhanced water disposal requirements are needed; if there are Karst formation leaking/impacts; and a report on number of DEP inspections and inspectors. Studies with annual reporting requirements and a July 2016 final report date.

Requiring the operations to be drug free work places.

Timber to be valued at a minimum of two times the value of the present appraised value.

Repeals the Oil and Gas Inspectors Examining Board, allowing DEP to hire inspectors in the same fashion it hires all other inspectors.

II. CREATION OF JOINT SELECT COMMITTEE ON MARCELLUS SHALE

The Speaker and Acting President created the Joint Select Committee on Marcellus Shale in June of this year to study and draft legislation that would have broad based support in the Legislature. The Committee is made up of five Senate and five House members.

A. Select Committee monthly meetings

Beginning in July of this year the Committee has been meeting regularly to hear testimony, review legislation and consider amendments. We agreed to begin working from the Senate bill as a regulatory framework and to consider each proposed amendment individually to allow for debate and discussion, and hopefully reasonable compromise. The House members proposed over 20 amendments to the bill. These amendments (with the exception of a few which were revised or offered later)were published and remain on the WV Legislature web page since August 17th 2011. At that time a letter was send to gas industry groups and businesses and other interested parties soliciting comment and reactions to the proposed legislation and pending amendments. The industry and others responses to this request are attached to these comments. The Committee has diligently worked each amendment and many of these proposals were amended and adopted by the Committee and represent reasonable compromises to these areas of concern. Each amendment adopted and pending before the Committee has and continues to be available at www.legis.state.wv.us.

Interest Groups and stakeholders

During the months of study of this issue the Committee and individual legislators have heard from a variety of parties and interest groups regarding this legislation. These include surface owners, residents living near drilling operations, environmentalists, mineral owners, watershed groups, the oil and gas industry, municipalities and counties and their associations, labor groups, local law enforcement officials, the Division of Highways, and regulators.

B. House Members public hearings

The House members of the Select Committee held a series of public hearing around the state to receive input from affected communities. These meetings took place in Wheeling, Morgantown and Clarksburg. The purpose of these meetings was to invite public comment and suggestions regarding the Committee's consideration of legislation that would regulate the horizontal gas well drilling. The first public hearing was held on July 21, 2011 in Wheeling, WV at the West Virginia Northern Community College. Approximately 38 individuals addressed house members to voice their views about gas well horizontal drilling and approximately 75 individuals were in attendance for this hearing. The second public hearing was held on July 25, 2011 in Morgantown, WV at the West Virginia University School of Law. Approximately 74 individuals presented with well over 100 individuals in attendance. The final public hearing was held at the Robert C. Byrd High School in Clarksburg, WV on July 27, 2011. Approximately 128 individuals spoke and over 500 individuals were in attendance. In sum, over 240 members of the public and industry addressed the House members. Additionally, over 700 attended these public hearings and submitted hundreds of documents, in writing, to support their respective positions. All submitted documents, attendance records and recordings of each of these public hearings are on file with the Committee's Clerk and I will be glad to make them or a portion of them available to this committee upon request.

The discussions at all three of these public hearings essentially mirrored one another. The gas industry employees, operators and lobbyists, which were generally the only speakers to speak in favor of the industry, took the position that drilling horizontal gas wells into the Marcellus Shale formation is essential to the economic growth of our state and the creation of employment opportunities for our residents. Additionally representatives of the gas industry, particularly at the Clarksburg hearing, took the podium to support this assertion and to stress the importance of their industry. They also stated that there was no factual evidence that current hydraulic fracturing has caused any deaths, illness, pollution or damage to surface owners' drinking water or the land and air in general.

Alternatively, the comments by those supporting more stringent regulation of the horizontally drilled gas wells varied greatly, but generally expressed concerns about community impacts. These speakers represented a wide variety of concerned citizens such as local residents, environmentalists, academics, and adjoining property owners regarding the need for legislation that strikes a reasonable balance between economic development/job creation and protection and consideration of the local residents who are absorbing the adverse impacts of these operations. Their areas of concern include: significant road use by large trucks in rural areas not accustomed or designed for such traffic, air pollution from machinery at the well site and from waste impoundments, protection of drinking, surface and ground water, surface owners' protections, the need for a safe distance from these operations to residences, the right to use and enjoy their land as intended, noise pollution, impacts to local towns and cities at or near well sites, adequate permitting requirements and fees, property devaluation, management of large water and waste impoundments, and effective well inspections. Several speakers advocated a moratorium on further drilling until a proper regulatory scheme is in place. With the exception of one circumstance where a lobbyist for the industry attempted to disrupt a hearing by provoking a breach of decorum, the participants at these hearing were respectful and attentive.

C. Amendments Adopted by Committee

1. INFORMATION TO ACCOMPANY PERMIT APPLICATION

A. Filing of directional drilling information

The current information to be included in a drilling permit application was designed when vertical wells were the only types of wells that were being drilled. Currently, the direction and length of the proposed horizontal lateral is not reflected on any submitted plat, and the proposed directional drilling information is not required to be included with the application.

There is a need to identify the direction and length of the well's proposed and constructed laterals for a variety of reasons. The location of the laterals helps identify the areas and properties from which gas production is to be stimulated, and the location of other surface and subsurface structures in relation to the entirety of the drilled borehole. The ability to locate the proximity of the proposed borehole and laterals to other prior drilling activity and abandoned wells is necessary to protect against unanticipated migration of gas or potential hazards while drilling the horizontal laterals. Reliable as-built mapping of these horizontal sections will also be

increasingly important as additional laterals or vertical sections are drilled through the well's completion zone.

For these reasons, the amendments recommended by the Committee would require that the projected directional drilling information be included as a part of the permit application.

B. Karst Formations

An amendment pending before the committee will require an assessment and certification from the permit applicant that no karst formations, which are generally sandstone formations which tend to have large cracks and can serve as a conduit for frack water into groundwater, are not impacted by the drilling operations. These formations only exist in certain regions of the state, and this amendment is intended to assure that there are no impacts to these formations.

2. NOTICE OF PERMIT APPLICATION

A. Notice to specific groups of affected individuals/property owners

Under current WV code, the only classes of people who are provided with notice of a natural gas well drilling permit application are:

1. The owners of record of the surface tract where the well is to be located;
2. The owners of record of a surface tract where land would be disturbed or owners of a surface tract to be utilized as roads to the proposed well site; and
3. Coal operators or other owners of coal interests for any coal seam known to underlie the tract where the well is to be located.

After hearing the additional concerns expressed by the other property owners whose ability to utilize and enjoy their property interests would be potentially impacted by a large horizontal drilling operation and hydraulic fracturing, the Committee has proposed by amendment to add the following categories of persons to receive individual notice of the permit application:

4. Surface owners of any tract of land which is immediately adjacent to a tract where well work is to be conducted or other land disturbance is to occur;
5. Any surface owner or water purveyor who is known to have a water well, spring or water supply source located within 2500 feet of the center of the proposed or existing well pad, when the water from that supply source is used for consumption by humans or domestic animals.

Each of the individuals receiving individual notice of the application would receive a copy of the application, the well plat setting forth the location of the well and the roads and appurtenances to be established for the well, and the well's erosion and sediment control plan.

B. Public notice requirements

Under the current provisions of the West Virginia Code, public notice is not required of a proposed shallow gas well or a proposed deep well. It only provides an alternative for the applicant to provide a Class II legal ad as an alternative to providing individual notices to a surface tract which is owned by three or more tenants in common. The current provisions of the West Virginia Code require that public notice be provided by a Class II legal ad (2 consecutive weeks) for a proposed coalbed methane well.

The public concerns regarding the impact of horizontal well drilling on large multi-well pads and the stimulation of the gas production by hydrofracturing with large volumes of water are much more significant than the issues normally associated with traditional vertical wells and other drilling activities conducted on a much smaller footprint. Therefore, the Committee found it reasonable and appropriate to establish a mechanism to provide for public notice and comment for proposed horizontal well permit applications which proposed to utilize more than 210,000 gallons of water over a 30 day period or require a drilling footprint of 3 acres or more on the surface.

Under the provisions reflected by the Committee's adopted amendment, the public notice is to be provided by a Class II legal ad, with the first notice to be provided at least ten days' prior to the filing of the application. The public may file public comment for a period of thirty days 30 days after the filing of the application, and the public comment period can end no sooner than 30 days after the second published notice.

3. REVIEW AND CONSIDERATION OF COMMENTS, OBJECTIONS AND PROTESTS

The DEP (Office of Oil & Gas) is to review all comments, protests and objections that are filed in response to a permit application.

Under the amendments proposed by the Committee, the character of all objections, comments and protests received to the application are to be provided by the DEP to the applicant within 15 days of the close of the public comment period, or 45 days after the date of the permit application, whichever is later.

Objections filed by owners of coal interests will continue to be reviewed and considered by the DEP or by the Shallow Gas Board, as provided by the current statutory framework. That current statutory framework provides a mechanism for the applicant and the owners of the coal interest to agree on any changes or alterations of the application by agreement, or submit the dispute for hearing or resolution. A hearing on the coal owner's unresolved issues are initially heard by the Shallow Gas Review Board for shallow wells, and by the DEP for deep wells.

The proposed amendment would similarly allow the applicant and the objecting surface property owners and water purveyors to agree on an alternate location or agree on the conditions under which the drilling is to take place, subject to approval by the DEP.

The amendment would provide the DEP with the discretion to conduct a public hearing on the permit application, if it so desired. The DEP would be permitted to identify and narrow the issues to be addressed at any such scheduled public hearing. At the close of the comment period the DEP would provide notice of the public hearing by Class I legal ad. This public hearing would have to be scheduled and conducted within thirty days after the close of the comment period. Any person may submit a written or oral statement for the Secretary's consideration. However, the only parties allowed to file testimony or documents for consideration at the public hearing would be the proposed well operator, those receiving individual notice of the permit application, counties or municipalities where the activity is to be conducted, or other parties who are specifically granted intervener status by the DEP.

4. DEP AUTHORITY TO CONDUCT A PUBLIC HEARING ON HORIZONTAL PERMIT ISSUES

While the DEP had a clear statutory authority to conduct public hearing to address related objections raised by owners and operators of an underlying coal seam, the current statutes did not provide a clear mechanism for the DEP to conduct a public hearing on other issues associated with a horizontal drilling permit application. The Committee's proposed bill, as amended, would provide that clear authority to the DEP. The DEP's decision to conduct such a public hearing is purely discretionary, and the DEP may identify and limit the scope of the issues to be addressed at the hearing. Any such hearing is to be conducted promptly and in such a manner which would not unreasonably delay the DEP's ultimate decision on the permit application.

5. PREDRILLING WATER SUPPLY TESTING/ PRESUMPTIONS

Under current West Virginia law, in any cause of action brought for the contamination or deprivation of a fresh water source or supply, if the fresh water source or supply is located within 1000 feet of a drilling site for an oil or gas well, there is a statutorily created rebuttable presumption that the oil or gas well was the proximate cause of the contamination or deprivation of the fresh water supply source. At the time this standard was developed, all oil and gas wells were drilled as vertical wells, and there was no horizontal drilling.

Currently, all surrounding surface owners within 1000 feet of a permitted well are provided with notice of the opportunity to have a predrilling survey conducted at the operator's expense before drilling is commenced under an issued permit. This provides both parties the opportunity to have a baseline study conducted to protect their respective interests.

Opponents of horizontal drilling and hydraulic fracturing are concerned about the prospects of drilling fluids and fracking fluids potentially contaminating freshwater supplies which lay overtop of the stimulated zones. They are also concerned that if a well is not properly cased and cemented before hyrdrofracturing stimulation is performed on the well, then zones and formations above the targeted completion zone may be inadvertently injected with contaminants and fluids, which could migrate into the water supplies over time.

While industry experts assure the Committee that the prospect of such a scenario is highly unlikely, there is frankly a lack of scientific data to confirm the existence or absence of such contamination. Methane may naturally leach into freshwater supplies, and certain contaminants may be found in the water as a result of other

natural or manmade occurrences. The best means for evaluating the impact of any prospective drilling activity on a water supply is by conducting reasonable and sufficient baseline testing in advance of the drilling activities, and comparing those results to samples taken from the same water supply source sometime after the drilling and/or production activities ceased. If no sufficient baseline testing in conducted, the owner of a water supply may conclude, rightly or wrongly, that a subsequently observed contamination of his or her water supply was attributed to the drilling or production activity.

According to microseismic testing conducted by some entities after stimulation, longitudinal microcracks produced in Marcellus shale by hydrofracturing have been measured to travel as far as 2400 feet from the horizontal lateral. These microfractures travel along a path of least resistance, and are effectively sealed from the other shale formations above the Marcellus zone by a layer of limestone just above the Marcellus shale. It is easier for the microcracks to travel through the Marcellus shale than to break into the limestone which lies above. While there may be some naturally occurring fractures or fissures in this limestone layer, the limestone effectively acts as a caprock, or a relatively impermeable barrier above the stimulated Marcellus production zone. The hydrostatic pressures are carefully monitored during the hydrofracturing process, and the frack is immediately ceased if a sudden and unanticipated pressure drop is observed during the fracking procedure. Such a sudden pressure drop could indicate that an unanticipated void or cavern was encountered, or the ability to maintain containment within the production zone had been somehow compromised.

Even if some fluids were to theoretically get past the first limestone caprock layer, there is a second layer of limestone caprock several layers above, which would effectively keep any of the escaping fluids trapped in the Devonian shale layers that lay above the Marcellus zone. This second limestone layer would keep any such fluids away from the freshwater supplies.

The most likely route of contamination from Marcellus shale drilling and stimulation activities would likely come from fluids getting into the annulus of the borehole, (or the space between the production pipe and the drilled out rock formations), where the limestone caprock was compromised during he drilling process. This breach of the limestone caprock is effectively repaired and resealed during the casing and cementing process, and keeps fluids from crossing from one zone into another. That is the reason why the establishment of sufficient casing and cementing requirements for the production zone are so important for a horizontal Marcellus well.

The present standards, which provide a 1000 foot presumption and a 1000 foot zone for predrilling baseline testing, may be sufficient for testing the integrity of a vertical well, but it is generally agreed that an expanded level of baseline testing is reasonable to confirm the integrity of a horizontal well.

Since the horizontal laterals are drilled on a gradual slope after the well-bore deviates from vertical, the actual fracking activity is initiated several hundred feet away from the center of the well pad. While the vertical bore would still represent the most likely conduit for a contaminant associated with drilling or stimulation activities from reaching a fresh water zone, the Committee agreed, by amendment, to expand the statutory presumption (and the associated baseline testing driven by the presumption) from 1000 feet of the well to 2500 feet of the center of the well pad.

The amendment also specifically provided that this presumption would be rebutted by the following:

1. The pollution existed prior to the drilling or alteration activity, based upon a predrilling or prealteration survey.
2. The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration survey.
3. The water supply is not within 2500 feet of the well.
4. The pollution occurred more than 6 months after completion of drilling or alteration activities.
5. The pollution occurred as the result of some cause other than the drilling or alteration activity.

The predrilling or prealteration testing would have to be conducted by an independent certified laboratory, and a copy of the results of the survey would be submitted to the DEP and to the landowner or water purveyor in a manner required by the DEP.

The public notice provided with the permit application shall also advise owners of water supplies and water purveyors in proximity of the proposed drilling activities of the advisability of securing such prealteration and predrilling surveys, and the associated presumptions that are associated with those tests.

The conduct of these baseline studies will provide the drilling industry with its best ability to defend itself from future claims if any water supplies should later be found to be contaminated, after its drilling activities are completed. They will also provide the public with a means to verify when observed contamination is apparently associated with the horizontal drilling and fracking. In the event that repeated contamination is revealed by such baseline testing, the Legislature could revisit the issue, with the benefit of more definitive scientific data.

6. ESTABLISHMENT OF ADDITIONAL WEB-BASED RESOURCES, AVAILABLE TO PUBLIC

As amended, the bill drafted by the Committee would have the DEP provide resources on its public website which would provide searchable information on Marcellus well applications filed in the state, including county and approximate location, well number, date of application, name of the applicant and well application number. Notice of any scheduled public hearings are to be concurrently published on the DEP website. Finally, an e-notification system is to be established by the DEP, by which individuals, corporations and agencies may register to receive electronic notice of filings and notices pertaining to horizontal well applications, by county of interest.

7. CONSIDERATIONS IN REVIEWING AND ISSUING/CONDITIONING PERMITS

A. Well location restrictions from residences, water intakes and protection of nearby state waters

One of the most pressing concerns raised by local residents is establishing reasonable distance restrictions from their homes, water intakes and other localized uses that can be adversely impacted by a drilling operation. The Committee adopted an amendment that established several protections for local residents. A general prohibition of drilling within 650 feet of a home or larger agricultural facility, a 100 foot prohibition from drilling from any watercourse or body of water, and 200 feet from a wetland and 300 feet from a naturally occurring trout stream. No wellpad may be located within 1,000 feet of a public water intake. These prohibitions relating to watercourses may be waived by the DEP upon finding that specialized facilities or practices will assure protection of these waters. The residence/agricultural structures prohibition may be waived by the property owner. The well operator may also request a variance from the DEP if a distance restriction would deprive the owner of the oil and gas the right to produce or share in the oil or gas underlying the surface tract. If a waiver or variances is granted by the DEP, the DEP is to identify the additional measures or practices to be employed at the site.

The well location restriction language is clarified to make it clear that the distance restriction for location near existing springs, wells and other existing water supplies only apply to those water sources that existed at the time the operator first gave notice of entry. This was done to prevent surface owners from sterilizing land from drilling activities by installing wells after notice that a operator was interested in placing a well on their property. This was done to address industry concerns that some surface owners were unfairly taking advantage of this prohibition.

B. Pending amendment on areas of special concern to allow DEP to place special permits conditions

A amendment is currently pending before the committee that will address other localized concerns that may require special limitations places on permitted locations. These include allowing the DEP to consider the drilling activity will potentially threaten a public or private water resources; the well's proximity to municipalities or densely populated areas and the well's impact on those areas; the adequacy of the permit's proposed erosion and sediment control plan and water use plan; the impact on public resources including parks, forests, gamelands and wildlife, natural landmarks, endangered species and historical sites. These protections are intended to facilitate a balance between the gas industry land use and the local communities to protect the local communities from losing exiting natural, historic and other resources that are highly valued and deserving of protection.

8. IMPOUNDMENT ISSUES

The DEP is directed to conduct a study and report back to the Legislature next year about the need for further requirements for the regulation of impoundments. The DEP is directed to investigate whether a need for greater regulations to prevent toxins and other hazardous materials contained in impoundments and pits need further air regulation and safety standards and if so to propose those though the rulemaking process. This issue has received much discussion and the committee is ask-

ing for an ongoing review be undertaken to satisfy the concerns of the proper management and disposal of the substances generated by these operations.

9. Water use/ water impact issues

The committee has continued to support the water use and reporting requirements that were developed in the House bill last year and have been incorporated into this draft and were the basis for the Governor's executive order directing the DEP, by emergency rule, to establish these requirements. The committee did adopt on amendment that requires in addition to flow tests for nearby water wells that water quality tests also be taken to establish baseline water quality for these wells, to determine if the drilling activity has impacted these resources.

10. Casing and cementing standards

One of the primary issues raised by the public during the public hearings was the concern that the drilling fluids and fracking fluids used to stimulate horizontal Marcellus wells would somehow contaminate well water and other public water supplies. The hydrofracturing or "fracking" process uses large volumes of water under high pressures to fracture and create microcracks in the Marcellus shale so that the large volumes of gas contained in the rock are released under high pressures. Proper containment, recapture and disposal of the drilling fluids and fracking fluids which return to the surface is easily monitored and observed on the surface, as it is collected and contained in tanks, trucks or impoundments. The ability to ensure that the fracking fluids which don't return to the surface are properly contained within the Marcellus production zone, thousands of feet from the surface, is depends on the adequacy of the protective casing and cementing that is done along the length of the well.

The well itself has a number of protections, through the installation of multiple layers of steel and cement, to insure that the gas flows coming from production zones 5000 to 6000 feet below the surface, do not interact with the fresh water supplies located much closer to the surface.

The 7 or more layers of protection begin with a steel surface conductor pipe, which is cemented in place. A new borehole is then drilled through the interior of the conductor pipe to a point below the fresh water zone. At that time, a water protection string of casing is placed in the borehole, and in cemented from the bottom of the hole created below the base of the casing string to the surface. The cementing process causes cement to fill the space between the casing string and the outside diameter of the borehole. A new (smaller) borehole is then drilled down the center of the water protection string to a depth below the last expected coal seam (usually 2000 feet or more). At that point, a coal protection casing string is installed and cemented in place, to the surface. If the coal protection casing cannot be cemented to the surface, WV has certain statutory requirements which are to be satisfied, to insure that all zones are properly sealed off from one another. From that point, a smaller borehole is drilled down the center of the coal protection string, to a point where the well is to deviate from vertical. An intermediate casing is installed, and cemented in place. Finally, the well is drilled to its final depth, and the horizontal drilling extends the borehole along the target formation to the well's final total length.

The fracking activity or stimulation of the well is done along the horizontal length of the production casing, in incremental stages. After one length of the horizontal lateral is stimulated, it is temporarily sealed while the next length of horizontal section is stimulated. After this process is completed, the temporary plugs are removed, and the produced gas starts flowing to the surface at high pressures. The gas which is flowing to the surface through the production pipe is separated from the fresh water zones by at least four layers of steel piping, with at least two of those layers sealed with cement to the surface.

At the time the present WV casing and cementing standards were developed for oil and gas wells, they were developed for vertical wells, and there was no such thing as a horizontal well. While they included clear standards for cementing and completing casing in the water protection zones and the coal protection zones, they did not establish clear or uniform standards for cementing or completing the intermediate string of casing or the production string of casing. The completion techniques in those zones differed depending on the characteristics of the formation being stimulated or produced.

