HYDRAULIC FRACTURING OF SHALE BEDS: ENSURING REGULATORY APPROACHES THAT WILL HELP PROTECT JOBS AND DOMESTIC ENERGY PRODUCTION

(112–61)

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

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November 10, 2011

MEMORANDUM

TO: Members of the Subcommittee on Water Resources and Environment

FR: Bob Gibbs
Subcommittee Chairman

RE: Hearing on "Hydraulic Fracturing of Shale Beds: Ensuring Regulatory Approaches that Will Help Protect Jobs and Domestic Energy Production"

PURPOSE OF HEARING

The Water Resources and Environment Subcommittee is scheduled to meet on Wednesday, November 16, 2011, at 10:00 a.m. in 2167 RHOB, to receive testimony from federal and state regulators and industry representatives on regulatory approaches to the hydraulic fracturing of shale beds.

BACKGROUND

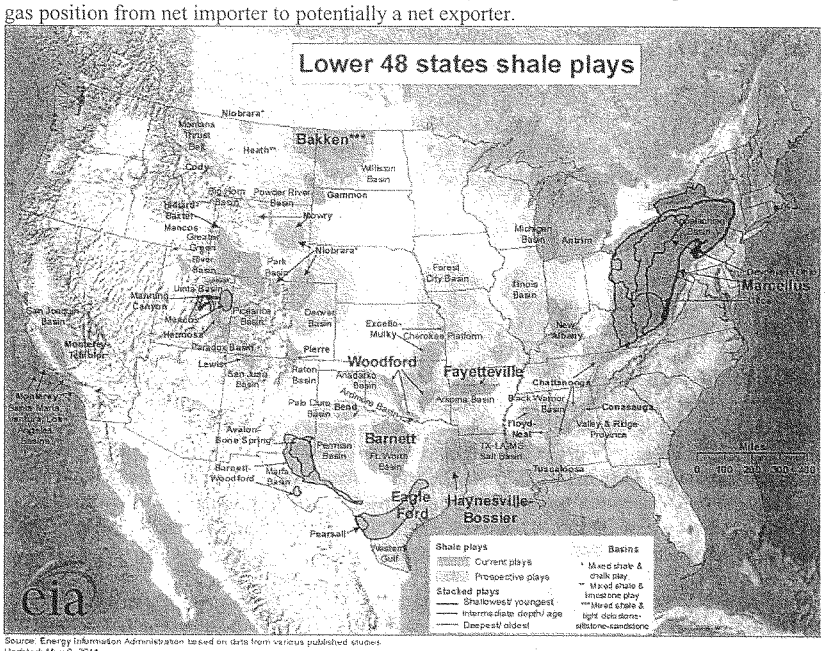
Natural gas is a plentiful, inexpensive and emerging source of domestic energy. A 2010 Congressional Research Service (CRS) study titled "Global Natural Gas: A Growing Resource" found that in 2009, almost 84% of the natural gas the United States consumed was from domestic production. According to a 2011 Massachusetts Institute of Technology (MIT) study, natural gas has gained market share on an almost continuous basis over the past half century, growing from some 15.6% of global energy consumption in 1965 to approximately 24% today. In absolute terms, global natural gas consumption over this period has grown from around 23 trillion cubic feet (Tcf) in 1965 to 104 Tcf in 2009, a more than fourfold increase. The United States Environmental Protection Agency (EPA) found that production from shale formations has grown from a negligible amount just a few years ago to almost 15% of total U.S. natural gas production and is expected to triple in the coming decades.

Traditionally, unconventional sources of natural gas, and particularly shale gas, will significantly contribute to the nation's future energy supply and CO2 emission reduction efforts. Unconventional gas has proven to be difficult to precisely define because what was unconventional yesterday may, through some technological advance or ingenious new process, become conventional tomorrow. In the broadest sense, unconventional natural gas is gas that is

more difficult or less economical to extract, usually because the technology to reach it has not been developed fully, or is too expensive. Assessments of the recoverable volumes of shale gas in the U.S. have increased dramatically over the last five years and continue to grow. According to EPA Administrator Lisa Jackson, America's potential natural gas resource is nearly 50 % larger than it was believed just a few years ago due to advances in drilling technology, such as hydraulic fracturing. The Potential Gas Committee of the Colorado School of Mines states the estimated natural gas reserves within the U.S. have grown by 77% since 1990. Although the development of shale technology has grown rapidly in the past few years, there are still scientific, technological and regulatory challenges to overcome before this very large resource base is optimally developed.