The adequacy of the cementing and packers used to separate fluids introduced into the production zone from the other zones is critical to ensure that the zones above the limestone caprock are not compromised. It is also important to the operator of the well, to insure that the well produces gas efficiently, and the targeted gas supplies are properly contained for production.

While the specific casing and cementing standards for each horizontal well was reviewed and approved by the DEP's Office of Oil and Gas, there is quite frankly a general distrust of the adequacy of those efforts and requirements by some members of the public.

To address that concern, the Committee had its staff review the casing and cementing standards which had been adopted in neighboring states, and compare them to the recently amended standards which have been proposed by a policy letter issued by the Director of the DEP's Office of Oil & Gas. The modified standards proposed by that policy letter are still under comment and review by the Office of Oil & Gas, and may require further revision to address concerns raised by various commentators.

The State of Pennsylvania revisited and amended its casing and cementing standards to reflect what is needed to provide adequate protections for horizontal drilling. The PA casing and cementing standards, which have been in place since October of 2010, were developed by a multidisciplinary effort which included experts from the oil and gas industry, submitted for an extensive public comment period, and have been fully vetted by a completed rulemaking review process. The horizontal formations to be drilled and fracked in West Virginia are essentially the same as those to be drilled and fracked in Pennsylvania. Many of the same operators are drilling horizontal wells in both states and are already well familiar with the Pennsylvania casing and cementing requirements. Therefore, the members of the Committee saw no legitimate reason why the West Virginia casing and cementing standards are not at least as protective as those utilized in Pennsylvania.

The State of Pennsylvania casing and cementing standards are much more detailed and explicit than the current standards or the proposed revisions advanced by the WV Office of Oil & Gas policy letter. The Committee would require that the WV casing and cementing standards be updated to be at least as protective as those that have been implemented for similar formations in Pennsylvania. The adopted Committee amendment requires the Office of Oil & Gas to issue a policy document which incorporates most of those standards as a baseline requirement. The amendment adopted by the Committee reiterates the PA standards, for the most part, with the exception that the WV protections for the coal protection zones were deemed superior to Pennsylvania's, and were incorporated by reference.

This action would not prevent the WV Office of Oil & Gas from establishing more stringent standards for horizontal wells by rule or by permit condition, or from adopting alternative protections and requirements by rule or permit condition, consistent with best industry practices, as they continue to evolve.

11. Other environmental concerns

Air Quality

The Committee adopted two amendments to address air quality concerns. If you have toured one of these operations as I have it is striking to see the size of the operation, the number of trucks and diesel engines used in the fracking process, the amount of dust generated, and the size of the large impoundments and pits. All of these have the potential to impact air quality and it is vitally important to investigate whether additional requirements need to be established to regulate these emissions. An amendment was adopted authorizing the Office of Air Quality to regulate these activities and to consider the cumulative impacts of these emissions in determining whether additional air quality permitting is needed. The agency is authorized to promulgate rules as needed to regulate these emissions. The DEP is also directed to conduct a study of health impacts and the need for further legislation for regulation of these activities and to report back to the Legislature on its findings.

12. Application fees and bonding requirements

A. Permit fees

This has been a most difficult issue to nail down for the committee. Permit fees are intended to fund the necessary inspectors and permit writers to adequately serve the existing permitting and new permitting activities. Our efforts to find a fair and appropriate permit fee as been thwarted by the inability of the DEP to provide us with a good estimate of the numbers of employees it needs to hire to do its job. We finally did get an estimate of the numbers of employees they will need to do their job regulating the gas industry. It has been extremely frustrating to have the regulatory institution for this state being unable or unwilling to provide a good faith estimate on their funding needs. Nonetheless we reached a number which the DEP says will allow it to hire 9 more inspectors and permit writers. We do not know for

sure if this is sufficient to address regulating the thousands of existing wells in the state and properly permitting and inspecting these new wells. We settled on $10,000 for first well and $5,000 for each additional well on a well pad as the permit fee that will fulfill the agency's employment needs.

B. Increased bonding

Current bonding requirements provide a $5,000 bond with a blanket bond of $50,000 for ten or more wells. The committee agreed to adopt a $50,000 per well bond with a $250,000 blanket bond for these operations. This is close to the information the Committee received that the actual cost is near $50,000 to $60,000 to plug one of these wells.

13. REPORTS TO THE DIVISION OF LABOR

This is a contiguous issue to which the industry has expressed strong opposition. The Committee feels that it is in the best interests of this citizens of this state that we try to track employment in this transitory industry to see what we can do to maximize the number of citizens in this state employed in this industry. The amendment is not onerous to the industry and asked them simply to report to the Division of Labor their in-state and out-of-state employment trends, payroll information and job types held by in-state verses out-of-state, and the number of instate residents employed by them. This would be reported to the Division of Labor which would then generate a report to the Legislature. The hope is that we can develop training and employment opportunities for our citizens in the industry and an important component of that is to being able to track employment trends and opportunities. This is an important component of that effort. The industry feels like they are being singled out by this amendment and they are to the extent it is. But, by its nature the gas industry more than any other has temporary jobs moving throughout our state and we want to be able to monitor those movements to help facilitate better understanding of the employment opportunities for our citizens.

E. Amendments pending for November interim meetings

Amendment—Establishing requirments for surface owners land use agreement. This proposal is to incentivise gas operators to reach agreement with surface owners prior to entering into the land to conduct drilling operations. The amendment would require the gas operator to pay all legal fees of the surface owner if the surface owner is awarded in court an amount greater than 15% of the last offer made by theoperator.

Amendment—Providing evaluation of area for karst formations and special testing requirements when karst formation found within area drilling is to occur. The purpose of this amendment is to provide additional protections through proper evaluation of the geologic formations in the area to assure no fracking water reached karst formations containing groundwater.

Amendment—Establishing minimum qualifications for Oil and gas inspectors. This amendment will establish minimum experience qualifications for inspectors .

Amendment—Establishing additional localized factors the DEP is to consider when granting a permit: Include dense population areas, location of public water intakes, to allow protection of preexisting conditions to allow the DEP to provide additional protections for these existing conditions.

III. INDUSTRY PARTICIPATION

The House members of this Committee have spoken in one voice about the need for reasoned protections for the citizens of this state impacted by these drilling operations. I have been extremely frustrated by the industry's lack of participation in the process we have undertaken. Despite frequent invitations, they have been unwilling to negotiate and agree to solutions for our most difficult issues. The industry trade groups provided at my invitation, letters responding to proposed amendments under consideration by the Committee. The industry states that it wants fair and reasonable regulations but beside offering criticisms about proposed and adopted amendments, they have not brought forth one proposal offering solutions to the problems we are trying to address.

IV. CONCLUSION

I am hopeful that legislation can be enacted in West Virginia to address the concerns of all those benefitting and impacted by the new horizontal drilling activities. I encourage the United State Congress to also investigate whether any uniform regulatory requirements are appropriate for the various states regarding this new gas drilling activity. I do believe that the industry can profitably operate in this state

without causing harm to the local communities and residences, but a balance must be struck between these competing interests. I stand ready to offer you any assistance that I can provide in this important inquiry and will continue in my efforts to advance a reasonable and balanced approach to regulation of this new opportunity for West Virginia.

[Applause.]

Senator MANCHIN. Thank you.

Senator Facemire.

STATEMENT OF DOUG FACEMIRE, STATE SENATOR, WEST VIRGINIA LEGISLATURE, GASSAWAY, WV

Mr. FACEMIRE. Thank you, Senator Manchin, Representative Rahall, McKinley and Capito for the opportunity to address the Senate committee on Energy and Natural Resources and hopefully answer any questions that you might have.

The development of the Marcellus shale formation in West Virginia is critically important to the economy of our State. It represents a historic opportunity to join hands and create a well balanced regulatory program in West Virginia which encourages economic growth and job creation along with the implementation of standards that ensure protection of the environment. To achieve this goal all West Virginians, industry, government and the public must come together in the spirit of cooperation to develop a comprehensive regulatory program which balances all competing interests.

After considerable time and effort from all interests the Joint Select Committee on Marcellus shale is close to recommending legislation that provides safeguards for the environment, encourages development and promises certainty for the regulated community. With these considerations in mind I will provide a brief review of pending legislation.

Marcellus operations use considerably large amounts of water to conduct fracturing operations compared to the conventional operations. Because of this the proposed legislation imposes new comprehensive casing and cementing standards to protect fresh water and ground water supplies from the increased potential for contamination. To protect the surface water sources the pending legislation imposes new surface water use and reporting requirements, operations would have to submit a water management plan which identifies the location of surface withdrawal and nearby public water intakes along with the anticipated volume and months of each withdrawal, a disposal plan for waste water and a list of chemicals used in the fracturing fluids.

Additional requirements increase the minimum distance between well sites and water bodies and public water intakes and expands the distance between well sites and existing water sources to survey water quantity and quality prior to drilling. To address the concerns about protecting the public interest this legislation more than triples the distance between well sites and existing homes and agriculture facilities. It also potentially subjects Marcellus operations to regulation under our air quality laws and calls for a study of the impact of air emissions from well sites on the public health.

Moreover the category of persons entitled to receive notice to propose Marcellus operations are expanded to include adjacent surface owners and owners and suppliers of water sources. Current law

only requires notice to surface owners and owners of coal interest directly affected by the proposed gas operation. This notice would have to include a copy of all documents and information required in a permit application. Those entitled to receive notice would then have 30 days to comment on any part of the proposed operation. Current law only provides for a 15 day comment period.

In response to the concerns regarding the impact of increased vehicle traffic on our State's infrastructure and the effect of operations on local interests, the pending legislation contains 2 provisions governing road use and land development. Marcellus operations would have to enter into a written agreement with the State to maintain and repair public roads used by the operations. Any failure to do this would result in a suspension of operations until compliance is achieved.

To protect local interest the legislation allows local governments to pass zoning and land development laws to protect the health and welfare of the general public. These are just a few of the many provisions in the legislation currently pending before the Marcellus Committee.

Some interests believe the legislation is not enough. Others believe it represents a significant improvement over the existing laws governing gas operation in the State. I believe it provides a framework of certainty for everyone, the regulated community, the public and other related businesses that might convince to local here and take part in the opportunity to create more jobs and contribute to the continued economic growth in the State.

However, none of this will happen without the cooperation of all competing interest and the willingness to compromise. If we can do this West Virginia will truly be a more wonderful place to live. Thank you. I appreciate this opportunity.

Senator MANCHIN. Thank all of you.

We are going to start the same. We're going to have the same round of questioning like we had before with our first panel. I will start it off.

If I can ask both of our State Representatives, Delegate Manchin and Senator Facemire, do you all believe that you have enough support or can muster enough support to pass legislation?

Mr. MANCHIN. We think so. I mean, there are some provisions in the bill that industry is not very happy with. There's a concern that they will exert influence to block the bill.

But I think that in my private discussions with many Senators and the House members, I believe that we want a bill. I think our citizens have spoken loudly and clearly that they want a bill. We owe them that bill. I think everybody is going to try to get there.

Mr. FACEMIRE. I tend to agree. The main thing that we have to remember here is this is the beginning. This is not a bill that it's a onetime deal.

As this bill gets put into law and implemented, we will have the opportunity to come back and make any adjustments that needs to be made to this. But the citizens have made it perfectly clear to us over the last few years that they want some regulation and some rules put into place. That's what we're going to attempt to do here.

Senator MANCHIN. Secretary Huffman, have you been working, your agency been working, with the legislators as they've been drafting and putting together this bill?

Mr. HUFFMAN. Yes. There are a lot of amendments that have been offered so far that our environmental, directly environmental protection type things that we have worked with them on. Some of the matters that they are addressing are policy matters that don't directly fall into our area of expertise and responsibility.

But yes, we've been working closely with them.

Senator MANCHIN. Have you shared basically the proceedings with the EPA? How well are you working with the EPA District Office in Philadelphia?

Mr. HUFFMAN. Mr. Capacasa accurately pointed out a while ago that the actual drilling process and activities related to oil and natural gas extraction are not directly subject to any Federal oversight. What is subject to Federal oversight, however, and is also subject to the State oversight are the requirements to protect the ground water, the surface water and the air. We already have a regulatory framework in place to do that. We have adequate and proper oversight from the Federal Government within those programs.

So there's really not a counterpart. We've talked a lot about primacy today. There's not a counterpart, oil and gas regulatory program at the Federal level.

Senator MANCHIN. Mr. Dettinger has the Governor's Office basically evaluated the amount of resources that it's going to take to amply oversee this procedure and this new opportunity we have. If the legislature falls short of securing the revenue or enhancing the revenue that the DEP is going to need how do you all plan on funding that?

Mr. DETTINGER. Senator Manchin, we feel comfortable that the legislature will implement appropriate drilling permit fees. I know Secretary Huffman has appeared before the Joint Select Committee on a number of occasions and has offered testimony about the amount of money he needs to implement these regulations. I believe that encompasses what's in the current amendment for the bill.

Senator MANCHIN. My time is up.

Congressman Rahall.

Mr. RAHALL. Thank you, Senator Manchin.

Delegate Manchin, let me explore with you in my limited time the job reporting requirement. We all want to see these jobs go to West Virginians. You referenced motel parking lots that are full of out of State license plates.

I have talked to some of those out of State license plates in Southern West Virginia. In some cases they are West Virginians, who left during the bad times and now are coming back to work here and leaving their families living in North Carolina and they're commuting on weekends.

How do you account for that? What——

Mr. MANCHIN. I don't know.

Mr. RAHALL [continuing]. Job reporting requirement upon the industry.

Mr. MANCHIN. It's not very specific. It just asks for aggregate number of in State residents who are employed, aggregate number of out of State and the total payroll for each, something that can be created by computer easily. We just feel like we need real numbers.

I mean, I know that there's going to be deviations. I don't expect us to have 100 percent West Virginians. You know, if it was 80 percent West Virginians and 20 percent out of State, I'd be tickled to death. If it's 20 percent West Virginians and 80 percent out of State, I'm not so happy.

That doesn't mean we can do anything about it. But the point is that you need some public pressure on these companies to make them know that the public is aware of it. That they want to see them do something about it. That they want to see them work with our community and technical training schools to provide that training that's necessary for those people to come in and take those jobs.

That's what we're after, Congressman. It's not meant to be a punitive thing by any measure. We just need some real numbers.

Mr. RAHALL. I would agree. I didn't mean it in a punitive term. I just think, you know, you've got to take into account those that want to come back home too.

Mr. MANCHIN. Absolutely.

Mr. RAHALL. I mean, out of State license plates.

Mr. MANCHIN. Absolutely agree with you.

Mr. RAHALL. OK. Thank you. Thank you, Senator.

Senator MANCHIN. Congresswoman Capito.

Ms. CAPITO. Thank you. I'm going to apologize in advance. I'm going to have to leave here in about ten or fifteen minutes to catch the flight back to Washington.

Secretary Huffman, when you have complaints, when there are complaints, how do you handle those and what's your follow up?

Mr. HUFFMAN. The complaints take on many forms. We get a number of complaints that are really contractual, related to the contractual relationship between the driller and the land owner. We don't mediate those. We try to prioritize the calls we get based upon the environmental issue that has been brought up whether it's mud in a creek or a slip that's blocked a road or an allegation of water contamination or something like that.

So that's how we try to handle the complaint.

Ms. CAPITO. Do you follow up with those?

Mr. HUFFMAN. Yes.

Ms. CAPITO. Delegate Manchin, you mentioned that the bill failed. Give me the 3 top reasons why that bill didn't make it.

Mr. MANCHIN. The industry didn't like it.

[Laughter.]

Ms. CAPITO. For what reasons?

Mr. MANCHIN. It was——

Ms. CAPITO. Just 3.

Mr. MANCHIN. I don't know to be real honest with you. I mean there were essentially wording problems and some of those sorts of things. But we consulted with—I mean, EQT helped us write that bill. They were the only company that I could get to sit down and actually address the issues, the subjects that we wanted. They actually sat down and helped us write a good bill.

Ms. CAPITO. So was the industry at the table with the new bill that you're writing now?

Mr. MANCHIN. They've been invited to be at the table. We haven't received many comments. Although, within the recent—I mean, we posted these amendments and sent them out to every member of ANGA about 2 months ago.

We're now starting to see a trickle in. We've heard a position from ANGA. So we're starting to get a little bit of feedback. But we're awfully late in the game to try to perfect it if we're going to have a special session. That's one of the problems.

But nevertheless, I've still talked with some industry representatives. We hope to have a sit down and discussion with them between now and Wednesday to see if there are a few things that we can hammer out that can make the bill more attractive. We certainly want it to be workable and feasible. I mean, that's first and foremost, that's our desire.

Ms. CAPITO. Yes, I didn't know, Senator Facemire, if you had—I didn't follow it as specifically as to the particulars of that legislation. So I really was honestly curious as to know, you know, if there was a specific thing that you've now dropped out or reformed or reshaped in this new legislation?

Senator Facemire.

Mr. FACEMIRE. To go back to the start. Last year the Senate did pass a bill for whatever reason the House decided to not take the bill up and let it die.

Ms. CAPITO. I understand that problem.

Mr. FACEMIRE. Yes.

[Laughter.]

Mr. FACEMIRE. But, you know, like I said, we did do what we thought we needed to be done and with Senate bill 424, so we passed out a bill last year.

Ms. CAPITO. Alright. Thank you.

Senator MANCHIN. Congressman McKinley.

Mr. MCKINLEY. Delegate Manchin, let me build a little bit back on your—you had commented about the lack of training, a trained work force, for West Virginia. That was one of the first bills I introduced when I went to Congress because I was hearing the very same thing. So we offered some legislation in the House to be able for our employers, our employees, to go to a community college to get the training necessary so that we can overcome that bias because they were saying we didn't have a trained work force.

Let's get that trained work force. We have the resources if we can get that bill out of the House.

Mr. MANCHIN. Thank you.

Mr. MCKINLEY. Now second with the—West Virginia has a history, unfortunately, of extracting some of our natural resources and shipping them out whether that's hardwood and petroleum and the like. So we have an opportunity here downstream from that, after that, cracking process, where we're going to have some of the feedstock for the plastic industry.

What is happening in the legislature? What can happen to see that industry, that stay here, that product stay here in West Virginia instead of being shipped down to the Gulf. If it's incentives, let's do it. With 10.2 unemployment and across the country apply-

ing for unemployment, that's an excellent opportunity for us to create jobs here in West Virginia.

Mr. MANCHIN. Sure.

Mr. MCKINLEY. Yet there seems to be an undercurrent. That's what I'm trying to understand. Why are the industry not keeping these—that gas products here in West Virginia?

Mr. MANCHIN. I don't know all of that. I know that last session we already acted and provided important tax incentives for anybody that was interested in establishing a cracker plant in this State. That was done in consultation with industry.

Mr. MCKINLEY.—Downstream. Once you get a cracker they're going to take off and they're going to take that product and use that feedstock someplace else. I want to see that stay here in West Virginia so that we have that plastic, that ethylene that we create or the propane, or the butane and have an industry that is built around that, that we can create jobs here in West Virginia instead of taking that propane and shipping it to the Gulf Coast or the ethylene to another area of the country.

Mr. MANCHIN. I can't speak specifically whether the tax credit in—the downstream to the spin off industries that you're talking about. But I'm sure we're willing to. But I think the real issues are, are they willing to put up the capital.

Can you put up the capital and build them here more cheaply than what you can do in just hauling them down to existing plants. I think that's part of it. I don't know. But that seems like a logical question to ask.

Mr. MCKINLEY. Senator, do you have anything? I know I'm going to run out of time here in a second.

Mr. FACEMIRE. We heard the testimony of what kind of an investment is involved in these cracking plants. I think it's a prudent business decision. What these people are wanting to know before they commit to West Virginia, they want to know that we're going to create an environment where that they will have the supply of gas that they need.

When you talk about the magnitude of gas these cracking plants have, you know, it takes a lot of gas. I'm not sure that right now we produce enough gas in this State to operate 2 or 3 cracking plants. In order for them to make that investment they have to know that the supply of gas is going to be here.

Mr. MCKINLEY. I'll leave it at that. My time is up. I'd like to follow it back. Maybe what I'll do with you Senator, get back with both of you and let's see what we can do because there are too many people unemployed.

Mr. MANCHIN. Sure.

Senator MANCHIN. We have time for one more round. I know Senator Capito has to catch a plane. I want to thank her for participating.

Ms. CAPITO. Thank you.

Senator MANCHIN. If we will we'll have one more round here. I'll start.

Secretary Huffman and maybe to Kurt, very quickly, is there adequate or is there a fund set aside for severance tax or the permitting fees that would adequately have a fund that was capable of proper closure and capping of wells. Because you look on that

map, 150,000 wells have been drilled in West Virginia. How many of them have properly been closed/capped?

How many air pollutants are we getting from them that should be taken care of? With this new fine is it going to be possible for us to put a fund together to take care of our past sins and maybe prevent the future ones?

Mr. HUFFMAN. Yes, sir. There is no such fund that I'm aware of that has adequate resources in order to take care of the number of wells out there that are no longer producing. They're abandoned or orphaned that need reclaim by the State.

Senator MANCHIN. Like the AML money?

Mr. HUFFMAN. Yes, sir.

Senator MANCHIN. Like the AML money, abandoned land mine money. We have no abandoned well money?

Mr. HUFFMAN. We do, but it's a small amount. It's not enough to——

Senator MANCHIN. It needs to be a great cash, I mean, for this type of a play coming in to put something properly to take care of that?

Mr. HUFFMAN. It very possibly could be.

Senator MANCHIN. Mr. Dettinger, does the Governor or the Administration have a position on that?

Mr. DETTINGER. I'd like to understand the magnitude of the emissions and the number of wells, you know, help make sure to consult with Secretary Huffman.

Senator MANCHIN. Either one of our delegates have a position on that? Is that being considered in the legislation?

Mr. MANCHIN. No. I mean, what we're trying to do is make sure it doesn't happen in the future. But taking care of the past sins is not yet a consideration.