Prevalence of Shale Gas Formations in the U.S.

In the U.S., unconventional natural gas reserves and production, particularly shale gas, have grown rapidly in recent years. In 2009, shale gas reserves increased 76%, while production rose 47%, according to a recent U.S. Energy Information Administration (EIA) report. Between June and July the EIA boosted its own forecast for 2012 liquids production by a startling 170,000 Barrels Per Day (BPD). The newly extractable shale gas resources have changed the U.S. natural gas position from net importer to potentially a net exporter.

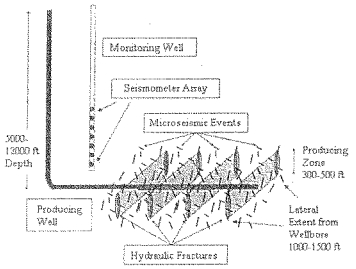


Source: Energy Information Administration based on data from various published studies
Updated: May 9, 2011

As the map above shows, shale gas basins, also referred to as plays, can be found throughout the county. According to "Unconventional Gas Shales: Development, Technology, and Policy Issues", a 2009 Congressional Research Service document, there are at least 21 shale basins in more than 20 states. According to EIA research, 86 % of the total 750 trillion cubic feet of technically recoverable shale gas resources identified are located in the Northeast, Gulf Coast, and Southwest regions, which account for 63 %, 13 %, and 10 % of the total, respectively. In the three regions, the largest shale gas plays are the Marcellus (410.3 trillion cubic feet, 55 % of the total), Haynesville (74.7 trillion cubic feet, 10 % of the total), and Barnett (43.4 trillion cubic feet, 6 % of the total). The Barnett Shale play is reportedly the most active natural gas play in the United States with as many as 173 drilling rigs at work in 2008. The United States Geological Survey (USGS) estimated that as much as 26.7 tcf of natural gas could be present in continuous accumulations as non-associated gas trapped in strata of two of the three Barnett Shale Assessment Units (AU)—the Greater Newark East Frac-Barrier Continuous Barnett Shale Gas AU and the Extended Continuous Barnett Shale Gas AU. The Ohio Department of Natural Resources reports that hydraulic fracturing has been used in more than 1 million wells throughout the country.

What is hydraulic fracturing?

Hydraulic fracturing, also referred to as "fracking," was first used in the late 1940s and has since become a common technique to enhance the production of low permeability formations, especially in unconventional reservoirs such as tight sands, coal beds, and deep shales. Gas shale refers to any very fine-grained rock capable of storing significant amounts of gas. Hydraulic fracturing is required to extract valuable natural gas from the dense shale. The process creates small cracks, or fractures, in horizontal underground rock formations of up to 2 miles below ground level to extract gas from shale. The fracturing process entails the pumping of fracture fluids, primarily water with sand proppant and some chemical additives, at a calculated, predetermined rate and enough pressure to generate fractures or cracks in the target formation. The sand proppant is needed to "prop" open the fractures once the pumping of fluids has stopped. The below diagram illustrates a sample horizontal well fracture.



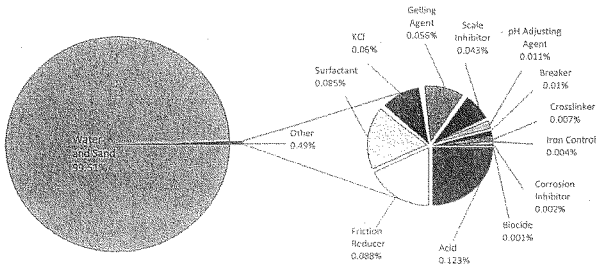
(Diagram is not to scale)

Before operators or service companies perform a hydraulic fracture treatment of a well (vertical or horizontal), a series of tests is performed. These tests are designed to ensure that the well, well equipment, and hydraulic fracturing equipment are in proper working order and will

safely withstand the application of the fracture treatment pressures and pump flow rates. After the testing of equipment has been completed, the hydraulic fracture treatment process begins.

Hydraulic fracturing is performed in stages. Lateral lengths in horizontal wells for shale gas development may range from 1,000 feet to more than 5,000 feet. Because of the length of exposed wellbore, it is usually not possible to maintain a down hole pressure sufficient to stimulate the entire length of a lateral in a single stimulation event and hydraulic fracture treatments are usually performed by isolating smaller portions of the lateral, sequentially beginning with the section at the farthest end of the wellbore, moving uphole as each stage of the treatment is completed until the entire lateral well has been stimulated. By fracturing discrete intervals of the lateral wellbore, the operator is able to make changes to each portion of the completion zone to accommodate site-specific changes in the formation. After hydraulic fracturing is complete, gas begins to flow out of the well to the surface, where it is processed, compressed, and typically transported to markets through pipelines.

The addition of friction-reducing chemicals to fracturing fluids allows this "slickwater" to be pumped to the target zone at a higher rate and reduced pressure than if water alone were used. Slickwater increases water pressure in these microfractures, inducing shear-slip, or microseismic events that generally have magnitudes of less than -1.5 on the Richter scale—about as much energy as released by a gallon of milk dropped from chest height to the floor. In addition to friction reducers, other additives include: Biocides to prevent microorganism growth and to reduce biofouling of the fractures; oxygen scavengers and other stabilizers to prevent corrosion of metal pipes; and acids that are used to remove drilling mud damage within the near-wellbore area. These fluids are used not only to create the fractures in the formation but also to carry a propping agent (typically silica sand) which is deposited in the induced fractures. The graph below demonstrates what the mixture may include; each well may have a unique fluid makeup to address specific geological and hydrological concerns.



Source: ALL Consulting based on data from a fracture operation in the Fayetteville Shale, 2008

Since the make-up of each fracturing fluid varies to meet the specific needs of each area, there is no one-size-fits-all formula for the volumes for each additive. In the classification and regulation of fracturing fluids and their additives, it is important to realize that service companies providing these additives have developed a number of compounds with similar functional

properties to be used for the same purpose in different well conditions. The difference between additive formulations may be as small as a change in concentration of a specific compound.

Wastewater Management

After each fracturing stage, the fracturing fluid along with water originally present deep underground in the shale formation is forced back through the wellbore to the surface. The flowback period can last from a few hours up to several weeks, although some injected water can continue to be produced along with gas for several months after production has started. A USGS study of the waters associated with oil and gas extraction found that flowback and water produced during a well's lifetime can contain naturally occurring formation water that is millions of years old and therefore can display high concentrations of salts, naturally occurring radioactive material (NORM), and other constituents including arsenic, benzene, and mercury. On the other hand, some wells produce water that is nearly potable in quality. Many oil-field waters are particularly rich in chloride, and this enhances the solubility of other elements that might be present including the naturally occurring radioactive element radium. The possible contamination of this water requires that it be disposed of in a responsible manner.

Flowback water is dealt with differently in various shale plays across the country. In the Barnett, Fayetteville, Haynesville, Woodford, Antrim, and New Albany Shales, the primary disposal method has been injection into underground saline aquifers, such as the Ellenberger Limestone that underlies the Barnett formation. Underground Injection Control (UIC) Class II wells provide a means for disposing produced water by re-injecting them back into their source formation or into similar formations. UIC Class II wells are governed by Sections 1422 and 1425 of the Safe Drinking Water Act. According to EPA, the approximately 144,000 Class II wells in operation in the United States inject over 2 billion gallons of brine every day. Most oil and gas injection wells are in Texas, California, Oklahoma, and Kansas. There are tens of thousands of licensed injection wells in Texas, but because of geological and political constraints, many fewer exist in the Marcellus Shale states. According to the EPA, Pennsylvania had only 10 of these Class II Underground Injection Control (UIC) wells in 2008. The emerging Utica Shale play appears to be favorable for the extensive use of UIC wells.