Senator MANCHIN. We did that with coal mining, our AML money is done by tonnage. I'm just asking is there a consideration because I never knew the magnitude of what we have done in our State.

Mr. MANCHIN. No, but it's a great idea. We are aware. I mean, this is one of the reasons why some of the complaints that we have is are we going to put in place enough bonding and that sort of thing to make sure that they reclaim, that they cap when the time comes, so.

Senator MANCHIN. Thank you.

Mr. MANCHIN. I think we've taken action in that regard.

Senator MANCHIN. Congressman Rahall.

Mr. RAHALL. Just to follow up on Senator Manchin's question in a sense we're establishing new funds here. What about the infrastructure? Are you requiring the companies to repair public roads?

I heard you say, Senator Facemire?

Mr. FACEMIRE. Yes, sir.

Mr. RAHALL. Does that go into a fund that would be dispersed for public road infrastructure repair?

Mr. FACEMIRE. They make an agreement. They go out. They film the road before the job starts. When it's done they film it again. They assess the repair bill. The company has to pay to repair the bill.

They can either do it themselves. They can contract it out or they can just directly pay the Department of Highways to do it.

Mr. RAHALL Are you getting any push back?

Mr. FACEMIRE. No, sir. We're not.

Mr. RAHALL. No push back.

Mr. FACEMIRE. No.

Mr. RAHALL. You?

Mr. MANCHIN. Congressman, there are some additional issues. I mean, that there is discussion and I think it's a great idea that at some point in time we need to designate a portion of our severance money to go into a perpetual trust that we use solely for infrastructure in West Virginia in the future whether it be roads. Because a lot of the roads we're talking about, these are really small roads.

We're not doing anything in terms of US route 79 or other things. Those aren't being factored in. They would be difficult to factor in.

But there is wear and tear on those. We do need to set aside some of that money and put it in perpetual trust and use that interest to improve the roads as well as perhaps other infrastructure projects of which we're in desperate need.

Mr. RAHALL. One last quick question probably to our DEP Director and/or the Governor's Office. Of course we all are hearing many cases of citizen complaints regarding pollution from drilling activities, traffic congestion, land aggregation, etcetera, all of these resulting from new operations in West Virginia.

What would DEP and/or the Governor's Office be doing to alleviate or some avenues through which people can address these concerns? Is there a hotline number or an office of complaints or what avenue do they have?

Mr. HUFFMAN. Congressman, I think the first thing that we needed to do was to establish, you know, the rules of the game which we have a, you know, framework for that in place now with the emergency rules so that we know what is acceptable and what is unacceptable. Right now the process that you're referring—to which you're referring has a—it's a complaint system that where people call in the agency and we direct that to the field representative in order for him or her to investigate. So we don't have anything more formal than that. But other than a resource issue, that system works pretty good.

Mr. RAHALL. Adequately staffed?

Mr. HUFFMAN. I don't think I'll go that far today.

Mr. DETTINGER. One of the other things, Representative, that we need to do is embrace the evolution of best practices and centralize impoundments is one of the ideas that's blossoming in the industry where one large, centralized fresh water impoundment is being used to supply water for multiple operations nearby and that decreases traffic on the roads. So there are some things that are evolving that are taking care of some of these practices and problems.

Senator MANCHIN. Congressman McKinley.

Mr. MCKINLEY. It just seems like from industry or the whole issue is it's convenient for people to say that we don't have the supply here in West Virginia. We'll ship it out. Much like the issue

with the post offices, the volume isn't here so we're going to lose our post offices to someplace else.

We're going to lose our gas to someplace else because they claim maybe we don't have gas, but yet I've talked with several in the industry and they're talking about maybe even shipping our gas over to Ohio. OK?

But why are they shipping the gas from the Utica from Ohio back to West Virginia and creating it here? I'm really am touring the legislature to find ways with tax incentives and opportunities that we've seen in South Carolina when they landed the Boeing and others and the auto sales down in Tennessee, the manufacturing. They offered some terrific incentives for people to locate these jobs here in West—in those respective States.

I just hope there's somehow that you all in West—in the legislature can come up with something to attract that back because there are so many secondary jobs can come from that if you will provide them the incentives to do it. They're going to locate someplace. I'd love it to be in West Virginia. Put our people back to work.

So I ask you in that when you go in your special session if you can look at that to see if there are ways that you can create some incentives with that.

Thank you all very much.

Senator MANCHIN. Let me just thank all of you. It's been an extremely informative panel, very much so. I think everyone has enjoyed it. I know our first 2 panels now, we want to thank both of them.

We're going to take a 5-minute recess. We have a third panel coming back. It's going to be a very, very good panel. Then we'll wrap it up.

But I want to thank you all again. I encourage you to come together as West Virginians always do and work for the betterment of the people of West Virginia.

Thank you.

[RECESS.]

Senator MANCHIN. This is our final panel. We want to thank all of you.

Pat, anybody out there wants to come in, get them in. Round them up, brother.

OK.

I want to introduce you to our witnesses for this final panelists and they include:

Dr. Tom Witt, who is the Director of the Bureau of Business and Economic Research at West Virginia University.

We have Mr. Scott Rotruck, who is Vice President of Corporate Development and State Government Relations for Chesapeake Energy.

We have Mr. Kevin West, who is the Managing Director for External Affairs of EQT Corporation.

We have Mr. Don Garvin, who is a Legislative Coordinator for the West Virginia Environmental Council.

Dr. Witt, we'd like for you to proceed.

STATEMENT OF TOM S. WITT, DIRECTOR, BUREAU OF BUSINESS AND ECONOMIC RESEARCH, PROFESSOR OF ECONOMICS, COLLEGE OF BUSINESS AND ECONOMICS, WEST VIRGINIA UNIVERSITY, MORGANTOWN, WV

Mr. WITT. Thank you, Senator Manchin and Congressman Rahall and McKinley. Thank you for having me here today.

I'm here to discuss the economic impact of the development of the Marcellus shale play in West Virginia. I'm currently the Director of the West Virginia University Bureau of Business and Economic Research, a position I've held since 1985. I'm also a Professor of Economics in the WVU College of Business and Economics.

Since I arrived in West Virginia in 1970 I've had the opportunity to research various dimensions of our State economy ranging from manufacturing coal and chemicals to tourism and bioscience. Most recently our research in the Bureau has focused on the emerging economic development associated with the Marcellus shale play in our State. My testimony today covers the key points from some of our recent studies on this topic as well as providing my perspectives on the future development from this energy resource.

I co-authored a Bureau report, The Economic Impact of the Marcellus Shale Play in 2009 that was released last year. I'd like to take time to highlight some of the key elements.

Since 2002 drilling and development operations in the Marcellus shale play have become an increasing important component of West Virginia's natural gas industry. The development of this play has led to a significant amount of job creation in the industry. It's also raised the average wage level for the industry in comparison to the rest of the State.

In order to quantify the economic importance of this play in West Virginia our report started with publicly available data on the natural gas industry that we obtained from Federal and State statistical agencies. Our starting point was the use of the North American Industrial Classification Sector definitions for the oil and natural gas industry which encompasses the following sectors: oil and gas extraction, drilling oil and gas wells, support activities for oil and gas operations, natural gas distribution, oil and gas pipeline and related structures construction, oil and gas field machinery and equipment manufacturing and pipeline transport of natural gas.

These categories cover all aspects of the natural gas extraction processing and transportation system but I'll show you that's not the whole story.

In our publication we surveyed West Virginia operators to obtain information on their operations in 2009. The responses indicated that the average 139 acres were leased per well for Marcellus shale development at a cost of $914 per acre. This average acreage price estimate from the industry fell in line with lease estimates found on land owner websites such as GoMarcellusShale.com and the Natural Gas Forum for land owners in which land owners indicated that they've been receiving between $300 and $2,500 per acre depending on the area of the State in which their land was leased.

Prior to drilling operators spend, on average, $300,000 per well in location set up according to our survey responses. Drilling for

natural gas in the 2009 in the Marcellus shale costs, on average, about 1.5 million per well and averaged 2 million per well completed.

Now we use these survey results to estimate the total expenditures for Marcellus development and found that they were quite considerable. The estimated economic impacts which are shown in Table 1 of my testimony, show that Marcellus shale development generated 2.35 billion in business volume and approximately 1.16 billion in total value added in the West Virginia economy. In 2009 the economic activities associated with the Marcellus shale development created approximately 7,600 jobs and $298 million in employee compensation.

We also estimated the associated sale—State taxes were approximately $14.5 million and other taxes paid included nearly $66 million in severance taxes and $88.4 million in real and personal property taxes. But our economic impact estimates are conservative since they exclude the impacts associated with bonuses and royalties paid to the mineral owners and also excludes the economic impacts associated with mid stream development pipeline construction and operation within the State necessary for delivery of the natural gas to the ultimate customers.

For this reason we also believe that the study underestimated the economic impact since it does not include the impacts that resulted from the drops in natural gas prices that are paid by West Virginia customers that come about as a result of the development of this unconventional gas playing.

Our study also projected what the economic impact was of future development in the industry based on scenarios that we developed based on responses from the industry. That's reflected in the testimony that I've provided here today.

In addition as others have testified the downstream opportunities associated with the development of crackers and associated chemical industry are fairly considerable. I stand ready to answer any questions you might have.

[The prepared statement of Mr. Witt follows:]

PREPARED STATEMENT OF TOM S. WITT, DIRECTOR, BUREAU OF BUSINESS AND ECONOMIC RESEARCH, PROFESSOR OF ECONOMICS, COLLEGE OF BUSINESS AND ECONOMICS, WEST VIRGINIA UNIVERSITY, MORGANTOWN, WV

Thank you Mr. Chairman and members of the Committee: I appreciate the opportunity to be here today to discuss the economic impact of the development of the Marcellus Shale Play in West Virginia. I am Tom S. Witt, director of the West Virginia University Bureau of Business and Economic Research, a position which I have held since 1985. I am also a professor of economics in the WVU College of Business and Economics. Since I arrived at WV in 1970, I have had the opportunity to research various dimensions of our state's economy, ranging from manufacturing, coal and chemicals to tourism and biosciences. Most recently our research in the Bureau has focused on the emerging economic development associated with the Marcellus Shale Play in our state.

My testimony today covers the key points from our recent studies on this topic as well as providing my perspectives on the future potential from the development of this energy resource.

ECONOMIC IMPACT OF THE MARCELLUS SHALE PLAY IN 2009

I co-authored a Bureau report, Economic Impact of the Marcellus Shale Play in 2009, that was released in December 2010.[1] I would like to take this time to highlight some of the key elements of this report.

Since 2002, drilling and development operations in the Marcellus Shale play have become an increasingly important component of West Virginia's natural gas industry. The development of the Marcellus Shale play has led to a significant amount of job creation in the state's natural gas industry and has also raised the average wage level for the industry in comparison to the rest of the state.

In order to quantify the economic importance of the Marcellus Shale play in West Virginia, our report started with publicly available data on the natural gas industry from state and federal statistical agencies. Our starting point was the use of NAICS sector definitions for the oil and natural gas industry, which encompasses the following sectors[2]:

- NAICS 211: Oil and gas extraction
- NAICS 213111: Drilling oil and gas wells
- NAICS 213112: Support activities for oil and gas operations
- NAICS 221210: Natural gas distribution
- NAICS 237120: Oil and gas pipeline and related structures construction
- NAICS 333132: Oil and gas field machinery and equipment manufacturing
- NAICS 486210: Pipeline transportation of natural gas

These NAICS categories capture all aspects of the natural gas extraction, processing and transportation system; however, as we'll soon see this is not the total story.

We surveyed West Virginia operators to obtain information on their operations during 2009. The responses indicated that on average 139 acres were leased per well for Marcellus Shale development at a cost of $914 per acre. This average acre price estimate from the industry falls in-line with lease estimates touted on landowner websites, such as GoMarcellusShale.com and the Natural Gas Forum for Landowners, in which landowners indicate that they have been receiving between $300 and $2,500 per acre depending on the area in the state in which their land was located.

Prior to drilling, operators on average spent $300,000 per well in location setup according to survey responses. Drilling for natural gas in the Marcellus Shale for 2009 in West Virginia cost, on average, $1.5 million per well and averaged $2 million per well completed.

We used these survey results to estimate the total expenditures for Marcellus Shale development in 2009. Total expenditures for the 383[3] Marcellus Shale wells drilled in West Virginia in 2009 were estimated at $1.5 billion[4]. Drilling and well completion expenditures accounted for approximately 87 percent of total expenditures.

The total estimated impact of the Marcellus Shale development on the West Virginia economy in 2009 was developed using the IMPLAN modeling software. As shown in Table 1, Marcellus Shale development generated $2.35 billion in business volume and approximately $1.16 billion in total value added in the West Virginia economy. In 2009, the economic activities associated with the Marcellus Shale development created approximately 7,600 jobs and $298 million in employee compensation. Assorted state taxes (sales, use, personal income, corporate net income, and business franchise taxes) associated with Marcellus Shale development totaled $14.5 million. Other taxes paid include $65.9 million in severance taxes and $88.4 million in real and personal property taxes.

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[1] Amy Higginbotham, Adam Pellillo, Tami Gurley-Calvez and Tom S. Witt. The Economic Impact of the natural Gas Industry and the Marcellus shale Development in West Virginia in 2009, WVU Bureau of Business and Economic Research, December 2010. Available at www.bber.wvu.edu.

[2] The North American Industry Classification System (NAICS) classifies establishments by their primary type of activity. Further information regarding NAICS can be found at http://www.naics.com.

[3] Source: West Virginia Geological and Economic Survey http://www.wvgs.wvnet.edu/www/datastat/devshales.htm)

[4] Note that the economic impact of the Marcellus Shale in West Virginia did not include expenditures for bonuses and royalties to landowners, exploration, pipeline, processing, royalties or severance taxes. Data for these expenditures were not available but if added would increase the economic impact on the state.

Table 1: Economic Impact of Marcellus Shale Development in West Virginia 2009			
	Direct	Indirect & Induced	Total
Business Volume (millions 2009$)	$1,500.0	$850.0	$2,350.0
Employee Compensation (millions 2009$)	$145.2	$152.7	$297.9
Employment (jobs)	3,600	4,000	7,600
Total Value Added (millions 2009$)	$839.0	$317.7	$1,156.7
Assorted Other State Taxes[1] (millions 2009$)			$14.5
1: Assorted Other State Taxes include personal, corporate net income, business franchise, sales and use taxes Note: Rows may not equal due to rounding.			

Our economic impact estimates are conservative, however, since they exclude the impacts associated with bonuses and royalties paid to mineral owners. It also excludes midstream gathering, processing and pipeline construction and operation within the state necessary for the delivery of natural gas to ultimate customers. The estimate also excludes the impacts on West Virginia business and consumer budgets resulting from the significant drop in the price of natural gas from earlier period that resulted from the development of these unconventional gas resources.

ECONOMIC IMPACTS FROM FUTURE MARCELLUS SHALE PLAY DEVELOPMENT

The continued development of the Marcellus Shale represents a game changer for our state's economy. Our report provided estimates of these impacts for the period 2010 thru 2015 that were again estimated using the IMPLAN modeling software and responses to a survey of West Virginia industry operators. These operators were asked to provide growth estimates for each year (2010-2015) based on 2009 EIA forecasted average wellhead price for natural gas. Based upon these responses three levels of growth were projected and analyzed in more detail: no growth (i.e. same level of development each year as there was in 2009), 5 percent growth each year, and 20 percent growth each year.

The future economic impacts under these three different growth scenarios are shown in Table 2. The levels of employment and employee compensation impacts vary greatly by not only the year but also by range of growth per year. The employment impact of Marcellus Shale development for 2010 was estimate at between 7,600 and 8,500 additional jobs depending upon the growth rate. By 2015 the number of additional jobs created in 2015 was estimated to be between 6,600 and 19,600. The employee compensation impacts range from less than $300 million each year with no growth to approximately $890 million in 2015 with 20 percent growth each year.

Table 2: Future Total Economic Impacts of Marcellus Shale Development in West Virginia 2010-2015 (Based on 0, 5, and 20 percent growth in drilling activity each year)					
	Employment (Jobs)			Employee Compensation[1] (millions 2009$)	
	0%	5%	20%	5%	20%
2010	7,600	8,000	8,500	$300	$330
2011	7,400	8,200	10,700	$330	$430
2012	7,200	8,400	12,500	$350	$515
2013	7,000	8,500	14,500	$360	$615
2014	6,800	8,600	16,900	$380	$740
2015	6,600	8,800	19,600	$400	$890
1: Note that zero growth in 2009 dollars will be the same impact for each year.					

As indicated earlier in my testimony, these impacts are conservative. We are continuing our research on the industry and hope to have updated estimates of its economic contribution soon.

One of the most exciting opportunities from the development of the Marcellus Shale play is the opportunity to use the resulting ethane extracted from the gas stream to attract ethane crackers and associated petrochemical investments back to West Virginia. Earlier this year the American Chemistry Council released a study on the downstream economic impacts associated with new petrochemical production that would make use of the ethane associated with the methane in the wet gas por-

tions of the Marcellus Shale play[5]. This analysis indicated that the economic impact associated with the construction and operation of a new 1.0 million metric ton per year world-class ethylene cracker as well as affiliated polyethylene and other downstream derivative plants. A $3.2 billion investment in an ethylene complex would generate a total of $4.8 billion in additional chemical industry output and 12,000 permanent jobs.

Last week we released our annual West Virginia economic outlook forecasts covering the period 2011-2016[6]. Over this period we project continued growth in employment in the natural gas industry, offsetting employment declines in the coal industry. If the potential of the Marcellus Shale play is realized and downstream development materializes, I anticipate even greater economic growth across a wide range of industries for the foreseeable future. Besides the additional employment and earnings above the statewide averages, West Virginians will benefit from the continued low natural gas prices and state and local tax revenues paid. Future development of the Utica Shale play within the state will only add to the economic contributions associated with this resource. In short, shale gas development is a great economic development opportunity for West Virginians.

CONCLUSION

I am happy to answer any questions that you may have.

Senator MANCHIN. Thank you.

Mr. Rotruck.

STATEMENT OF SCOTT ROTRUCK, VICE PRESIDENT, CORPORATE DEVELOPMENT, CHESAPEAKE ENERGY CORPORATION, OKLAHOMA CITY, OK

Mr. ROTRUCK. Thank you, Senator Manchin. Thank you, Representative Rahall. Thank you, Representative McKinley. It's a privilege and an honor to be here today with you.

I want to discuss the enormous economic and environmental potential of natural gas production from the Marcellus shale in our home State of West Virginia. What the U.S. now considers the Saudi Arabia of natural gas, Senator Manchin, as you said announcing this field hearing, we're in a unique position of strength for this resource. Companies like Chesapeake are excited to be leading the way with other leaders in the industry staying highly focused, committed to the safety of our employees, our contractors, our communities and the environment.

I am Scott Rotruck, Vice President for Corporate Development for Chesapeake Energy. Our company is the second largest producer and most active driller of clean burning natural gas in the United States, as well as a top 15 producer of natural gas liquids and oil. Chesapeake has about 12,000 employees.

I am a native West Virginian. I'm one of 700 West Virginians who work for Chesapeake. We have offices in Jane Lew and Charleston all focused on the Marcellus.

Today we have about 175 rigs running across the Nation, 7 in West Virginia. We hope to have 9 by January, totaling about 30 in the Marcellus.

The natural gas industry has and can continue to be a great economic impact on our State. The industry employs thousands of West Virginians and more than 19,000 additional jobs could be cre-

[5] American Chemistry Council, Shale Gas and New Petrochemicals Investment, available from http://www.americanchemistry.com/shalegasimpact.

[6] George W. Hammond, West Virginia Economic Outlook 2012, available from the West Virginia University Bureau of Business and Economic Research, www.bber.wvu.edu. These forecasts have been incorporated Executive Budget that have been submitted by five governors to the West Virginia Legislature.

ated by 2015 according to West Virginia University's study. We have 187 West Virginia vendors on our approved list, hiring locally and having an impact on communities.

Areas of the State that have been experiencing higher unemployment are now seeing real success. In Wetzel County which had an unemployment rate of 16.3 in January and 11.9 now, boast Litman Excavating and Construction Company, a small company owned by New Martinsville resident Bob Litman. His employment has gone from 17 to 105.

With this activity comes a great commitment to safe and responsible development. Our industry has evolved significantly, technologically to do so. At Chesapeake we use state-of-the-art technology and resources that enable us to drill more accurately and precisely.

West Virginia also has many other wonderful assets that can help us advance our industry, including the National Energy Technology Lab and West Virginia University which has one of the few petroleum engineering programs east of the Mississippi. Our industry has known about the existence of natural gas in deep shales because that was a source rock for all the shallow gas has been drilled. But advancements in horizontal drilling and hydraulic fracturing have unlocked these vast new resources.

Horizontal drilling is the process of drilling vertically and then directionally approaching the target formation on a horizontal plane. It is a great innovation as we move toward the sweet spot of the rock. The second advancement that makes the shale revolution possible is hydraulic fracturing or fracking which has been utilized since 1940s but has become more and more sophisticated. It is very important to reiterate that these deep shale formations exist thousands of feet below the land surface and separated from freshwater supplies by layers of steel casing protected by concrete barriers as well as millions of tons of solid rock geologic formations above.

One issue that has arisen in recent times is the concern over additives used in the process like EQT here today, Chesapeake is a proud participant in FracFocus.org, a public registry where operators post their chemicals used in the hydraulic fracturing mix. Education on all issues associated with energy development is one of the things our industry has been too slow to do with this supply revolution. Not just for communities where we operate but for policymakers and leaders, like yourself. We are going to continue to do better in getting our message out.

We are committed to the highest standards of environmental at Chesapeake. While no energy source is without impact, we work every day to improve our industry leading practices by integrating our core values, protecting the environment, striving for operational excellence, continuously seeking ways to improve practices and to minimize our footprint. Fortunately today's shale gas is no longer just a potential. It has indeed become a game changer.

Institutions like MIT and the U.S. Energy Information Agency have all confirmed there is abundance. As you can see shale gas extraction has changed the economic and energy picture in States like West Virginia. We also realize that with this leadership comes responsibility. We take it seriously.

We'll continue to be committed to the highest standards in all areas.

Senator Manchin, thank you very much for the opportunity to be here today.

[The prepared statement of Mr. Rotruck follows:]

PREPARED STATEMENT OF SCOTT ROTRUCK, VICE PRESIDENT, CORPORATE DEVELOPMENT, CHESAPEAKE ENERGY CORPORATION, OKLAHOMA CITY, OK

Thank you, Senator Manchin, for the opportunity to discuss the enormous economic and environmental potential of natural gas production from the Marcellus Shale in our home state of West Virginia. With the U.S. now considered the "Saudi Arabia of natural gas," as you said in announcing this field hearing, West Virginia is in a "unique position of strength" with this resource, and companies like Chesapeake Energy are excited to be leading the way—staying highly focused and committed to the safety of our employees, our communities and the environment and our natural resources.

I am Scott Rotruck, Vice President for Corporate Development for Chesapeake Energy Corporation. Our company is the second-largest producer and most active driller of clean natural gas in the United States, as well as a top 15 producer of natural gas liquids and oil. No company knows more about producing these domestic resources than Chesapeake, and we are proud of the leadership role we have built and continue to play in developing natural gas and oil from shale plays throughout the country and specifically here in West Virginia.

While Chesapeake is headquartered in Oklahoma City with about 12,000 employees nationwide, I am a native West Virginian and live in Morgantown. As such, I am one of nearly 700 West Virginians employed by Chesapeake. Our offices here in Jane Lew and Charleston (and likely the northern panhandle soon) are focused on the development of what we believe may be one of the world's largest natural gas deposits, underlying parts of West Virginia, Pennsylvania, New York and other Appalachian states, which—as we know well today—is called the Marcellus Shale.

First, let me begin by providing some additional background on Chesapeake Energy. Today, we have about 175 rigs operating across the country of the approximately 2,000 total rigs—with seven of our 175 operating in West Virginia and 28 in the Marcellus Shale.

Chesapeake was one of the early entrants into the major natural gas shale basins, including—in addition to the Marcellus where we hold about 1.8 million acres of leasehold (net)—the Barnett Shale in north-central Texas, the Fayetteville Shale in north-central Arkansas (though we have since sold this), the Haynesville Shale in Louisiana and East Texas and the Bossier Shale in Louisiana. Today, we are also a key player in liquids-rich like the Eagle Ford Shale in south Texas and the Utica Shale in Ohio, Pennsylvania and other eastern states.

We are very proud that our company is America's leader in high-potential deep shale gas exploration and production, and we are excited about what this can mean to West Virginia and America's energy future and security.

As you know, the natural gas industry has and can continue to have a great economic impact on our state. Today, the industry employs 32,000 West Virginians, and more than 19,000 additional jobs could be created by 2015, according to a West Virginia University study. Chesapeake alone has 187 West Virginia vendors on our approved vendor list, hiring locally and having an economic impact on communities where they operate.

Thanks to our industry, areas of the state that have been experiencing higher unemployment are now seeing real success stories. In Wetzel County, Litman Excavating and Construction, a small company owned by New Martinsville resident Bob "Boo" Litman, has seen his company's employment grow more than 400 percent from just 17 employees to about 105 due to Marcellus Shale activity, and as he told New Martinsville's City Council, "we need more."

With this activity comes a great commitment to safe and responsible development, and our industry has evolved significantly over the years and decades with great technological advancements to make natural gas production truly a manufacturing process.

At Chesapeake, we use state-of-the-art technology and resources that enable us to drill more accurately and precisely. Our Reservoir Technology Center allows us to generate on-site core analysis. We also have our own 3-D seismic visualization center where we can display robust and vivid subsurface images, making it possible for our geologists to pinpoint natural gas prospects miles below the surface. Our company has an unparalleled inventory of more than 30 million acres of 3-D seismic

data, as well as U.S. onshore leasehold of about 15 million acres. In short, we believe no other entity has more knowledge about America's subsurface as it relates to natural gas than Chesapeake.

West Virginia also has wonderful assets that can help us advance our industry, including the National Energy Technology Lab (NETL), based in Morgantown, as well West Virginia University, which has one of the few petroleum engineering programs west of the Mississippi.

The rest of the energy industry is now investing heavy dollars into shale prospects. Chesapeake, for example, has attracted billions of dollars in our company in recent years, including deals with Statoil, BP, Total, BHP Billiton and others. You see the "major" integrated companies for the first time in many years really investing in the U.S., including ExxonMobil's purchase of XTO in 2010.

To provide some background about this supply revolution, our industry has known about the existence of natural gas in deep shale formations for many years. Unfortunately, we did not know how to economically extract the gas in commercial quantities from this very hard, non-porous and low-permeability sedimentary rock.

Then along came the Barnett Shale in the Dallas-Fort Worth area of Texas. George Mitchell pioneered the Barnett Shale play starting in the 1980s. After combining hydraulic fracturing with horizontal drilling techniques while natural gas prices rose off their lows, the play took off in 2003, and today, is the most prolific producing natural gas field in the country.

Horizontal drilling is the process of drilling vertically and then directionally approaching the target formation on a horizontal plane at an "entry point." In some cases, the horizontal portion of the well bore extends beyond a mile. While not a new process, horizontal drilling has greatly advanced over the years.

Modern horizontal drilling can make a near 90-degree turn with the drillbit, which allows much increased exposure of the drillbit to the "sweet spot" of a geologic formation and the ability to extract much greater quantities of natural gas than a vertical well because the horizontal well bore exponentially increases contact with the target formation. In addition, it can provide a much more environmentally friendly technique because the number of surface locations is dramatically reduced, thus minimizing the surface footprint. It also allows us to safely drill in urban areas such as Fort Worth, Texas, near Shreveport, Louisiana and in other heavily populated areas where surface locations and surface disturbances need to be minimal.

The second advancement that makes this shale revolution possible is hydraulic fracturing, or "fracking," which has been utilized commercially since the 1940s and is now used on nearly all producing natural gas wells drilled. Performed after a well has been drilled, this process creates fissures in very tight shale formations deep underground, many thousands of feet below the surface and freshwater aquifers. Water and sand, which is a "proppant," are pumped down the wellbore at high pressure to fracture the rock, so natural gas will flow into the wellbore while the proppant serves to prop and keep open those fractures. In addition to these primary elements a very small percentage of other additives is used in the fracturing mixture to protect target formations and increase recoveries.

It is very important to reiterate that these deep shale formations exist thousands of feet below the land surface and are separated from freshwater supplies by layers of steel casing, protected by concrete barriers as well as millions of tons of hard, dense solid rock geologic formations.

One issue that has arisen in recent years is the concern over chemicals used in the process. Like EQT here today, Chesapeake is a proud participant in www.fracfocus.org, a public registry where operators post chemicals used in hydraulic fracturing on a well-by-well basis. In fact, we have been disclosing our chemicals since 2009. Today, Chesapeake is working with the Environmental Protection Agency (EPA) on its hydraulic fracturing study—we have offered a prospective site for this study—which is scheduled to have initial research results by the end of 2012 and a final report released in 2014. Our highest priority is a science-based and balanced report.

Education on all the issues associated with energy development is one of the things our industry has been too slow to do with this supply revolution, not just for local communities and states but policymakers and leaders like yourself. At Chesapeake, we have certainly tried to change that in recent years by leading the way—not just by disclosing hydraulic fracturing chemicals, but also on issues like road use and truck traffic, water use and noise.

For instance, in West Virginia in the past several years, we have hosted meetings with residents most affected by our activities to listen to their concerns and share our plans. Through our experience with these Community Advisory Panels in drilling areas, we have negotiated solutions on issues like school bus travel, noise, and road use. It is no secret that our activity takes a toll on roads, and so we have in-

vested $70 million on rebuilding roads in the state—in many instances returning them to a condition better than we found them.

We are committed to the highest standards of environmental excellence at Chesapeake. While no energy source is without impact, we work every day to improve our industry-leading practices by integrating our core values—protecting the environment and natural resources; striving for operational excellence; continuously seeking ways to improve our practices and minimize our footprint; supporting robust science-based regulation at the appropriate levels of government; community focus and involvement; and a commitment to human, physical and financial capital to achieve and maintain those core values. These values are vital to our operational structure, and we expect the same commitment from our partners, contractors and vendors.

I will conclude with some comments about what all this can mean for our state and our nation. Interestingly, the last time someone from Chesapeake spoke on a related issue before a Congressional panel was in June 2009, when a former Chesapeake colleague, also from West Virginia, testified on the issue of "shale gas potential" before a House Natural Resources subcommittee. Even with all the enormous potential then, it is amazing how much has even changed—just a little more than two years later.

That same year, the U.S. surpassed Russia as the largest producer of natural gas in the world. Moreover, companies like ours have now discovered additional natural gas and oil fields across the country, including, for instance, the Utica Shale in Ohio and other Eastern and Midwestern states.

Today's widely recognized natural gas supply abundance is even more amazing considering that, less than a decade ago, the U.S. was facing difficult energy and economic decisions based on natural gas scarcity.

Then, our manufacturing and chemical facilities were moving offshore—as you know, chemical companies use large amounts of natural gas as a feedstock and a fuel—agriculture was facing steep fertilizer prices due to higher natural gas prices, affected Americans were facing high home heating costs, and we were importing more and more foreign oil for transportation, posing continued national security concerns. The broad effects of this then-natural gas supply scarcity demonstrates the wide variety of uses for natural gas, which represents about 23 percent of our power generation mix, in addition to its industrial, commercial and residential uses.

Fortunately, today shale gas no longer just has "potential." It is real, and it is a game-changer not only for America's natural gas industry but also potentially for our nation, our economy and our environment—and possibly the world. Institutions like the Massachusetts Institute of Technology (MIT), the Potential Gas Committee at the Colorado School of Mines and the U.S. Energy Information Administration (EIA) have all continued to reaffirm in recent years the reality of U.S. natural gas supply abundance.

Finally, according to a recent study by Navigant Consulting released just this month, the boom in natural gas development is saving consumers billions of dollars a year, thanks to a supply that keeps outstripping demand and can do so for many decades. According to the report, in West Virginia alone, consumers in 2010 saved $296 million—or 33 percent of their gas bill—versus what it would have been without the new, abundant supply.

As you can see, shale extraction has changed the economic and energy pictures in states like West Virginia, and we are proud to be leading the way. As I said before, though, we also realize that with leadership comes responsibility. Chesapeake takes this responsibility seriously, as an industry, economic and environmental leader, and we will continue to be committed to the highest standards in all areas. That is what Chesapeake expects of our employees, our partners, and our company.

Thank you, Senator Manchin, and I look forward to answering any questions.

Senator MANCHIN. Thank you.

Mr. West.

STATEMENT OF KEVIN WEST, MANAGING DIRECTOR, EQT CORPORATION, PITTSBURGH, PA

Mr. WEST. TThank you, Senator Manchin, Congressman Rahall and Congressman McKinley. EQT appreciates the opportunity to be able to provide this testimony at this field hearing this morning.

EQT is truly an Appalachian based natural gas producer. We've been headquartered in Pittsburgh for over 120 years. Have been operating in West Virginia for over a century.

We have 427 employees in West Virginia. It is estimated we're responsible for almost 500 additional jobs related to our operations. We have over 5,000 natural gas wells and 5,100 miles of pipeline in West Virginia. Have drilled 27 horizontal wells in West Virginia thus far in 2011 with that number projected to reach 33 by year's end.

As many of the distinguished witnesses on the panel have testified this morning, West Virginia's abundant natural gas reserves provide the State with a tremendous economic opportunity. EQT and other natural gas producers in West Virginia are keenly aware of that with the opportunities that natural gas provides the State come the responsibility to be dedicated environmental stewards. Just as important as accessing this clean energy resource is making sure that we place safety first.

The vast increases in our domestic natural gas resources over the last few years have been made possible by 2 technologies that have been improved in recent years to the point where we are now able to tap into deep supplies of natural gas like the Marcellus shale that were once thought to be inaccessible.

The first of these technologies is horizontal drilling. This process is exactly what it sounds like. A vertical hole is drilled that turns horizontally over a mile below the surface and then extends laterally. This is an important advancement because it allows multiple wells to be drilled from a single well pad significantly reducing the overall environmental impact of drilling activities by giving access to more of the natural gas formation underground from a lesser amount of surface above the ground.

The other improved technique that is allowing natural gas producers to tap into new supplies of natural gas is hydraulic fracturing. Hydraulic fracturing takes place more than a mile below the Earth's surface and several thousand feet below any water sources. Hydraulic fracturing is minimally invasive and involves drilling a small hole that is lined with 3 layers of steel encased in cement to protect any fresh water supplies and allow for the safe extraction of natural gas. Then pressurized water, sand and additives are used to create small, often millimeter thick fissures in carefully targeted sections of the shale rock.

In addition to ensuring that no water sources are impacted during the drilling and hydraulic fracturing process EQT and other West Virginia producers have developed comprehensive spill prevention plans to minimize the risk that any water source will be affected by natural gas surface operations.

In the interest of providing the public with all of the facts about hydraulic fracturing in August 2010, EQT began posting on its website the contents of the hydraulic fracturing solution for each well we drill along with a broad range of industry participants including Chesapeake, EQT supports FracFocus.org, a public data base of hydraulic fracturing fluids developed by the Ground Water Protection Council and their Interstate Oil and Gas Commission.

Governor Tomblin, Secretary Huffman and their staffs have and continue to ensure that natural gas operations are conducted in a safe and environmentally responsible manner. They possess the expertise to ensure that West Virginia's natural resources are not damaged by natural gas production. State level enforcement is con-

sidered critical because drilling practices are customized to the unique geological characteristics of different parts of the country.

EQT looks forward to continue to work with West Virginia State regulators and with the general assembly so that West Virginia can reap the benefits of natural gas production without any fear that its other abundant natural resources will be disturbed. Natural gas presents one of the most significant opportunities ever for West Virginia economic development. The State has and will benefit from the jobs natural gas production creates, the ability to attract to West Virginia industries that use natural gas as a fuel source or seed stock and cheaper energy and fuel costs for its citizens.

EQT has been in West Virginia for more than 100 years. We're here for the long haul. We look forward to working with the rest of the natural gas community in West Virginia to help the State take advantage of this tremendous opportunity.

Thank you, Senator.

[The prepared statement of Mr. West follows:]

PREPARED STATEMENT OF KEVIN WEST, MANAGING DIRECTOR, EQT CORPORATION, PITTSBURGH, PA

Good morning, I am Kevin West, Managing Director of External Affairs for EQT. EQT appreciates the opportunity to provide testimony to the Committee this morning.

EQT is truly an Appalachian based natural gas producer. We have been headquartered in Pittsburgh for over 120 years and have been operating in WV for over a century. We have 427 employees in West Virginia and it is estimated we are responsible for almost 500 additional jobs related to our operations. We have 5,288 natural gas wells and 5,100 miles of pipeline in West Virginia and have drilled 27 horizontal wells in West Virginia thus far in 2011, with that number reaching projected to reach 33 by year's end.

It has been conservatively estimated that there are between 98 Tcf and 150 Tcf of Marcellus reserves in West Virginia. This abundant natural resource presents West Virginia with a tremendous economic opportunity. In a time of economic downturn, the natural gas community is actually adding jobs. Studies examining the economic impact of natural gas production in West Virginia estimate that natural gas production in the state accounts for 7,600 jobs and total annual added revenues to the state's economy of a billion dollars. These same studies have projected that with steady growth at least 6,600 new jobs will be created by 2015. Development of the Marcellus Shale has enabled West Virginia to be the only state east of the Mississippi River that is a net exporter of natural gas.

EQT and other West Virginia natural gas producers are keenly aware that, with the opportunities that natural gas provides the state come the responsibility to be dedicated environmental stewards. Just as important as accessing this clean energy resource is making sure we place safety first.

The vast increases in our domestic natural gas supplies over the last few years have been made possible by two technologies that have been improved in recent years to the point where we are now able to tap into deep supplies of natural gas like the Marcellus Shale that were once thought to be inaccessible.

The first of these technologies is horizontal drilling. This process is exactly what it sounds like, a vertical hole is drilled that turns horizontally over a mile below the surface and then extends laterally. EQT's average lateral is approximately 5,000 feet and we have drilled laterals that extend as far as 9,000 feet. This is an important advancement because it allows multiple wells to be drilled from a single well pad significantly reducing the overall environmental impact of drilling activities by giving access to more of the natural gas formation underground from a lesser amount of surface wells above ground. Thanks to horizontal drilling, today's average well site is just 30 percent of the size of its 1970s counterpart and can access 60 times more below-ground area. Continued technological advancements mean fewer wells are recovering even greater reserves and creating less surface disturbance and waste.

The other improved technique that is allowing natural gas producers to tap into new supplies of natural gas is hydraulic fracturing. Hydraulic fracturing takes place more than a mile below the earth's surface, and several thousand feet below any

water sources. EQT has conducted micro-seismic testing, which revealed that from the surface down as deep as 5300 feet there was no impact caused by hydraulic fracturing.

Hydraulic fracturing is minimally invasive and involves drilling a small hole that is lined with three layers of steel encased in cement to protect any fresh water supplies and allow for the safe extraction of natural gas. Then pressurized water, sand and additives (less than one percent of the overall mixture) are used to create small, often millimeter-thick fissures in carefully targeted sections of the shale rock. This releases the natural gas, allowing it to safely rise to the surface within the self-contained system. In addition to ensuring that no water sources are impacted during the drilling and hydraulic fracturing process, EQT and other West Virginia producers have developed comprehensive spill prevention plans to minimize the risk that any water source will be affected by natural gas surface operations.

In the interest of providing the public with all of the facts about hydraulic fracturing, in August, 2010 EQT began posting on its website the contents of the hydraulic fracturing solution for each well we drill. Along with a broad range of industry participants, including America's Natural Gas Alliance, the Independent Petroleum Association of America and the American Petroleum Institute, EQT supports FracFocus.org—a public database of hydraulic fracturing fluids developed by the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission. This state-based registry of hydraulic fracturing fluids includes information on a well-by-well basis for operations on government and private lands.

Governor Tomblin, Secretary Huffman, and their staffs have and continue to ensure that natural gas operations are conducted in a safe and environmentally responsible manner. They possess the expertise to ensure that West Virginia's local air, land and water are not damaged by natural gas production. State-level enforcement is considered critical, because drilling practices are customized to the unique geological characteristics of different parts of the country. The geology of natural gas formations can vary greatly from region to region—even well site to well site in some areas. Each shale, and even different parts of the same shale, possesses unique geological characteristics that require specialized approaches to developing the natural gas found there. Well design, location, spacing, operation, water management and disposal, waste management and disposal, wildlife impacts and surface disturbance are all variables that differ and are accounted for by state-led regulation. EQT looks forward to continuing to work with West Virginia's state regulators so that West Virginia can reap the benefits of natural gas production without any fear that its other abundant natural resources will be disturbed.

West Virginia has also taken a major step toward reducing its dependence on foreign oil by enacting legislation that promotes the use of natural gas vehicles. EQT looks forward to working with the state in providing its citizens with a cheaper, cleaner, American alternative transportation fuel.

Natural gas presents one of the most significant opportunities ever for West Virginia economic development. The state has and will benefit from the jobs natural gas production creates, the ability to attract industry to West Virginia that use natural gas as a fuel source or feedstock, and cheaper energy and fuel costs for its citizens. EQT has been in West Virginia for more than 100 years and is here for the long haul. We look forward to working with the rest of the natural gas community and West Virginians to help the state take advantage of this tremendous opportunity.

Thank you.

Senator MANCHIN. Thank you.

Mr. Garvin.

STATEMENT OF DONALD S. GARVIN, JR., LEGISLATIVE COORDINATOR, WEST VIRGINIA ENVIRONMENTAL COUNCIL, BUCKHANNON, WV

Mr. GARVIN. Thank you, Senator Manchin, Congressman Rahall and Congressman McKinley. My name is Don Garvin. I'm the Legislative Coordinator and Lead Lobbyist for the West Virginia Environmental Council.

We don't drill wells. We have bake sales.

[Laughter.]

Mr. GARVIN. I moved to Buckhannon, West Virginia in 1982 to manage Braxton Oil and Gas, my father's independent oil and gas

production company. We drilled conventional wells primarily to produce natural gas from relatively shallow, geological formations. But Marcellus drilling is not my father's gas patch.

Marcellus shale drilling is gas drilling on steroids. Everything about these unconventional drilling operations is leaps and bounds bigger than conventional gas well drilling. They impact more land. They use more water. They produce more liquid and solid waste and they emit more air pollution.

Marcellus drilling operations are so huge that the impacts are felt far beyond the surface tracks being disturbed. Impacts can occur to public lands, special places, high quality streams, neighboring land owners, local infrastructure and to quality of rural life. It is resulting in what can only be described as the industrialization of rural West Virginia.

The hundreds of large truckloads daily hauling drilling equipment, water, sand and fracturing chemicals and then all the liquid and solid wastes on narrow country roads, huge drilling rigs running 24 hours a day, months on end. It all amounts to a major industrial activity. In areas where this drilling is occurring the very nature and character of rural life is changing.

In West Virginia the problems and conflicts are compounded by our mountainous terrain and by the fact that so many surface owners do not own the minerals under their own land. Therefore have little or no control over what is happening on their property.

The new technologies responsible for this boom in drilling are still largely unregulated. Horizontal drilling and hydraulic fracturing cause an exponential increase in surface disturbance, water use and waste disposal and can pose a serious threat to our land, water and air resources and public health. Eliminating, or at the very least, minimizing those threats is the main concern of the West Virginia Environmental Council.