If UIC wells are not feasible, it is likely that a service company will have to transfer the wastewater off-site to an industrial treatment facility or a municipal sewage treatment plant that is capable of handling and processing the wastewater. In this case, the operator of the publicly owned treatment works (POTW) or industrial treatment facility would assume responsibility under the Clean Water Act (CWA) for treating the waste before discharging it into a nearby receiving water in compliance with effluent limitations contained in the facility's discharge permit. Currently, wastewater associated with shale gas extraction is prohibited from being directly discharged to surface waters.

One potential alternative to off-site disposal may be on-site treatment and reuse of flowback and produced water. Some companies are reportedly considering on-site treatment options such as advanced oxidation and membrane filtration processes. On-site treatment technologies may be capable of recovering 70%-80% of the initial water to potable water standards, thus making the water immediately available for reuse. The remaining 20%-30% is

very brackish and considered brine water. A portion may be further recoverable as process water, but not at potable water standards. In other cases, companies send the briney water off-site for treatment and disposal. The economics of any such options are critical, and site factors such as available power and final water quality are often the determinant in treatment selection.

Recycling the water is another option, but will require new technological developments. In one case, Devon Energy Corporation (Devon) is currently using water distillation units at centralized locations within Texas's Barnett Shale play to treat produced water from hydraulic fracture stimulations. As of early 2008, Devon had 50 wells using recycled water. Devon reports that the program is still in its testing and development stages. With further development, such specialized treatment systems may prove beneficial, particularly in more mature plays such as the Barnett; however, their practicality may be limited in emerging shale gas plays. New approaches and more efficient technologies are needed to make treatment and re-use a wide-spread reality.

According to MIT's study of natural gas and hydraulic fracturing, every year the onshore U.S. industry safely disposes of approximately 18 billion barrels of produced water. By comparison, a high-volume shale fracturing operation may return around 50 thousand barrels of fracture fluid and formation water to the surface. The challenge is that these volumes are concentrated in time and space.

Regulation of Fracking

The development and production of oil and gas in the U.S., including shale gas, are regulated under a complex set of federal, state, and local laws that address every aspect of exploration and operation. The EPA administers most of the federal laws, although development on federally-owned land is managed primarily by the Bureau of Land Management (part of the Department of the Interior) and the U.S. Forest Service (part of the Department of Agriculture). The Clean Water Act governs the wastewater from hydraulic fracturing activities, including the discharge to surface water bodies or sewage treatment plants; the Safe Drinking Water Act regulates the underground injection of fluids into wells; and the Clean Air Act limits air emissions from engines, gas processing equipment, and other sources associated with drilling and production. The National Environmental Policy Act (NEPA) requires that exploration and production on federal lands be thoroughly analyzed for environmental impacts. Most federal laws have provisions for granting "primacy" to the states who also thoroughly analyze environmental impacts (i.e., state agencies implement the programs with federal oversight).

State and local agencies not only implement and enforce federal laws, but also have their own sets of laws to administer. The States have broad powers to regulate, permit, and enforce all shale gas development activities—the drilling and fracture of the well, production operations, management and disposal of wastes, and abandonment and plugging of the well. State regulation of the environmental practices related to shale gas development, usually with federal oversight, addresses the regional and state-specific character of the activities. Some of these location-specific factors include: Geology, hydrology, climate, topography, industry characteristics, development history, state legal structures, population density, and local economics. State laws often add additional levels of environmental protection and requirements to the already strict

federal requirements. Several States also have their own versions of the federal NEPA law, requiring environmental assessments and reviews at the State level and extending those reviews beyond federal lands to State and private lands.

Rules and regulations developed by state agencies such as the Oklahoma Corporation Commission, Colorado Oil & Gas Conservation Commission, the Texas Railroad Commission, or the Pennsylvania Department of Environmental Protection govern the specifics of gas production, requiring producers to obtain permits before drilling, and requiring certain standards and practices to be used during well construction, hydraulic fracturing, waste handling, and well plugging. State regulations also deal with tanks and pits as well as any chemical or waste water spills.

Beyond government regulation, stakeholder groups provide industry-wide best practices reviews. One group, STRONGER, an acronym for State Review of Oil and Natural Gas Environmental Regulations, was formed in 1999 to reinvigorate and carry forward the state review process begun cooperatively in 1988 by the EPA and the Interstate Oil and Gas Compact Commission (IOGCC). This diverse group that includes industry representatives, environmental groups, federal and state agencies meets to study and review state practices and make recommendations as needed. This activity provides a validation of state regulation practices.