In the United States the responsibility for regulating the oil and gas industry is largely been delegated to the individual States. So for the last 3 years WVEC has worked cooperatively with the West Virginia DEP as well as the State legislature in efforts to craft a comprehensive State regulatory framework to regulate Marcellus shale drilling that would protect the environment while allowing the drilling to continue. To this date, as you've heard, those efforts have failed largely due to industry opposition.

On the Federal level last week, late last week, the Shale Gas Production Subcommittee of the Secretary of Energy's Advisory Board released its second 90 day report. The report concludes that the subcommittee believes that if action is not taken to reduce the environmental impact accompanying the very considerable expansion of shale gas production expected across the country. There is a real risk of serious environmental consequences causing a loss of public confidence that could delay or stop this activity.

The Subcommittee's report contains 20 recommendations that WVEC broadly supports particularly those dealing with air and water pollution.

I want to draw your attention to the subcommittee's recommendation No. 2 which recommends Federal funding of $5 million a year for 2 existing non-profit organizations, the State Review of Oil and Natural Gas Environmental Regulations known as

STRONGER and the Ground Water Protection Council which is involved in FracFocus. The State review process now conducted by STRONGER is a voluntary program that measures a State's regulatory program against the set of guidelines developed and revised by stakeholders over the last 20 years. I've been a board member of STRONGER since the year 2000. I urge Congress to fund the STRONGER State review process.

Finally the West Virginian Environmental Council supports repeal of the exemptions to Federal law granted to the oil and gas industry and the Energy Policy Act of 2005. These exemptions have weakened the previous safeguards against water pollution from oil and gas exploration under the Clean Water Act, the Safe Drinking Water Act and the NEPA. We urge their repeal.

I, in my written testimony talk about the efforts in the State to craft legislation. I'll be glad to answer questions about that and—or anything you might want to have——

[The prepared statement of Mr. Garvin follows:]

PREPARED STATEMENT OF DONALD S. GARVIN, JR., LEGISLATIVE COORDINATOR, WEST VIRGINIA ENVIRONMENTAL COUNCIL, BUCKHANNON, WV

Senator Manchin, Congressman Rahall, Congresswoman Capito, and Congressman McKinley:

My name is Don Garvin, and I am the Legislative Coordinator and lead lobbyist for the West Virginia Environmental Council (WVEC). I thank the Committee for the opportunity to testify today at this Field Hearing on behalf of WVEC.

I moved to Buckhannon, West Virginia, in 1982 to manage Braxton Oil and Gas, my father's independent oil and gas production company. We drilled conventional wells, primarily to produce natural gas from relatively shallow geological formations. This was not the "oil patch" of tycoons portrayed in the popular television series, Dallas. But it provided my father's family, and several other families, with a comfortable middle-class living. And, yes, we did hydraulically fracture those gas wells.

But Marcellus shale drilling is not my father's "gas patch".

Marcellus shale drilling is gas drilling on steroids. These well sites are gargantuan. Everything about these "unconventional" drilling operations is exponentially leaps and bounds bigger than conventional gas well drilling: they impact more land, they use more water, they produce more liquid and solid waste, and they emit more air pollution.

Marcellus drilling operations are so huge that the impacts are felt far beyond the surface tracts being disturbed. Impacts can occur to public lands, special places, high quality streams, neighboring landowners, local infrastructure, and to quality of rural life.

Of course, the money is also bigger. The Marcellus shale formation is now the second largest field of gas in the world. It is twice the size of the gas fields in Saudi Arabia. Major oil companies are buying up gas resources here. Conventional shallow wells that cost $300,000.00 to drill have given way to 6 to 8 horizontal wells drilled from one well pad. And each horizontal well costs $3 million or more to drill.

The result is a boom in gas drilling the likes of which West Virginia has never seen, and it is resulting in what can only be described as "the industrialization of rural West Virginia." The hundreds of large truckloads daily hauling drilling equipment, water, sand and fracturing chemicals on narrow country roads, huge drilling rigs running 24 hours a day, months on end—it all amounts to a major industrial activity. In areas where this drilling is occurring the very nature and character of rural life is changing—perhaps forever. There can be no dispute that Marcellus shale drilling is bringing economic benefits to the state. At the state level, severance taxes and other revenues are up. And business at the restaurants, gas stations and convenience stores in communities near the activity is booming—just try to get a motel room near by. However, local community leaders and state policy analysts and decision makers are only now beginning to look at the externalized economic costs this activity is bringing to public infrastructure, public health and the environment.

WVEC'S CONCERNS

This new boom in drilling (and the new technologies associated with it) is still largely unregulated.

Horizontal drilling and hydraulic fracturing cause an exponential increase in surface disturbance, water use and waste disposal, and can pose a serious threat to our land, water and air resources, and public health.

Eliminating, or at the very least minimizing, those threats is the main concern of the West Virginia Environmental Council.

In the United States the responsibility for regulation of the oil and gas industry has largely been delegated to the individual oil and gas producing states. And this new boom of shale gas drilling across the nation, enabled by new technologies in horizontal drilling and high-volume hydraulic fracturing, caught most state regulatory agencies off guard.

West Virginia was no exception. WV Department of Environmental Protection (DEP) Cabinet Secretary Randy Huffman has said publicly that his agency was not prepared for this increase in permit activity and has noted that DEP's Office of Oil and Gas needs more funding, more field inspectors, and additional statutory and regulatory tools to deal with the new technologies. For at least three years that office has been operating with a $1 million budget deficit and was until recently unable to fill four of the 17 field inspector positions due to lack of funding.

THE STATE LEGISLATIVE PROCESS

For the last three years WVEC has worked cooperatively with the DEP as well as the State Legislature in efforts to craft a comprehensive state regulatory framework to regulate Marcellus shale drilling that would protect the environment while allowing the drilling to continue.

It began in 2009 with some minor changes proposed by DEP to Rule 35CSR4, the Oil and Gas Well Rules. At that time the industry lobbyists even opposed requiring drilling pits to be lined with synthetic liners. However, the final rule adopted by the Legislature contained language that basically guaranteed the use of the liners.

In 2010 WVEC supported HB 4513, "establishing requirements for Marcellus gas well operations' use of water resources." If it had passed, the bill would have set additional reporting requirements for water withdrawals from streams, the contents of water used for high-volume "slick water" hydraulic fracturing, and where the waste water was to be disposed. The bill would also have required drillers to have plans for handling water withdrawals and waste disposal prior to getting the permit to drill. One of those plans would have covered maintaining minimum instream flows when withdrawing water. But the bill died in conference committee on the final night of the session, again due to industry objections.

Also in 2010 WVEC participated with DEP stakeholder meetings as the agency began a programmatic review of its oil and gas regulatory program. Later that year I served on DEP's Marcellus Task Force, along with Dave McMahon with the WV Surface Owner's Rights Organization (WVSORO), Ted Streit with the WV Land and Mineral Owners Association, and eight or nine industry representatives. Basically, the task force was a discussion group used by DEP as a sounding board for developing proposed legislation.

Then in 2011 DEP submitted its proposed Marcellus shale regulatory bill to the Legislature (HB 3042 and SB 424), and the Joint Judiciary Interim Committee submitted its proposed bill, the Hydraulic Fracturing and Horizontal Drilling Gas Act (HB 2878 and SB 258). The Senate passed a pared down version of the DEP bill, SB 424, while the House was continuing to work on the Judiciary Committee bill, HB 2878. Eventually, House committees passed a committee substitute version of SB 424, but the bill was not voted on by the full House. So the bill died.

That brings us to where we are today. After the regular session, Governor Earl Ray Tomblin said publicly that if the two chambers could agree on a Marcellus regulatory bill, he would call the Legislature into Special Session to pass the bill. So, during the June Interim Committee meetings, the Joint Committee on Government and Finance created a Select Committee on Marcellus Shale comprised of five Delegates and five Senators and charged it with attempting to come up with a bill. The Select Committee agreed to begin with the version of SB 424 that was passed by the Senate during the regular session. At the time of this writing, the Select Committee has adopted 27 amendments to the bill, with four amendments pending. It is still not clear whether there is general overall support for the amended bill, and with the holidays upon us, it is looking less and less likely that there will be a Special Session.

The West Virginia Environmental Council has been, and will continue to be, actively involved in the state legislative process. As you might expect, we have devel-

oped our own list of "essential elements" that should be contained in an effective state regulatory bill. We have shared this list with both the DEP and the Legislature. I have attached that list at the end of this document.

FEDERAL REGULATION

While the responsibility for regulation of the oil and gas industry has largely been delegated to the states, a broad array of Federal environmental laws provides the blanket for state regulation. However, since the 1980's specific executive administrations, with the support of the U.S. Congress, have granted exemptions to the oil and gas industry from several major environmental laws. The result has been weakened federal laws, a patchwork of differing state laws and regulatory programs, and little oversight by the federal government until recently.

For example, the oil and gas industry enjoys an exemption granted by Congress from the Resource Conservation and Recovery Act (RCRA). This statute gives the EPA the authority to control hazardous wastes from "cradle to grave" including the generation, transportation, treatment, storage, and disposal of hazardous waste (USEPA). Essentially, this exemption precludes all fluids used by industry for oil and gas drilling exemption from being regulated as hazardous wastes. This exemption was granted in the late 1980's.

As a more recent example, in the "Energy Policy Act of 2005" Congress granted the industry numerous adjustments to and exemptions from federal laws. These changes have weakened the previous safeguards against water pollution from oil and gas exploration contained in three of the major pieces of federal environmental law that protect our waters in the United States:

> The first of these 2005 changes totally exempted oil and gas field activities from the storm water runoff provisions of the federal Clean Water Act. However, at least one federal court has thrown out this exemption, but the case is still under litigation.
>
> Secondly, the 2005 Energy Policy Act contained three weakening provisions to the federal Safe Drinking Water Act (SDWA): it completely exempted hydraulic fracturing procedures from SDWA regulation; it allowed for the voluntary cessation of the use of diesel fuel in fracking fluid instead of banning it; and it exempted flow back water from regulation if disposed via underground injection wells unless it contained diesel fuel.
>
> Thirdly, the 2005 Energy Policy Act gave the industry an exemption from the environmental assessment requirements of the National Environmental Policy Act (NEPA). The NEPA requires an environmental assessment to be conducted before any major projects on federal public lands are undertaken that could possibly impact the environment and also provides an opportunity for public interaction though a comment process. Instead, the 2005 Energy Policy Act, however, granted various oil and gas industry operations a created a "categorical exclusion" under the Interior and Agricultural Departments. Granting this "categorical exclusion" means that less strict assessments are now required for oil and gas operations on federal lands, reduces the opportunity for public involvement though the NEPA process, and shifts the burden of proof for the need for additional analysis of these projects from the agency to the public.

The West Virginia Environmental Council supports the removal of the exemptions granted under the 2005 Energy Policy Act.

Again, thank you for the opportunity to provide testimony today.

ATTACHMENT.—ESSENTIAL ELEMENTS OF AN EFFECTIVE MARCELLUS REGULATORY BILL

PUBLIC NOTICE OF PERMIT APPLICATIONS

Every permit application to drill a horizontal well should be officially noticed to the public (via newspaper ads, etc.), and should include a 30-day public comment period (this is in addition to all the appropriate notice provisions to surface owners and others).

Water: Regulation from "Cradle to Grave"

- Water Withdrawals.—WV should implement a permit system for large volume water withdrawals in order to maintain minimum in-stream flows. This is necessary to protect both aquatic life and downstream users.
- Water Content.—WV should require an initial listing of chemicals to be used in fracturing a well in the permit application, and a complete listing of the ac-

tual chemicals used, and the amounts, should be filed with the completion report and be available to the public.
- Wastewater Disposal.—The operator should be required to measure and report both the volume of water used to frac a well, and the volume that returns as flow-back water. WV should require the use of a "closed loop" system for large volume fracs. Flow-back water should not be stored in temporary impoundments or pits. Drilling pit wastewater should be disposed of in the same manner as flow-back water (no land application). The operator must maintain an appropriate evidentiary record tracking the disposal of all wastewater. WV should also prohibit the disposal of oil and gas well wastewater in underground mines.

Source Water Protection

- There should be a minimum 150' buffer zone to distance all oil and gas drilling activities from stream channels and wetlands.
- No horizontal well should be drilled within 2,500 feet of a surface water source that serves a public water system.
- All fresh water and flowback water impoundments, and all drilling pits should be constructed with a dual liner system with a leak detection system installed between the two liners.
- WV should end the practice of burying drilling pits on site. All drilling pit liners and drill cuttings should be removed and disposed of at licensed hazardous waste landfills.
- The operator should test all flow-back water and drill cuttings for the presence of naturally occurring radioactive materials (NORMs).
- All drill site reclamation, including pits, impoundments, roads and pipelines, must be timely and prevent the erosion and sedimentation of fresh water streams and wetlands.

Groundwater Protection

- No horizontal well should be drilled within 1,000 feet from any existing building or existing water well without the written consent of the owner.
- No horizontal well should be drilled within 1,000 feet of a groundwater source that serves a public water system.
- The operator should be required to perform a "pre-drilling" test of all water wells and freshwater springs within 5,500 feet of the bore hole, and provide copies of the test results to the landowner. These tests must be conducted by a certified lab, and include testing for chemicals or chemical compounds known to be commonly used for hydraulic fracturing.
- The operator should be automatically required to replace damaged or lost groundwater supplies located within 2,500 feet of the well.
- An oil and gas inspector should be present during each phase of cementing well casings.

PERMIT FEES AND WELL BONDS

The increase in drilling activity has left the agency in the position of lacking both the funds and the staff to adequately review, evaluate and issue permits, observe field activities and perform compliance monitoring. The permit fee for drilling a horizontal well should be set at a minimum of $10,000 per well. In addition, a $25,000 individual bond should be required for each horizontal well (no "blanket bonds"). Additional fees should be established for modifying a well work permit, reclamation, and annual inspections.

INSPECTORS

The Oil and Gas Inspectors' Examining Board, which has been historically dominated by the regulated industry, should be eliminated. In its place, the agency should be given the authority to hire inspectors under the civil service system, with an appropriate training program and a six-month probationary period.

Additional Protections for Surface Owners

- Pre-permit notice for the surface owner. The notice should include copies of applicable statutes and rules and an offer to meet with the surface owner before coming onto the land.
- Pre-permit incentives to encourage the operator to work with the surface owner on planning where and how well sites and access roads will be built and reclaimed.
- Improvements to damage compensation procedures and standards.

SEISMIC EXPLORATION

WV needs a statute and rules regulating geophysical seismic testing.

Some Useful Links

WV Surface Owners' Rights Organization (split estate issues): http://www.wvsoro.org/

Wetzel County Action Group (air quality and other drilling issues): http://www.wcag-wv.org/Default.htm

West Virginia Rivers Coalition (a primer on Marcellus in West Virginia): http://www.wvrivers.org/articles/Marcellus%20Report%202010.pdf

Senator MANCHIN. Thank you.

We'll have a round of questioning like we had with the previous 2 panels. I will start it.

First of all let me say to Dr. Witt that I know there's a decline. You mentioned a decline in the coal industry. With the decline in the coal industry, the people that work in that industry right now, the jobs that we're providing in the coal industry. Do you believe they can—that same type of a work force can be retrofitted, if you will, or re-trained for the work that should be in this Marcellus shale and the opportunities we have there?

Mr. WITT. Yes, I think so. Actually last week we released our economic forecast for the State. We're showing continued declines for the foreseeable future in the tons from the coal industry. But that's offset by the potential growth.

So I think those issues of work force development and retraining are very essential for the State to make that transition.

Senator MANCHIN. Would there be a net increase of jobs or is it going to be revenue neutral? I mean, net neutral?

Mr. WITT. There is going to be a net increase for the whole mining industry. Over the next 5 years.

Senator MANCHIN. OK.

If I can to Mr. West, do you believe that it's possible to have an irresponsible drilling operation that could do irreparable harm to our environment if we don't have specific drilling rules in place because you were talking about double walled and proper drilling and cementing. If it's not adhered to and it's not inspected and oversight, I mean, how does that line up with other States you're operating in? I'm sure you're in Pennsylvania.

Mr. WEST. We are.

Senator MANCHIN. OK. Tell me how we line up with that.

Mr. WEST. Certainly, Senator Manchin. Our company supports reasonable regulation of the industry. It's an industry like any industry that has risk. Responsible regulation is necessary.

So in particular, as one of the specific items you mentioned on the casing and cementing. Other States do have standards that are proposed standards here in West Virginia. We're supportive of that.

Senator MANCHIN. Are the proposed standards that we have in the bill adequate?

Mr. WEST. They are. They are.

Senator MANCHIN. How do they compare? Are they comparable or are they more stringent?

Mr. WEST. They're comparable. They are a little more detailed. The one thing that might be beneficial is to give the DEP, as part of any bill, latitude to be able to regulate as there are advancements with regard to drilling practices.

Senator MANCHIN. Thank you.

Mr. Rotruck, there have been several reports and news articles, various lawsuits that your company Chesapeake has been involved with related to mineral rights, lease disputes, probably more troublesome is the claims that they did not properly reclaim drilling pad sites. I'm sure you're aware of all these. What is the condition of those now and how are you all settling them?

Mr. ROTRUCK. Any site that is found to be not in compliance is immediately remediated. We now have an internal auditing program, a third party that we bring in to audit all of our sites so that we make certain that we don't make mistakes.

This industry has gone up quite a learning curve and so has our company especially in regards to roads. But we're getting out ahead of that now. We've hired a highway engineer who retired to help us in that regard.

So we're trying to be continuously improving everything we do and be in compliance.

Senator MANCHIN. The most troublesome thing, sir, was that there were some land owners that said they had to clean up the sites after you all left. You all were——

Mr. ROTRUCK. If you would tell me, sir, which ones those are I will look into them and get back to you. Absolutely.

Senator MANCHIN [continuing]. Do that.

The most troubling thing that I have concern of is—and you and I have spoke about this, is the contract that you have with the pipeline company that the first 75,000 barrels of, let's say, of product is going to be leaving our State which gives us less chance to really develop a cracker or more future development.

If you'd want to speak on that?

Mr. ROTRUCK. Yes, sir. Thank you very much for that opportunity.

First, Governor Tomblin appointed me to the Marcellus to Manufacturing Task Force. My company was instrumental in bringing the first company here, Petrochem, who would take a look at building a cracker and that was Petro logistics. They were pretty far along, but for their own reasons they pulled out. So we've been very favorable to having a cracker built in this region.

The contract that you speak of, Senator Manchin, is a contract with Enterprise Pipeline. It is a contract for transportation. We've not sold any ethane ahead yet. We have bought capacity on that line.

The reason that is so critical, we're seeing the Marcellus continuing to ramp up. We have 7 rigs now. We're going to go to 9. We hope to go to more.

The ethane is either a wonderful benefit or it could be a burden. We had to make certain we didn't shut down the Marcellus, that we had some way of dealing with it. So sir, it's a multi-tiered solution, but a cracker is a big part of it.

Senator MANCHIN. Thank you. My time is up.

Congressman Rahall.

Mr. RAHALL. Thank you, Senator.

Survey question time. On a scale of one to 5 with 5 being the most urgent, one being the least urgent. Starting with you Dr. Witt. How urgent is it that the State legislature pass a bill?

Mr. WITT. Without saying specifically what bill, I'd say the State does need to pass a bill that provides certainty for all the players in the industry. One thing that investors do not like is uncertainty. We have to face the fact that we're competing with other States not only on the Marcellus and Utica, but with other shale plays around the country.

Mr. RAHALL. One to 5 scale?

Mr. WITT. I would say it's probably 4.

Mr. RAHALL. Four?

Mr. Rotruck.

Mr. ROTRUCK. Yes, sir, Representative Rahall. Thank you.

I believe it's 2 and a half. The reason I would say that is the DEP had a lot of provisions already in place and were doing a good job with the industry in regulating it. But the public is demanding what we have is certainty and just like the market is as well.

So I think it's right in the middle in terms of need.

Mr. RAHALL. Mr. West.

Mr. WEST. I would have to echo a little bit of what Dr. Witt said and Mr. Rotruck said. I think the DEP has done a good job here in West Virginia in regulating natural gas production. But I think certainty is important to all of the stakeholders involved in natural gas development here.

So I would say that, without addressing any particular bill, that by the end of the 2012 session, I think that it's—I would rate it at a 4.

Mr. RAHALL. One, 2 and a half and 2 4.

Mr. Garvin?

Mr. GARVIN. A 5.

[Laughter.]

Mr. GARVIN. The emergency rule provided no additional money to the department. It did not increase the drilling permit fees. The agency has had, for most of the last year, 13 inspectors, 4 positions they couldn't fill and the Office of Oil and Gas has been operating under a million dollar budget deficit for 3 years in a row.

The best written bill is no good if you don't have enforcement, if you don't have inspectors in the field overseeing the operations that's why it's a 5.

Mr. RAHALL. What's my time?

Senator MANCHIN. You're good. There's time.

Mr. RAHALL. OK.

Mr. Rotruck, you responded to Senator Manchin a minute ago.

Mr. ROTRUCK. Yes, sir.

Mr. RAHALL. In regard to a complaint you were going to look into.

Mr. ROTRUCK. Yes, sir.

Mr. RAHALL. Do you and you, Mr. West as well, and I asked a similar question to Mr. Huffman earlier. Do you have complaint divisions that respond to people's complaints, a toll free number or how does somebody?

Mr. ROTRUCK. We not only have—yes, sir. Thank you.

We not only have toll free numbers for people that have issues that relate to leases and so on. But in our company we have corporate development. That is the department that I'm the head of

for the Eastern United States. We have people that are very engaged with the communities every day.

We have conducted activities called CAPS, Community Advisory Panels, where we have brought people in from around the community, who are diverse in what they do so they could bring us their ideas and their problems so we could try to solve them at the community level.

Mr. WEST. Congressman Rahall, we have processes in place within our company to deal with any inquiries or complaints that we receive from land owners or any one that may have questions about our operations. But we realize the increased importance of that. So during 2012 we're establishing a separate Community Affairs department. Part of that will be in the areas where we have operations.

We're actually going to have resident employees so that if people do have questions about our operations or complaints, that they'll be able to approach those individuals right there in their own community and have them addressed.

Mr. RAHALL. Thank you.

Senator MANCHIN. Congressman McKinley.

Mr. MCKINLEY. Mr. Rotruck, as you know Marcellus shale, the gas is very substantially throughout the formation. West Virginia is more of a wet gas and high pressure. In New York and Pennsylvania is virtually dry and low pressure.

How do you accommodate the differences in your operation?

Mr. ROTRUCK. That's a very good question. One thing that does, I'll speak to it first, is a reason the regulation needs to be continued to be handled by States at the local level because they have the most expertise to understand those differences in topography and, as you say, in the geology.

The dry gas window in Northeast PA is different than what we have in our unique slice of the Marcellus in West Virginia which is wet gas primarily in the pan handle, although we're also producing dry gas in West Virginia as well. So we know that there are differences.

They are significant and a good thing is and we heard earlier about, and you mentioned it, about how much we were getting out of the formation. That's one of the greatest opportunities for innovation. More and more BTUs off of the same size well pad.

Thank you.

Mr. MCKINLEY. Mr. Garvin, there was a facility in Fairmont that they were—they had a way that cleans the recycled water, the brown water. That plant was closed for a variety of reasons. But I understand now that some of the drillers are recycling and putting the same material back in again.

What environmental issues does that pose to us in recycling the brown water?

Mr. GARVIN. The recycling doesn't. Although to recycle, reuse, the frack water they have to add fresh water to it. So they're increasingly—it's increasing the demand on the fresh water resource. But it's certainly recycling and reusing is a good thing. They're—I'm not an expert on the amount they get back, somewhere in the neighborhood of 20 to 40 percent.

Mr. MCKINLEY. Mr. Garvin, if I could. Some have come to us in Washington and said it's not a good thing. So that's why I was curious to see it, from a West Virginia perspective because the chemical concentration increases by virtue of it being recycled you get that. So I'm interested——

Mr. GARVIN. Eventually you're going to have the brine to contend with. Eventually you're going to have to deal with the salts and process that water. It's so salty.

One of the problems that AOP Clearwater, I think it was called, the plant in Fairmont had was all their equipment corroded from the salt.

Mr. MCKINLEY. Thank you.

Senator MANCHIN. We're going to have one more round very quickly and then we'll finish up. Thank you all so much.

Let me just say with all of our power plants and we're very hopeful for a new coal to liquids plant in Southern West Virginia, Mingo County. As you know we've been working on that. With the CO_2 we'd be producing from them, if we can take the clear stream CO_2 off would it—and any of you can answer this. Would it enhance, would it be a value with what we've developed now into the Marcellus, the enhancement of better recovery by using the CO_2 injection?

Probably be Mr. Rotruck and Mr. West.

Mr. ROTRUCK. Yes. That has been considered. In fact one of the members of TransGas, Randy Harris, a former employee at NETL, has thought about that a lot.

We don't know if that's doable yet. But everything like that is certainly worth investigating. In fact going back to the water treatment, we're looking at using AMD waters and cleaning them up and using that for frack water.

So everything that we can to complete those circles, we'll try.

Senator MANCHIN. Mr. West, do you feel the same?

Mr. WEST. I would agree, Senator. It's in the investigatory stage. But certainly EQT and this industry supports anything that enhances energy production for West Virginia or this country.

Senator MANCHIN. Mr. Garvin, if I could finish with you. Do you believe that we can do this right in West Virginia and should we be taking the primacy as a State to oversee this exploration?

Mr. GARVIN. I do believe we can do it right. I believe we can do it right.

We have primacy.

Senator MANCHIN. So you're not currently——

Mr. GARVIN. The feds aren't going to take primacy from us.

Senator MANCHIN. Right.

Mr. GARVIN. They don't have any money to come and run our program. So, you know, but we can do it right.

Senator MANCHIN. What——

Mr. GARVIN. I'll give you a good example.

Senator MANCHIN. Yes, please.

Mr. GARVIN. These 2 companies right here use something called a closed loop system for drilling. All of their drilling mud, all of their water, all of their fracturing chemicals, everything comes in in containers and trucks. Everything goes out in containers and trucks.

There's no drilling pits. Both of these companies are using secondary containment systems, you know.

Senator MANCHIN. What's your greatest concern?

Mr. GARVIN. That just ought to be in the rule.

Senator MANCHIN. What's your greatest concern?

Mr. GARVIN. Let's put that in the rule. Let's put that in the statute. Let's mandate it that all the companies do these protections.

Senator MANCHIN. Do you all agree to that?

Mr. ROTRUCK. We agree that there should be tough standards which incorporate the best practices.

Senator MANCHIN. What I'm saying is it looks like you all aren't that far apart.

Mr. WEST. No. I think that's been one of the positive things that industry and the environmental community and the general assembly are——

Senator MANCHIN. I know that will help our legislators in making their final determination if you all can be in agreement.

Mr. WEST. Right.

Senator MANCHIN. Mr. Rotruck.

Mr. ROTRUCK. Yes, sir, in agreement, Senator Manchin. Also just to note that the innovation around even this hasn't been completed. The WBU has a one million dollar grant now to study how to further perfect the filtering of the water for reuse in that closed loop system.

Senator MANCHIN. Finally, do you all agree and accept the recommendation as far as on the permit fees?

Mr. ROTRUCK. It is a standard that the regulated community has to pay to be regulated. That is the guiding principle. What that amount is has to be one that has the agency properly supplied with folks to regulate us and have the right amount of money.

But it needs to be the right amount.

Senator MANCHIN. Mr. West.

Mr. WEST. We agree that there need to be increased permit fees in West Virginia so that the regulators can enforce the law.

Senator MANCHIN. Mr. Garvin, you're watching that very closely I would suspect.

Mr. GARVIN. Yes, we're disappointed that the select committee bill lowers it from $10,000 a well for every well on the pad to $10,000 for the first well and then $5,000 for additional wells. But that amount will get DEP back in this ball game.

Senator MANCHIN. Thank you, sir. My time is up.

Congressman Rahall.

Mr. RAHALL. I have nothing.

Senator MANCHIN. Congressman McKinley.

Mr. MCKINLEY. Just earlier in this session we heard people referring to it as the—we were going to have the Saudi Arabia equivalent in gas.

Then I heard in the last panel maybe we don't. Maybe we're not going to have sufficient gas to justify a cracker.

Which is it? I think clearly we're going to have enough gas. But I'd like to hear from you all. I'm hoping there's more than one because again, if we don't those jobs are going to go someplace else.

I think we all have a responsibility to create jobs here in the private sector, not in the government jobs, in the private sector. We have an opportunity.

So do you think that there's going to be enough gas? Are we going to be the Saudi Arabia of gas?

Mr. ROTRUCK. The Chairman of my company, Aubrey McClendon, has said he thought the Marcellus maybe was 2 Saudi Arabias.

Senator Manchin mentioned us as being the Saudi Arabia of natural gas in West Virginia. We have that unique slice of wet gas in the Northern pan handle.

I think the legislator earlier was referring to the timing of it. He didn't think we had enough now, but as we keep ramping up our drilling activity his optimism will grow.

Mr. MCKINLEY. Mr. West.

Mr. WEST. I agree with Mr. Rotruck's statement. I think that certainly there's no doubt there are abundant Marcellus reserves here in West Virginia. That if things are done properly I don't know whether a comparison is necessary to Saudi Arabia, but I think that certainly there will be enough natural gas to supply the needs of West Virginia's and West Virginians and to attract business and industry here that use natural gas a fuel source and feed stock.

Mr. MCKINLEY. OK.

Mr. Rotruck, with the drilling that's going on in the North pan handle where the wet gas is. Is that wet gas being put in a pipeline or is there someplace—or is there someone separating that now?

Mr. ROTRUCK. That gets separated. Yes, Mark West is involved in that or a Caymans involved in that. Again, we have 30 rigs running in West Virginia now as an industry. We just have 7 of them. So that question is rather complex as to who is doing what.

But the activity is pretty robust.

Mr. MCKINLEY. In the time remaining if we just stay with you because you're one of the larger drillers and I think one with a better reputation. So my—I'm curious about your impact you've had in the communities in which you've been drilling. Can you share a little bit about what you've done?

Mr. ROTRUCK. As I mentioned earlier and this is my wife's hometown, your wife's hometown, New Martinsville in Wetzel County. That's an area that we know has lost a lot of employment over the years. But as we heard, Mr. Litman has a company that's dramatically increased his employment work force by 400 percent just in that area.

Across the State our employment has been growing in the industry and in Chesapeake. I think since 2005 the industry has added 2,500 people in West Virginia. So the news is good. It will continue to grow and be good.

Mr. MCKINLEY. My light is still green so as long as it's still green.

Senator MANCHIN. You—it all, aren't you?

Mr. MCKINLEY. How about go what you're doing in terms of training because we've all heard the concern about so that we're not outsourced. What are you doing to help train people to do the work for you?

Mr. ROTRUCK. Part of the corporate development department's effort is to be engaged with our community and technical college. We've been engaged with the Pierpont community and technical college. We supported that initiative to have a training facility. It was in Braxton, now in—County. We supported that with $100,000 involved with West Virginia Northern in helping them develop their program.

We're involved with Marshall University, West Virginia University in terms of scholarships for at the Law School and the College of Engineering and in the GO Sciences. So we're very involved across that seamless band of education because the opportunities in this industry goes from someone who loves to work outside and drive a truck to someone that wants to be a petroleum engineer and get 6 figures on his first day of work.

Thank you.

Mr. MCKINLEY. Thank you.

Senator MANCHIN. Congressman Rahall has one question.

Congressman Rahall.

Mr. RAHALL. Thank you, Senator.

I believe, Scott, you kind of addressed this earlier in your willingness and the fact that you are exploring for alternatives to water. But there is concern among some in the State about competing requirements for water resources. In 2007, for example, coal extraction in West Virginia required 8.8 billion gallons of water and natural gas extraction required 392 million gallons of water which is only expected, of course, to increase as more shale gas wells are drilled.

You are exploring feasibilities of alternatives to using water like CO_2 and propane. Would that be an alternative that's possible? A third question is what other frictions might exist with our coal industry? Can you live side by side with them?

Mr. ROTRUCK. Let me say something first we'll address the coal industry because I came from there. I spent 15 years in the coal industry.

In 1979 a nuclear engineer, Jimmy Carter, was President. He asked the coal industry to rise to the occasion and they did. We built a lot of coal fired based load power in this country that has served us very well.

Our coal industry is still the best in the country. We're exporting a lot of coal. I think they'll continue to do very well. I think Dr. Witt would agree with that.

As to water, Congressman Rahall, water is one of our best stories. We, from shale gas, we use less than a gallon all in to produce a million BTUs. Coal is more than that, but coal is nowhere near what it takes to produce ethanol with water.

As to alternatives for fracking right now in the shales water has been found to be the best medium as amended with a handful of additives in order to frack the formation. But since we're reusing it we're not using very much water at all comparatively and we frack once.

Mr. RAHALL. Mr. West.

Mr. WEST. We're constantly looking for ways to reduce our water use from the standpoint of one, we want to conserve West Virginia's resources.

Second, it makes good business sense too because one of the largest costs involved in drilling and completing a Marcellus well involves the water cost.

So that's why we're looking at ways to reduce our water use by recycling and other technologies. This, you know, this is an industry which everyone realizes is growing. So there are a number of companies, associated companies that are involved in research and development to try to find ways to reduce the amount of water to be used.

Mr. RAHALL. Yes, Mr. Garvin.

Mr. GARVIN. I first became really concerned about Marcellus shale drilling because of water withdrawals. In West Virginia it's only been, what, 5 years since we passed the West Virginia Water Resources Control Act or Protection Act that cleaned the waters of the State for West Virginia. The State legislature gave DEP 5 years to come up with a water resources protection plan and that's coming up in 2013, I believe, a statewide plan.

We're really concerned that the agency's water withdrawal guidance tool is inadequate and the Environmental Council really wants an actual permit system for withdrawals like they're doing in the Susquehanna River Basin and the Delaware River Basin. Then you can figure out how to charge the industry for that water.

Senator MANCHIN. Thank you all.

Before we close I think the Governor's Council, Mr. Dettinger had one comment.

Mr. DETTINGER. Sure. If I may, on the question as it relates to whether we're a Saudi Arabia or we don't have enough gas. In the Task Force we've quantified and estimated that by the end of 2015 we'll have approximately 270,000 barrels of ethane production a day in West Virginia and in Western Pennsylvania. With some of the commitments that have been made to Canada and to the Gulf Coast there still will be enough to produce a—or to support an ethane cracker in West Virginia.

We also think with the Utica shale coming online in the ethane rich natural gas over there we will have an abundant supply.

Senator MANCHIN. Let me say to everybody that it's been a wonderful panel. I appreciate all of your candor. I hope this has been informative for all of you. It sure has been for me.

I know that my colleagues here are learning more about this. I appreciate the open mindedness that the environmental community and also the production, if you will, and also Mr. Witt from you all kind of monitoring the whole thing.

The legislature, I encourage you. I appreciate the work that's been done so far. I know you will get a good product. I know that you have the best interest of the State of West Virginia. The future generations that are going to be depending on us to do this well, do this right.

I'd never imagine. If you look at that, if you haven't done anything else, look at that map and see what West Virginia and the activity we've had since the beginning of drilling in this State where we are today. We owe it to future generations to make sure that we clean up whatever we've left behind. We make sure we don't leave anything else behind with this new exploration. I think that you all can do that.

So I would encourage that. We'll be taking all this back from our field hearing to our committee. I'll be reporting to Chairman Bingaman. I'm sure that you're going to see the Federal Government hopefully act in a way that creates a good partnership.

With that, Secretary, I know that you will receive it in that manner also.

So this hearing is ended. Thank you all. I appreciate it.

[Whereupon, at 12:48 p.m. the hearing was adjourned.]

APPENDIX

Additional Material Submitted for the Record

AMERICAN CHEMISTRY COUNCIL

SHALE GAS AND NEW PETROCHEMICALS INVESTMENT: BENEFITS FOR THE ECONOMY, JOBS, AND US MANUFACTURING

For full-text of ACC report, please visit: http://www.americanchemistry.com/ACC-Shale-Report

March 2011.

EXECUTIVE SUMMARY

Chemistry transforms raw materials into the products and processes that make modern life possible. America's chemical industry relies on energy derived from natural gas not only to heat and power our facilities, but also as a raw material, or "feedstock," to develop the thousands of products that make American lives better, healthier, and safer.

Access to vast, new supplies of natural gas from previously untapped shale deposits is one of the most exciting domestic energy developments of the past 50 years. After years of high, volatile natural gas prices, the new economics of shale gas are a "game changer," creating a competitive advantage for U.S. petrochemical manufacturers, leading to greater U.S. investment and industry growth.

America's chemical companies use ethane, a natural gas liquid derived from shale gas, as a feedstock in numerous applications. Its relatively low price gives U.S. manufacturers an advantage over many competitors around the world that rely on naphtha, a more expensive, oil-based feedstock. Growth in domestic shale gas production is helping to reduce U.S. natural gas prices and create a more stable supply of natural gas and ethane.

In its new report, Shale Gas and New Petrochemicals Investment: Benefits for the Economy, Jobs and US Manufacturing, the American Chemistry Council (ACC) uncovered a tremendous opportunity for shale gas to strengthen U.S. manufacturing, boost economic output and create jobs.

ACC analyzed the impact of a hypothetical, but realistic 25 percent increase in ethane supply on growth in the petrochemical sector. It found that the increase would generate:

- 17,000 new knowledge-intensive, high-paying jobs in the U.S. chemical industry
- 395,000 additional jobs outside the chemical industry (165,000 jobs in other industries that are related to the increase in U.S. chemical production and 230,000 jobs from new capital investment by the chemical industry)
- $4.4 billion more in federal, state, and local tax revenue, annually ($43.9 billion over 10 years)
- A $32.8 billion increase in U.S. chemical production
- $16.2 billion in capital investment by the chemical industry to build new petrochemical and derivatives capacity
- $132.4 billion in U.S. economic output ($83.4 billion related to increased chemical production (including additional supplier and induced impacts) plus $49.0 billion related to capital investment by the U.S. chemical industry)

The scenario outlined in ACC's report is corroborated by trends in the chemical industry. ACC member companies, including The Dow Chemical Company, Shell Chemical, LyondellBasell, Bayer MaterialScience and others have announced new investments in U.S. petrochemical capacity to benefit from available resources and grow their chemical businesses. Some of these investments are being made in areas of the country that have been hardest-hit by declines in manufacturing, improving the outlook in economically depressed areas of the country. Further development of

the nation's shale gas and ethane can drive an even greater expansion in domestic petrochemical capacity, provided that policymakers avoid unreasonable restrictions on supply.

ACC supports a comprehensive energy policy that promotes energy efficiency and conservation, energy diversity, and expanded domestic oil and natural gas supply, onshore and offshore. The United States must ensure that our regulatory policies allow us to capitalize on shale gas as a vital energy source and manufacturing feedstock, while protecting our water supplies and environment.

LINKS TO ADDITIONAL DOCUMENTS SUBMITTED ON BEHALF OF THE AMERICAN CHEMISTRY COUNCIL

1. ACC West Virginia shale gas economic impact fact sheet http://www.americanchemistry.com/Policy/Energy/Shale-Gas/ACC-State-Shale-Fact-Sheet-West-Virginia.pdf

2. ACC West Virginia chemical industry fact sheet http://ex.democracydata.com/ACHEMC/sites/ImpactChem/docs/WestVirginia.pdf

3. Cal Dooley op-ed in Charleston Daily Mail http://www.dailymail.com/Opinion/Commentary/201110022796

4. Charleston Daily Mail front page story quoting Cal Dooley http://dailymail.com/ap/ApTopStories/201109200945

5. Wheeling Intelligencer story http://www.theintelligencer.net/page/content.detail/id/559754/Study—12-000-Cracker-Jobs-Possible.html?nav=515

STATEMENT OF GARY ZUCKETT, EXECUTIVE DIRECTOR, WV CITIZEN ACTION GROUP, CHARLESTON, WV

Dear Senator Manchin and Committee Members,

Marcellus Shale exploration in WV comes with great promise but also many unanswered questions on the long-term environmental and human health effects of exposure to the various chemicals used in the Hydro-Fracking process.

We work with a group—WV Surface Owners' Rights Organization—that receives calls on a regular basis from WV landowners that are experiencing adverse health effects and water quality problems that are occurring during or after Marcellus Drilling on their property.

The industry claims that this Hydro-Fracking process is safe. Why then did Congress have to exempt this process from the Clean Water Act, the Clean Air Act and at least four other major federal environmental and right-to-know laws in order for this process to be expanded into Shale drilling?

We would suggest that, if indeed this process is a benign as industry proponents claim then it should be no problem for Congress to rescind these exemptions which are not currently afforded to any other heavy industry such as Coal mining.

In these troubled economic times, we welcome the good-paying jobs associated with this industry but not at the expense of our citizens' health, well-being and land destruction. If this Hydro-Fracking process was overseen by the Clean Air and Water Acts citizens would have more protection from reported industry abuses.

In regards to jobs, it was very troubling to hear last week that an industry leader in the WV Marcellus fields had announced its decision to build a pipeline to ship WV production all the way to Texas. This is occurring at a time when WV business and labor leaders along with state government was actively negotiating for the construction of two ethane cracking plants to be located in-state.

This pipeline, if built, would literally pipe permanent WV jobs to Texas to the detriment of our state and its labor force. We have the skills and eager workers to fill such jobs and we ask our WV Senators to do whatever they can to support local value-added industries to make use of the Marcellus production.

Thank you and the Committee for the chance to submit these comments.

From: Julie Archer
To: Teri Anderson; Tim Manchin;
cc: Dave McMahon;
Subject: WV-SORO Comments on Proposed Marcellus Shale Legislation and Amendments
Date: August 31, 2011 11:52:56 AM
Attachments:

WVSORO—Comments—on—Proposed—Marcellus—Legislation—and—Amendments—Aug31—2011.pdf
SOROPrioritiesforMarcellusLegislation—LtrHead.pdf
Essential Provisions NOT Included in Proposed Marcellus Shale Legislation.pdf

Delegate Manchin,

Thank you for the opportunity to provide input on the proposed Marcellus Shale legislation and amendments. Our comments are attached. If you have any questions, please feel free to contact us.

Sincerely,

JULIE ARCHER,
WV Surface Owners' Rights Organization.

ATTACHMENT 1.—WV SORO COMMENTS

WEST VIRGINIA SURFACE OWNERS' RIGHTS ORGANIZATION,
Charleston, WV, August 31, 2011.

Hon. TIM MANCHIN,
Chairman, Select Committee on Marcellus Shale, 1900 Kanawha Blvd. East, Building 1, Room 418M, Charleston, WV.

DEAR DELEGATE MANCHIN, Thank you for your letter requesting input regarding the draft legislation and proposed amendments being considered by the legislature's Select Committee on Marcellus Shale. We appreciate the opportunity and our comments are below. However, we also want to express our gratitude to you and the other House members of the committee for the considerable time you spent holding public hearings to get input from the citizens of West Virginia. Many citizens are affected in profound and personal ways by the industrialization that is occurring in the rural parts of our state as a result of Marcellus Shale development. We also appreciate the time the House members have spent discussing, drafting and offering amendments to strengthen the proposed legislation in response to the concerns raised at the public hearings.

Comments on Proposed Amendments

- Eliminate Oil and Gas Inspectors Examining Board.—WV-SORO supports abolishing this industrydominated board and making oil and gas inspectors subject to the same hiring practices as other environmental inspectors within the Department of Environmental Protection.
- Consideration of Comments, Public Hearing.—WV-SORO supports extending the opportunity to comment on a permit application to both neighboring landowners and the general public and giving the DEP Secretary the authority to hold a public hearing to get additional input prior to issuing a decision on the permit. Because the effects of Marcellus Shale operations are felt far beyond the surface tracts being disturbed, giving neighboring landowners and others who might be affected the opportunity to provide input on a permit is appropriate.
- Notice Requirements.—Because the effects of Marcellus Shale operation are felt beyond the surface tracts being disturbed, WV-SORO supports and appreciates the expanded notice to adjacent landowners, owners of water wells and springs within 2,500 feet and the general public. However, we are concerned about the language notifying water supply owners about "the advisibility of taking their own prealteration survey." We appreciate that a subsequent amendment proposes to expand the operator's presumptive liability to 2,500 feet, and that drillers have the authority to ask for testing within that distance to protect themselves, but we believe that owners of water supplies within 2,500 feet of a proposed gas well should be able to have their water tested at the driller's expense.
- Well Location Restrictions.—WV-SORO supports increased setbacks from homes and water supplies to at least 1,000 feet. The current 200-foot setback can be found in leases dating back to the 1890's, and our laws have not kept up with technological advances in drilling. With Marcellus Shale operations in particular, we are especially concerned about the close proximity to peoples' homes given their duration and the noise, light and other pollution from the sites. There is also the potential for serious accidents such as the fires and explosions that occurred last year in the Northern Panhandle. In addition to homes and water sources, these setbacks should apply to schools, places of worship, nursing homes, hospitals, and other similar places where people live or gather. Finally, we suggest defining the word "occupied" or replacing it with the word "habitable."

- Department Website & Electronic Notification.—WV-SORO supports any efforts to make information more readily available and easily accessible to landowners and the public.
- Protection of Water Supplies.—WV-SORO supports and appreciates the proposed expansion of the operator's presumptive liability to 2,500 feet and the clarification of water replacement requirements. However, we are concerned about the six-month limitation on claims of contamination. When a contaminant plume enters an aquifer may take years, or decades, to pass by an individual well. (Most private water wells are developed in fractures in shale and sandstone, under thin soils, and in valleys that are typically down gradient from natural-gas well sites. U.S. Geological Survey data from the Kanawha and Monongahela NAWQA studies show that typical wells in this type of setting have water that is 40 years old, or older.) There is no limitation on the current 1,000-foot presumption and we feel the amendment would be more protective without this constraint. We are also concerned that neither the proposed legislation nor the amendments expand pre-drilling testing parameters. Currently drillers are required to test for constituents in drilling muds and fluids, but not for chemicals or chemicals compounds used in hydraulic fracturing, or naturally occurring radioactive materials (NORMs) known to exist in the Marcellus Shale. Additionally, we suggest that the operator be required to provide a temporary water supply until a permanent supply can be established and that the orders issued to the operator include deadlines for establishing temporary and permanent supplies.
- STRONGER Hydraulic Fracturing Review.—WV-SORO supports a STRONGER review of West Virginia's laws and regulations pertaining to the drilling of horizontal wells and hydraulic fracturing.
- Bonding Requirements.—WV-SORO supports revising and improving bonding requirements to prevent wells from being orphaned and unplugged. In order to have some assurance that wells will be plugged, blanket bonds should not be allowed. An individual bond should be posted for each well. The current blanket bonding provisions allow bonding amounts of $25 or less per well for some operators.
- Casing and Cementing Requirements.—WV-SORO supports enhanced casing and cementing requirements. In addition to requiring integrity (pressure) testing, drillers should be required to run a bond log to make sure that the casing job is done right and properly cemented to the well bore—something that did not happen in the Gulf of Mexico. Intermediate casing should be required (page 11 line 9 of the amendment says, "If the well is to be equipped with an intermediate casing, . . .") and each string of casing should be cemented from top to bottom to prevent the migration of gas or fluids from uncemented formations into peoples' water wells. WV-SORO also supports increased oversight of the casing and cementing process. In particular, an inspector should be there for the cementing of the surface/freshwater casing. DEP should also be given rulemaking authority to revise casing and cementing standards as needed in response to technological changes and advances. Finally, subdivision (3), subsection (e) of the gas migration response section (page 22, line 4) says that in the event of a potential migration event, the Secretary may require the operator to conduct an "evaluation of the operator's adjacent oil and gas wells [within 2,500 feet] to determine well cement and casing integrity and to evaluate the potential mechanism of migration." While we believe such an investigation is important in determining the cause of the migration, should such an event occur, an evaluation of all existing oil and gas wells within 2,500 feet of a proposed well (including the horizontal legs) could help prevent such migrations from happening in the first place.

Comments on Adopted Amendments

Generally, WV-SORO supports the strengthening amendments already adopted by the Select Committee, especially those dealing with air quality and drilling waste, however we have comments on two of the other amendments.

- Adopted Amendment #1 (Allowing Highways Enforcement).—WV-SORO supports the amendment to address problems with damage to roads and infrastructure, however, we feel that this sort of permit blocking should be authorized for any substantial violation of any existing permit. Unfortunately, as the proposed legislation is current drafted, drillers can get permits for horizontal wells even if they are in violation of requirements for conventional wells (subsection (k), section 7 of article 6A).
- Adopted Amendment #2 (Acreage Reduction for Engineer Certification).—WV-SORO appreciates the acreage reduction, however, the engineering requirement

does not apply to access roads and pipelines which are frequently more of a problem than the well sites themselves. Additionally, having a professional engineer supervise the construction and reclamation would help ensure that the soil erosion and sediment control plans are followed, since there are too few inspectors to oversee well site construction (although we hope the shortage of inspectors will be addressed with an amendment to increase permit fees and provide DEP with the funding necessary to increase staffing levels).

Thank you again the opportunity to provide input on the proposed legislation and amendments. At this time we remain concerned that the draft legislation is deficient in terms of addressing several important issues (see enclosed Priorities for Marcellus Shale Legislation and Essential Provisions NOT Included), however, we look forward to the Select Committee continuing its work and to working with you to continue to make improvements to the bill.

Sincerely,

JULIE ARCHER,
Project Manager.

DAVID MCMAHON, J.D.,
Co-Founder.

ATTACHMENT 2.—PRIORITIES FOR MARCELLUS SHALE LEGISLATION

August 31, 2011.

The impact and problems related to Marcellus Shale and other gas well drilling demand a comprehensive overhaul of our state's oil and gas regulatory program.

WV-SORO believes any bill passed by the legislature must:

1.) Include pre-permit incentives to encourage the driller to work with the surface owner on planning where and how well sites and access roads will be built, maintained and reclaimed. Earlier notice and a requirement to meet are needed and appreciated but allow the companies to give the appearance they are working with landowners without actually requiring that they to do so. Drillers should be required to negotiate a written agreement with the surface owner before they can get a permit or, if no agreement can be reached requiring them to post an individual well bond that guarantees the surface owners' compensation for damages. These incentives are needed for ALL wells, not just horizontal wells.

2.) Improve the laws governing conventional and vertical Marcellus wells not just horizontal wells. Marcellus Shale development is resulting in what can only be described as "the industrialization of rural West Virginia." Because our oil and gas drilling laws have not been updated in nearly 30 years, this new boom in drilling (and the new technologies associated with it) is largely unregulated. However, there are also many problems with other (conventional) gas well drilling that need to be addressed. Poor construction and maintenance of well sites and access roads, ineffective soil erosion and sediment controls, stream sedimentation and poor or delayed reclamation are common problems, problems that are exacerbated by a lack of enforcement. Regulations should be based on the amount of land disturbed and the amount of water used, rather than whether a well is "vertical" v. "horizontal" or "shallow" v. "deep."

3.) Increase the current statewide setback of 200 feet from homes and water wells to at least 1,000 feet. 200-foot setbacks can be found in leases dating back to the 1890's, and our laws have not kept up with technological advances in drilling. Natural gas drilling is a major industrial activity and with Marcellus Shale operations in particular, we are especially concerned about the close proximity to people's homes given their duration, the noise, light and air and other pollution from the sites, in addition to the potential for series accidents like the fires and explosions which occurred last year in the Northern Panhandle. In addition to habitable dwellings and water sources, these setbacks should apply to schools, places of worship, nursing homes, hospitals and other similar places where people live or gather.

4.) Expand protections for drinking water sources. Full and equal protection is needed for all water supplies, including adequate setbacks and testing. Increased oversight of casing and cementing is also critical. Recent events in Morgantown have highlighted the need for additional protections for public water supplies. Because of the concern about siting two Marcellus gas wells within 3,000 feet from Morgantown's drinking water intake, additional safeguards were written into the permits the WV-DEP issued to Northeast Energy. These safeguards include redundant spill prevention and containment measures, in-

tegrity testing of well casings and a prohibition of on-site disposal of drilling waste. Why shouldn't these conditions be required of all wells in order to protect citizens and the environment?

5.) Prohibit on-site disposal of drilling waste. Although land application of any return fluids from drilling in the Marcellus Shale is currently prohibited by the State (because they are known to contain high levels of salt, as well as naturally occurring radioactive materials or NORMs), under the State's general permit, drillers may land apply liquid waste from conventional wells on site. Current law also allows the cuttings of drilled out rock and other solid waste from the drilling and fracturing process to be buried in place , unmarked on the surface owner's land. These practices should be prohibited and all contents of the drilling pit should be hauled away and disposed of properly.

6.) Improve enforcement and reform hiring practices for inspectors. Regulations are only as effective as their enforcement. The DEP Office of Oil and Gas has too few inspectors to adequately protect citizens and the environment from the threats oil and gas drilling and development poses to human health and our land, air and water. In addition to increasing the number of inspectors, hiring practices need to be changed. The industry-dominated Oil and Gas Inspectors Examining Board should be abolished to allow the DEP Secretary to hire these inspectors the way it hires other inspectors within the agency. Fines and penalties should as be increased so that they serve as a deterrent rather than being considered part of the cost of doing business. And enforcement procedures should be changes to match those for other regulated industries. The state should be able fine drillers without having to go to circuit court.

ATTACHMENT 3.—ESSENTIAL PROVISIONS NOT INCLUDED IN PROPOSED MARCELLUS SHALE LEGISLATION

(ENGROSSED COMMITTEE SUBSTITUTE FOR SB 424, 2011 REGULAR SESSION)

Scope

Regulations should be based on the amount of land disturbed and the amount of water used, rather than whether a well is "vertical" v. "horizontal" or "shallow" v. "deep."

- Surface disturbance.—Sites that disturb 3 acres or more, including pipelines and access roads, should have soil erosion and sediment control plans certified by a professional engineer, and the engineer should supervise the construction and reclamation. Provisions in SB 424 apply only to horizontal well sites that disturb 5 acres or more, excluding pipelines and access roads.
- Water use.—210,000 gallons is a reasonable trigger for requiring water management plans, etc. but it should not be limited to horizontal wells. SB 424 would have no effect on Marcellus vertical wells that can use up to 1 million gallons in the hydraulic fracturing process.

Inspectors and Enforcement

The DEP Office of Oil and Gas has too few inspectors (17 for 59,000 active oil and gas wells) to adequately protect citizens and the environment from the threats oil and gas drilling and development poses to human health and our land, air and water.

- Funding.—Earlier this year, the DEP proposed a permit fee of $10,000 for horizontal wells to help it cover the additional costs associated with reviewing and processing Marcellus Shale drilling permits and to double its existing staff. The legislature should honor the DEP's request, or authorize the agency to implement and increase fees as needed to pay for oversight. A $10,000 permit fee would be only 1/4 of 1% of the cost of drilling a horizontal well ($3 million to $7 million) and is hardly excessive. The fee schedule provided in SB 424, ($5,000 for the first horizontal well on a pad and $1,000 for each additional well) is not adequate to sustain even current staffing levels.
- Hiring practices.—In addition to increasing the number of inspectors, hiring practices need to be changed. The industry-dominated Oil and Gas Inspectors Examining Board should be abolished. SB 424 maintains the board, although the original DEP bill proposed to eliminate it and make oil and gas inspectors subject to the same hiring practices as other inspectors within the agency.
- Enforcement procedures should be changed to match those for other regulated industries. For example, the state should be able to fine drillers without having to go to Circuit Court. No changes are proposed in SB 424, and as it is currently

drafted, drillers can get permits for horizontal wells even if in violation of requirements for conventional wells.
- Penalties for violations should be increased so that they serve as a deterrent rather than being considered part of the cost of doing business. SB 424 proposes some increases, but only for horizontal wells.
- Bonding requirements need to be improved to prevent wells from being orphaned and unplugged. Current blanket bond provisions allow bonding amounts of $25 or less per well for large drillers. SB 424 makes no improvements to the bonding requirements for conventional wells and allows a blanket bond of $50,000 for all of an operator's horizontal wells. An individual bond of at least $25,000 should be required for each horizontal well, as proposed in the interim bill by the Joint Judiciary Committee (HB 2878).

Notice and Other Protections for Surface Owners

- Pre-survey notice—SB 424 provides notice "at least seventy-two hours but no more than fortyfive days" prior to entry to conduct surveys. A firm 30-day notice, like that included in the House Judiciary amendments to SB 424, would be preferable.
- Incentives to work with the surface owner—SB 424 has no such provisions. HB 2878 would have allowed operators to obtain permits sooner if they negotiated a surface use and compensation agreement, or required them to post an extra bond if no agreement could be reached.
- Expanded notice and other provisions should apply to ALL wells not just horizontal wells.

Public Notice and Comment

Because of their industrial nature, the effects of Marcellus Shale operations are felt far beyond the surface tracts being disturbed. In rural areas in particular, neighboring landowners and local infrastructure are affected. Impacts can also occur to public lands, special places, high quality streams, etc. Therefore, any permit to drill a horizontal well should be officially noticed to the public and should include a 30-day public comment period.

Setbacks from Homes and Water Sources

The current setback of 200 feet from homes and water wells should be increased to at least 1,000 feet. With Marcellus Shale operations in particular, we are especially concerned about the close proximity to peoples' homes given their duration (up to 6 months to complete one horizontal well), the around-the-clock industrial noise and lighting, and the air and other pollution from the sites, in addition to the potential for series accidents like the fires and explosions which occurred last year in the Northern Panhandle. This is a safety issue as well as an issue that affects property values. In addition to habitable dwellings and water sources, these setbacks should apply to schools, places of worship, nursing homes, hospitals and other similar places where people live and gather. No increased setbacks are included in SB 424.

Protections for Drinking Water Sources.

Full and equal protection is needed for all water supplies (public and private), including adequate setbacks and testing. Increased oversight of casing and cementing is also critical.

- Testing parameters should be expanded to include chemicals or chemical compounds commonly used in hydraulic fracturing. Currently, drillers are required to test for constituents in drilling muds and fluids, but not fracturing fluids.
- A well operator's presumptive liability for pollution or water loss should be extended from 1,000 feet to at least 2,500 feet, to include possible pollution from horizontals that can extend a mile or more. Landowners with a water well or spring within 2,500 feet of a proposed gas well should be notified and be able to have their water tested at the drillers expense.

SB 424 proposes no changes to the current testing distance and parameters other than requiring flow tests of water wells within 2,500 feet. The flow tests will be conducted only upon request of the drinking well owner, yet current notice provisions only extend to 1,000 feet and no changes are proposed. The House Judiciary amendment to SB 424 comes much closer to providing the needed protections for both private and public water supplies.

- Clarify water replacement requirements for damaged or lost groundwater or surface water supplies. Both the original DEP bill and Joint Judiciary Committee bill introduced during the 2011 regular session contained new requirements for water replacement.

- Increase oversight of casing and cementing. In particular, an inspector should be there for the cementing of the surface/freshwater casing.

Because of the concern about siting two Marcellus gas wells within 3,000 feet from Morgantown's drinking water intake, additional safeguards were written into the permits the WV-DEP issued to Northeast Energy. These safeguards include redundant spill prevention and containment measures, integrity testing of well casings and a prohibition of on-site disposal of drilling waste. Why shouldn't these conditions be required of all wells in order to protect citizens and the environment?

Air Quality

In addition to increases in surface disturbance, water use and waste disposal, Marcellus Shale development degrades air quality. Many of the processes involved with this and other natural gas development release nitrogen oxide (NOx), volatile organic compounds (VOCs) and other potentially harmful substances into the air. However, no one is currently regulating or even monitoring these emissions. In order to protect citizens and the environment, DEP needs authority to monitor and regulate air emissions from well sites. The only provision in SB 424 that addresses air quality requires drillers "to control fugitive particulate matter."

Disposal of Drilling Waste

Land application of drilling wastewater and on-site burial of drill cuttings and other solid waste should be prohibited until further studies on the contents of drilling waste and the effects of on-site disposal on the soil and groundwater can be conducted to determine if these methods are safe. A recent U.S. Forest Service report on drilling in the Fernow Experimental forest documents problems and severe damage with both practices. A study conducted by the New Mexico Oil Conservation Division determined that pits contain characteristically hazardous waste. All contents of the drilling pit should be hauled away and disposed of properly. Unfortunately, SB 424 proposes no changes to the current disposal methods for drilling waste.

ADDITIONAL DOCUMENTS SUBMITTED ON BEHALF OF TIM MANCHIN, DELEGATE, WEST VIRGINIA LEGISLATURE, FAIRMONT, WV

ATTACHMENT 1.—COMMENTS BY WV-SORO ON MARCELLUS DRAFT BILL WITH ADOPTED AMENDMENTS

Prepared by David McMahon and Julie Archer
November 8, 2011.

WV-SORO has, on numerous occasions, submitted lists of what should be in legislation to regulate Marcellus Shale and other gas well drilling. These are our substantive and technical comments on the bill being worked by the Joint Select Committee on Marcellus Shale. Failure to mention or include in these comments recommendations we made in our previous public statements or correspondence does not mean that we have abandoned those positions.

SUBSTANTIVE COMMENTS

Inspectors

Page 12, §32-6-2(c). The changes regarding inspector qualifications and the elimination of the Oil and Gas Inspectors Examining Board are of course very good.

Definition of "Deep Well" and "Shallow Well."

Pages 7 and 9 (§22-6-1), and 109 to 118 (§22C-8-2 and §22C-9-2). The rule of capture, which is essentially legalized stealing, is bad. It can result in too many wells being drilled too close together, which results in less total gas being produced from the pool, as well as gaps between wells that will not be effectively drained. It allows citizens who should be receiving royalty be deprived of that royalty. The solution to these problems is forced pooling and unitization. These changes make less oil and gas subject to forced pooling. Bad idea. Also, if the bill is intended to apply only to horizontal Marcellus wells, this change has nothing to do with horizontal Marcellus wells, which are "shallow," and is therefore not appropriate in this bill.

Coal Declaration

Page 23 and 24, §22-6-36. Surface owners have no objection to this change. However, a less onerous solution was worked out but not adopted during the regular session last year. That solution would be even better if applied only to the tax district and not the county.

Scope/Applicability

Page 25, Article 6A. We think these provisions should apply to vertical Marcellus wells, and many of them should apply to all wells.

Application of Article 6 to Horizontal Wells

Page 30, §22-6A-5. David carefully reviewed this section of the bill during the regular session and pointed out some errors to Joe Jenkins. We do not know if this version of the bill corrects them and we not had an opportunity to re-review them.

Erosion and sediment control plan

Page 39, §22-6A-7(c)(1). It says the plan must show the amount of acreage disturbed. Current plans included in permits do show the total acreage disturbed-usually 12 acres or so in the ones that I have seen. However, some plans, and even the plats, do not show the dimensions of the well pad itself. And the ones I have seen that do show the dimensions of the pad, do not include the area to be disturbed for the impoundment. The definition of "horizontal well" needs to correspond with this provision of the erosion and sediment control plan and maybe the plat etc.

Permit blocking

Page 43, §22-6A-7 (k). Since permits can only be blocked if an inspector actually issues a violation to the operator and gives him time to fix the problem, this section is worthless. The presence of a violation elsewhere should block a permit whether or not an inspector has had time to write it up. Additionally, as the proposed legislation is currently drafted, drillers can get permits for horizontal wells even if they are in violation of requirements for conventional wells.

Minimize fire hazards

Page 48, §22-6A-8(f)(6) requires drillers to minimize fire hazards "in accordance with industry standards." There have been at least two fires in the last year. We suggest that the industry standards are not high enough.

Record Keeping and Reporting for Water and Wastewater

Page 51, §22-6A-8(f)(9)(C)(iii). We think that the information collected pursuant to this subdivision should be reported to the state rather than simply being maintained by the operator. Having this information will help the state to make informed decisions about future regulations and to monitor whether wastewater is being disposed of properly.

Impoundments

Page 52, §22-6A-9(f). There have already been problems with leaks from torn pit liners. The result was pollution of ground water. This pollution may have been avoided if there was a dual liner system with a leak detector.

Notice to property owners

Page 56, §22-6A-10. We previously submitted the following comments on the proposed notice provisions:

> Because the effects of Marcellus Shale operation are felt beyond the surface tracts being disturbed, WV-SORO supports and appreciates the expanded notice to adjacent landowners, owners of water wells and springs within 2,500 feet and the general public. However, we are concerned about the language notifying water supply owners about "the advisability of taking their own pre-alteration survey." We appreciate that a subsequent amendment proposes to expand the operator's presumptive liability to 2,500 feet, and that drillers have the authority to ask for testing within that distance to protect themselves, but we believe that owners of water supplies within 2,500 feet of a proposed gas well should be able to have their water tested at the driller's expense.

Location restrictions and distances

Page 64, §22-6A-12(a).

Distance from Homes

The distance in this version for an occupied dwelling is 625 feet from the dwelling to the center of the well pad.

The word "occupied" is not defined. What about rental or second homes? "Habitable" might be a better choice.

There is no requirement that the gas wells be at the center of the well pad. These wells are drilled 15-25 feet apart and 6 to 12 wells were drilled on a pad. The noise from the edge of the pad could be very close to the surface owner. We know some

surface owners that are 655 feet from a well site and they cannot sleep in their homes at night. This is unacceptable.

The World Bank, Colorado and California have determined that the maximum decibel level for a residence measured at the residence should be 45 decibels at night and 55 decibels during the day (see http://www.earthworksaction.org/noiseresources.cfm#45RATIONALE). These standards should be used. This would eliminate the need for a variance in some respects, if the driller did the things that are necessary to prevent homeowners from having their windows rattled. However, it does not the concerns about the air and other pollution from the sites and the state does not have data to confirm whether or not the proposed setback is protective of human health.

Additionally, even if the safety of persons could be assured, the proposed set back isn't protective of property values, marketability, etc. Although no instate studies have been done to determine what impact Marcellus drilling has on property values, marketability, etc., common sense will tell you that when houses are immediately adjacent to well sites there is likely to be a measurable impact on the value and the home owners' ability to sell. A study conducted for the Town Council of Flower Mound, TX found that negative impacts on property values generally dissipated at a distance of 1,000 to 1,500 feet. In response, Flower Mound adopted an ordinance that that makes it "unlawful to drill, re-drill, deepen, re-enter, activate or convert any oil or natural gas well, for which the closest edge of construction or surface disturbance is located . . . within one thousand five hundred feet (1,500') of any residence" (see http://www.flowermound. com/env resources/env resources ong.php).

Distance from Water Wells

Adequate setbacks are needed for the protection of all water supplies (public and private), yet the proposed legislation provides a more protective setback for public water intakes than it does for private water wells and springs. WV-SORO shares the concerns of public water supply managers and users that their water be protected, however, it is unfair and unjust that the Select Committee chose not to extend the same protections to those whose water supplies are most likely to be affected and who have fewer resources available to them to deal with the contamination if it occurs.

At one of the recent meetings of the Select Committee, an industry official testified that a typical well site is 300 feet by 400 feet. Based on these figures, if the well head is in the center of the pad, a water well or spring that is 250 feet measured horizontally from the well head would, at most be 100 feet from the well pad. Moreover, if the well pad were larger, the water well or spring would be located on the well pad.

Additionally, the 250 foot setback from water wells and springs may be less protective than the existing setback of 200 feet, because the proposed legislation allows drillers to seek a variance. However, under current law drillers cannot locate a well less than 200 feet from a water well without the written consent of the owner.

Bonds

The change from 50,000 to 250,000 for a blanket bond is largely cosmetic. For large companies with multiple wells that will only raise the bond per well from about $20 to $100—a pittance of what it will cost to plug the well.

Presumption of contamination of fresh water source or supply

Page 76, §22-6A-16. This presumption continues the limitation to the current presumption. The presumption is only proximate cause. A civil action for negligence requires the proof of duty, breach, proximate cause and injury. David had to take a case to jury trial for a well within 1,000 feet because the company denied breach of duty facts. We appreciate extending it to 2,500 feet although the horizontals can go for 5,000 feet or more, and be near abandoned, uncased or uncemented wells.

There should not be a limitation of six (6) months. If there is a spill of fracturing fluid or flowback onto the well site, it could take that long or much longer for it to work its way down into the groundwater and 2,500 feet away to ruin your water well. When a contaminant plume enters an aquifer it may take years, or decades, to pass by an individual well. A 2006 study by the U.S. Geological Survey found that groundwater in aquifers of West Virginia ranged in age from 5.9 to 56 years, with a median age of 19 years. The study concluded that because most of the groundwater sampled and analyzed in the study is young (geologically speaking), the potential for human activity to adversely affect ground water quality in West Virginia is high. According to the report, the ages indicate, "that the State's aquifers are vulnerable to contaminant sources in a time span of less than 30 years" (see http://pubs.usgs.gov/sir/2006/5221/pdf/SIR2006-5221.pdf).

Water Replacement

Page 78, §22-6A-16(e) and (f). We support and appreciate the clarification of water replacement requirements.

Website

Page 82, 22-6A-20. This should say, "at a minimum" in case the Secretary can easily make more information available the web site than is required.

Air Quality.

Page 83,. Surface owners support these provisions.

Air, pit safety and other studies

Page 83, §22-6A-21 and page84, §22-6A-22. Unless there is substantial funding for independent review, this is not going to be very effective.

Casing standards

Page 85, §22-6A-24.

It is most important that in casing standards require a bond log of the cementing of the surface casing after the cement has been allowed to harden for twenty four (24) hours. Also, the production casing should be cemented up through any formations that are productive of oil and gas. Additionally, one comment we have heard repeatedly from those we contacted seeking information about the PA regulations is that notwithstanding the new regulations, there are still numerous cases of methane migration that have been linked to faulty casing and cementing practices. According to PA DEP, an overpressured annulus was the cause of most recent incidents in Pennsylvania. A requirement to control and monitor annulus pressure would greatly improve safety and decrease the likelihood of such incidents occurring.

Gas Migration Response

Page 106, §22-6A-24(12)(E)(iii) says that in the event of a potential migration event, the Secretary may require the operator to conduct an "evaluation of the operator's adjacent oil and gas wells [within 2,500 feet] to determine well cement and casing integrity and to evaluate the potential mechanism of migration." While we believe such an investigation is important in determining the cause of the migration, should such an event occur, an evaluation of all existing oil and gas wells within 2,500 feet of a proposed well (including the horizontal legs) could help prevent such migrations from happening in the first place.

Property tax compensation

Page 108 §22-7-3(b). This is 8/100ths of 1% cost to drill the well, assuming it will cost $3,000,000.00 to drill the well, and only 2/100ths of 1% of total value of the gas produced assuming 8BCF at $4 per MCF gas.

TECHNICAL COMMENTS

Erosion and Sediment Control Manual

Page 28, §22-6A-4(b)1. The reference to this Manual in Article 6 talks about the Manual, "as adopted and, from time to time, amended by the office of oil and gas...". Similar language, with reference to the "department" as opposed to the office of oil and gas, is used in the next section on page 39, line 14. For consistency, that language should be included here.

Use of "parallel" in definition of Horizontal Drilling

Page 29, §22-6A-4(b)(3). As I read the dictionary parallel means along something else but next to it, not inside it.

Definition of Horizontal Well

Page 29, §22-6A-4(b)(4).

Can a "well" be defined as a "site" that is other than a "well".

"Utilizes" suggests something that has one purpose is being used for another purpose. Off-brand use of a drug would be utilizing the drug for different disease. The proper word is "uses" we believe.

"In any month" means they can use 150,000 gallons of water on October 31 and another 150,000 gallons on November 1 and fall outside the definition. That is the way we read it. It should say in any thirty (30) day period.

"Liquid" in definition of Pit

Page 29, §22-6A-4(b)(8). Should the word "liquid" should be removed. What about a gel or a solid? "Liquid" is also used in reference to drilling waste on page 79, §22-6A-17(b), line 16.

"Certified by a registered professional engineer"

Page 40, line1 §22-6A-7(c)(2) VS. §22-6A-7(d). Both of these provisions require the same thing. What is the registered professional engineer certifying? There won't be an erosion problem? That the plan complies with requirements? Just that he is an engineer?

Applicability

Page 40, §22-6A-(e). Does the bill need to restate the 210,000 gallons per month here? Same problem other places in the bill.

Statements of no objection

Page 45, §22-6-A-(b). This section only talks about serving the person with the soil erosion and sediment control plan and plat. Many other things accompany the permit application. And this language should be matched up with the final result of surface owner notice/agreement amendment.

Disposal of cuttings at the well site

Page 47, §22-6A-8(f)(3). This appears to allow the disposal cuttings at the well site when there was an amendment adopted to prohibit it (see page 67, §22-6A-14(a), lines 18-21).

Water flow

Page 49, §22-6A-8(f)(9). Should this read "In addition to the other requirements of this section, ..." rather than "subsection"?

Two or more well pads

Page 52, §22-6A-9. The use of this language is confusing and does not make sense in (b). Do two impoundments that serve one well require two fees? Would it be clear to end both (a) after the word "impoundment on line 13 and (b) after the word "impoundment on line 20?

Disposal of cuttings/waste

Page 67, §22-6A-14(a). What is "liner waste"? It is the process of drilling and developing a well that generates the waste.

ATTACHMENT 2.—COMMENTS BY WV-SORO ON PENDING AMENDMENTS TO MARCELLUS DRAFT BILL

Prepared by David McMahon and Julie Archer
November 9, 2011.

WV-SORO has, on numerous occasions, submitted lists of what should be in legislation to regulate Marcellus Shale and other gas well drilling. These are our substantive and technical comments on the pending amendments to the bill being worked by the Joint Select Committee on Marcellus Shale. Failure to mention or include in these comments recommendations we made in our previous public statements or correspondence does not mean that we have abandoned those positions.

COMMENTS/PROBLEMS WITH THE SURFACE OWNER AGREEMENT LANGUAGE

Summary

Under the amendment, the surface owner still does not have to get notice before the driller comes onto their land, the surface owner could have to pay attorney's fees if they sue the driller, and there is no right to a jury trial on damages. While the statute does have a better damages provision then the current surface compensation act, for these immense well sites, the common law claims are already better.

[Note that technically the paragraph numbers have errors that make it very difficult to determine what is intended. Provision (d) should probably be (c)(3) with its subdivisions 1, 2 and 3. Also, paragraph (f) has subdivisions (1), (2) "or" (g).]

"May"

It says the driller "may" provide a notice to the surface owner before coming out to the land. This still allows it to be legal for the driller to sneak out on to a surface owner's land without telling the surface owner first in order for the driller to survey a well pad, frac impoundment and access road location for 12 acres of surface disturbance with no input from the surface owner first. [Technically: what are "drilling

operations"? The permitting statute uses "well work" which is defined. Is surveying, or is staking a site by the driller for the surveyor to survey "drilling operations"? Surveying is the key.]

"Court"

The damages right now are determined by the "court" which means there is no jury trial.

"Reciprocal" attorney fees

Surface owners are opposed to an attorney's fees provision if it also provides that driller's could have attorney's fees against the surface owner. In the realities of bringing law suits, drillers may be willing to bring a law suit even if they have to risk paying the surface owner's attorneys fees, but most surface owners would barely be able to afford their own attorney's fees, let alone risk having to pay the driller's attorney's fees.

Page 2 line 24 says that the statute will provide for "prevailing party" attorney fees "as follows". What follows maybe is intended to provide attorneys fees only if the surface owner "prevails", but drillers will certainly try to get courts to misconstrue the statute using the word "reciprocal" in the statute.

Subsection (g) clearly provides for the possibility of drillers getting attorneys fees if the surface owner "willfully and knowingly violates" the surface compensation agreement. Driller's draft these agreements. Their lawyers will put in provisions to trip up surface owners so they can counter-sue any surface owner that sues the driller. "The terms of this agreement will be confidential," for example. Another example, "Surface owner will notify the operator within 24 hours of every act or omission that is a violation of the agreement". The surface owner notifies the driller 3 times and nothing happens and so gives up and later sues.

Damages

The damages for taking the surface owner's land are not limited to the current use value, as in the present code. However, we believe that under common law trespass and "contemplation of the parties" the driller has no right to be there at all, so the bill is weaker than common law.

Technical

Subsection (f) does not refer to (b) so it could be read to require notice before a surface owner brings any suit, even if the surface owner sues under common law legal theories and not this statute.

COMMENTS ON KARST AMENDMENT

Pre-permit application review

What constitutes/is involved in "a pre-permit application review"? The most reliable way to determine the subsurface/geologic conditions that would be encountered during drilling would be to conduct a geophysical or seismic survey of the area.

COMMENTS ON INSPECTOR QUALIFICATIONS AMENDMENT

This amendment appears to reinsert qualifications that were struck by the adoption of a previous amendment. Experience in the industry might be a good thing, but should not be a requirement. In addition the amendment says in order to be eligible an applicant must be "a citizen of West Virginia." Is this even constitutional?

ATTACHMENT 3

WEST VIRGINIA OIL AND NATURAL GAS ASSOCIATION,
October 12, 2011.

Hon. DOUGLAS E. FACEMIRE,
Room 217W, Building 1, State Capitol Complex, Charleston, WV.

Hon. TIM MANCHIN,
Room 212E, Building 1, State Capitol Complex, Charleston, WV.

Re:Joint Select Committee on Mareellus Shale Draft Legislation

GENTLEMEN,

I am writing to highlight a few of the very serious concerns that the members of the West Virginia Oil and Natural Gas Association (WVONGA) have related to the draft legislation and amendments under consideration by the Joint Select Committee on Marcellus Shale (Committee).

WVONGA recognizes the critical importance of safe and effective exploration using horizontal technology to develop the Marcellus shale formation and supports the public policy stated in proposed Senate Bill 424 that "allowing the responsible development of our State's natural gas resources will enhance the economy of our State and the quality of life for our citizens while assuring the long term protection of the environment." Equally as critical is that any legislation passed be limited to those wells drilled horizontally that use more than live thousand (5,000) barrels of water and disturb three (3) acres of land or more. Further, WVONGA recommends eliminating any language that identifies a single formation; i.e., Mareellus in a statute or subsequent rule, Identifying a particular formation may limit the application of the statute or subsequent rule when considering other formations produced through the use of similar techniques.

Our support is driven by the fact that WVONGA members are key participants in the development of the Marcellus shale, and we find that rational, predictable statutory and regulatory oversight are critical to decisions to invest in the development of Marcellus shale in West Virginia and elsewhere. This said, over-regulation and abusive fee increases will most certainly decrease investment and correspondingly reduce economic impact including job creation and tax revenue generation—both directly and indirectly. As such, we offer the following key points as a non-inclusive list of concerns associated with the work of the Committee—past and future.

First, the "well location restrictions" amendment pending before the Committee will cause very significant portions of the State to become off-limits to drilling thereby sterilizing many resources. Prohibiting production from being located within 1,000 feet of occupied dwellings, barns, water wells or springs used for "domestic animal consumption," and public water supply intakes effectively precludes drilling within a 72 acre area around each such location. You can quickly see how much drilling space is further sterilized by a water well that is 1,000 feet from a house which is 1,000 feet from a barn. Perhaps even more problematic is prohibiting drilling within 100 feet of a "watercourse" and 200 feet from a "wetland" where each can be located in close proximity to one another and are not always easily identifiable. This amendment will have a very significant and perhaps unanticipated negative impact on natural gas drilling in our State.

Second, the "casing and cementing requirements" amendment is an example of legislating details of operation rather than leaving such details to rulemaking by the appropriate State agency—the Office of Oil and Gas of the Department of Environmental Protection (DEP) in this instance. The rulemaking process is better designed to consider the very technical operating variables that may exist from one type of horizontal well or target formation to another. It appears that the drafters of the amendment essentially borrowed the language from Pennsylvania regulations that were finalized after considering around 2,000 comments. West Virginians deserve the same opportunity to participate in a rulemaking process rather than having the Legislature serve in the rulemaking capacity.

Third, "property owner public notice" amendment that was adopted appears to be designed to increase administrative burdens without material public benefit. Increasing the list of persons to receive notice of well permit application to include owners of property adjacent to where well work or land disturbance is performed significantly increases work to identify owners without regard to whether such owner might be remotely affected by drilling operations. Moreover, identifying and providing notice to persons "known to the applicant to have a water well, spring or water supply source within 2,500 feet" creates an area of roughly 143 acres subject to this requirement without any standard as to how "known to the applicant" will be interpreted. These requirements—along with an unprecedented requirement that notice of the tiling of each application must be published for 2 weeks in a local newspaper—will result in obstructing the well permit application process rather than promoting the stated public policy.

An overarching concern is the magnitude of the proposed fee increase by about 1400%. This increase—atop an already aggressive severance tax, as well as the various other incremental costs associated with current and future regulation—sends a clear message to the industry that West Virginia is an uncompetitive business environment. With low natural gas prices in the United States market, capital is limited and easily transferred to areas where a competitive environment is being embraced. Pennsylvania is experiencing a shift away from the dry gas areas where prices are low, to the liquids-rich regions of Ohio where a more competitive environment for development exists. During this foundation-setting period for shale gas development, making sure we have a proper balance in our statutory and regulatory approach to governing our oil and gas program is absolutely critical if we are to maximize the number of jobs flowing to West Virginia residents.This said, we em-

brace DEP's funding request and respectfully suggest an alternative approach toward the desired end: blending a small increase in the permit fee with a reallocation of a small percentage of the severance tax currently being collected.

It is WVONGA's view that the adopted and pending amendments do not advance the cause of promoting the development of our natural resources while at the same time ensuring long term protection of the environment. As examples, singling out the drillers of horizontal wells for additional and burdensome reporting to the Division of Labor and expanding from 1,000 feet to 2,500 feet the presumption of pollution of water wells due to drilling operations are unfair and undermine the confidence of the industry that the Legislature supports the development of Marcellus shale gas reserves.

Further, even though 22 amendments have been adopted with another 4 pending, the Committee has not taken any steps toward exploring pooling or unitization provisions that would dramatically improve our ability to efficiently develop our natural resources while at the same time minimizing environmental impact. Such a conservation provision in the proposed legislation would greatly enhance support from WVONGA members.

I would be happy to respond to questions or discuss these and other important issues with you at your convenience. Thank you for your consideration of this letter and for your service to our great State.

Sincerely,

ROBERT C. ORNDORFF,
President of the Board.

ATTACHMENT 4

INDEPENDENT OIL AND GAS ASSOCIATION OF WEST VIRGINIA, INC.,
Charleston, WV, August 31, 2011.

Hon. TIM MANCHIN,
1543 Fairmont Avenue, Suite 203, Fairmont, WV.

DEAR DELEGATE MANCHIN, Thank you for your letter dated August 16th that requests comments regarding the draft legislation and amendments being considered by the Joint Select Committee on Marcellus Shale. While the members of the Independent Oil and Gas Association of West Virginia (IOGAWV) appreciate the gesture, only being given a short period of time to adopt formal comments to the proposed amendments is somewhat unrealistic in that considerable study and debate among members of industry must be undertaken. Additionally, we would not be doing our due diligence if we did not also consider the expertise of professionals in the fields of civil engineering, petroleum engineering, environmental law, real estate and mineral law, the drilling process itself that is required to provide you with informed, factual, reliable and reasonable comments as to each proposed amendment.

In addition to industry experts, very thorough and competent study by lawyers well-versed in property law and even constitutional law is required for the balancing of the rights of surface owners and mineral owners. Without that sort of expertise, one can hardly imagine any new law emerging that would stand the scrutiny of courts. Changing the precedent vested rights of one party at the expense of another can be a very difficult challenge to meet and must be carefully considered by the best legal minds available to US.

That being said, what follows is our best effort, given the short notice, to address the current state of Marcellus Shale regulations in West Virginia.

Without question, the development of the Marcellus Shale is a generational changing event for West Virginia. Along with the downstream value added potential from wet or ethane rich natural gas produced from the Marcellus Shale, an economic revival of epic proportion for West Virginia is forecasted and hoped for by many as means by which today's students have lucrative jobs—whether as laborers, petroleum engineers, geologists, surveyors, chemical engineers, patent lawyers, mineral lawyers, or as entrepreneurs in the manufacturing sector of the economy. Whatever the case, much hope is given to a new generation of West Virginians—hope that is beyond anything else remotely considered at this time. Accordingly, IOGAWV feels it is very important to make sure whatever changes to current law, rule and regulation governing the drilling industry comes about, is reasonably protective of the environment and yet flexible enough to allow the natural gas industry and its downstream value added components to realize their potential.

While we are hopeful that your fellow House members recognize the potentials that our state faces thanks to the Marcellus Shale, and while we appreciate the time and effort that you and your committee members have put forth thus far through public hearings and discussions, in view of the expressed position of Senate members of the Joint Select Committee on Marcellus Shale and the obvious lack of

consensus on what should or can be done in these matters, it is the feeling of IOGAWV that a more deliberate, methodical process of issue development should be pursued in order to achieve a legislative response to issues that is right, based on fact and expert knowledge as opposed to sensationalism and emotion.

Further, it is not logical that one would express a preference or objection to any of the amendments to which you refer until they are fully vetted by those with expert knowledge as to each. Unfortunately, that was not able to occur before your August 31, 2011 deadline. However, you can be assured that IOGAWV has engaged an internal process of reviewing the amendments offered by House members and remaining to be considered by the Joint Select Committee. As determined appropriate at the time, I am sure such information will be shared with you and all members of the Joint Select Committee, including those from the Senate.

Until such time as we have the information we need to make informed decisions, we feel the state is well served by the proactive efforts of the WV Department of Environmental Protection (WV DEP) and its approach to dealing with Marcellus Shale drilling circumstances. It is important to note that since the active introduction of horizontal drilling and hydraulic fracturing the WV DEP has made at least twelve policy modifications within its inherent authority to regulate drilling. While industry has not necessarily felt each to be perfect, we do recognize they have been effective in addressing increased engineering standards for drill site construction, impoundment construction, pit construction, pit reclamation, modifications to the soil erosion and sediment control manual, various matters relating to water withdrawal, water usage and water disposal associated with the process and more.

We would also like to point out the collaborative efforts of industry and the WV Division of Highways to develop a program of pre-assessing the condition of roads and putting in place policies to insure restoration of local use roads to conditions equal to or better than they were prior to the onset of drilling operations.

Perhaps most significant are the new requirements imposed by Acting Gov. Tomblin's recent executive order. The approval of the WV DEP emergency rules by the Secretary of State serves our state well as an interim measure to further insure protection of the environment while additional policy concerns are considered in a more methodical, informed and calculated process than one in which only one half of a joint select committee is functioning at a time.

This concludes the comments that we are prepared and able to make at this time. Thank you again for your letter and for allowing us the opportunity to respond. We look forward to working with the members of the Select Committee on Marcellus Shale to insure that the significant opportunities surrounding the discovery of the Marcellus Shale formation and West Virginia's natural gas industry are developed to their fullest potential.

Best Regards,

CHARLIE BURD,
Executive Director.

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