Future Regulation Possibilities

In March 2010, EPA announced its intention to conduct a study of hydraulic fracturing in response to a request from Congress. Since then, the agency has held a series of public meetings across the nation to receive input from states, industry, environmental and public health groups, and individual citizens. The initial research results and study findings will be released to the public in 2012, with the final report scheduled for 2014. The final study plan looks at the full cycle of water in hydraulic fracturing, from the acquisition of the water, through the mixing of chemicals and actual fracturing, to the post-fracturing stage, including the management of flowback and produced or used water as well as its ultimate treatment and disposal.

On October 20, 2011, EPA announced a plan to develop national standards specifically for wastewater discharges produced by natural gas extraction from underground coalbed and shale formations. EPA will consider standards based on demonstrated, economically achievable technologies, for shale gas wastewater that must be met *before* going to a treatment facility. At the current time, the date of implementing these standards is unknown, but EPA is looking to propose a rule for shale gas in 2014. EPA needs time to gather sufficient comparable data on shale gas activities. In particular, EPA will be looking at the potential for cost-effective steps for pretreatment of this wastewater based on practices and technologies that are already available and being deployed or tested by industry to reduce pollutants in these discharges. The effluent guidelines program, which sets national standards for industrial wastewater discharges, is based on best available technologies that are economically achievable. EPA is required to publish a biennial outline of all industrial wastewater discharge rulemakings underway. EPA has issued national technology-based regulations for 57 categories of industries, including oil and gas development, since 1972.

Benefits of Natural Gas Production

As noted earlier, a 2010 CRS study found that in 2009, almost 84% of the natural gas the United States consumed was from domestic production. Domestic energy production is safe and secure – not subject to international turmoil. According to MIT, in the U.S., around 30% of natural gas is consumed in the electric power sector. Within the power sector, gas-fired power plants play an important role, due to their inherent ability to respond rapidly to changes in demand. In 2009, natural gas plants represented over 40% of the total generating capacity. The U.S. gas market is mature and sophisticated, and functions well, with a robust market. Domestically, the price of oil (which is set globally), compared to the price of natural gas (which is set regionally), is very important in determining market share when there is an opportunity for substitution. Abundant domestic natural gas production ensures consistently low-cost energy for American consumers.

Natural gas is also the fuel of choice for a wide range of industries, including pulp and paper, metals, chemicals, petroleum refining, and food processing. According to the EIA, these five industries alone account for almost three quarters of industrial natural gas use. For many products, there is no economically viable substitute for natural gas and a major disruption to availability or price would negatively affect many sectors of the economy.

Natural gas also has environmental benefits, emitting only half as much Carbon Dioxide and other air pollutants and as coal and approximately 30% less than fuel oil. With these facts, it is generally considered to be central to energy resource plans focused on the reduction of greenhouse gas emissions. The current emphasis on the potential effects of air emissions on emissions, and air quality solidifies that cleaner fuels like natural gas are an important part of our nation's energy future.

Natural gas is a cornerstone of the current Administration's efforts to reduce environmental impacts of energy consumption. EPA Administrator Lisa Jackson stated "The president has made clear that natural gas has a central role to play in our energy economy. That is why we are taking steps – in coordination with our federal partners and informed by the input of industry experts, states and public health organizations -- to make sure the needs of our energy future are met safely and responsibly."

Economic Impacts of Domestic Shale Gas Development

Natural gas is an increasingly valuable commodity. In future projections from the International Energy Agency, demand increases by 44% between 2008 and 2035 – an average rate of increase of 1.4% per year. Growth in demand for gas far surpasses that for the other fossil fuels due to its more favorable environmental and practical attributes, especially given the constraints on how quickly alternative low-carbon energy technologies can be deployed. China's gas demand growth accounts for more than one-fifth of the increase in global demand through 2035. The largest single use of natural gas continues to be power generation, where it is used as a low cost, environmentally friendly alternative to coal. Future demand increases could stem from the growth of clean natural gas fueled vehicles.

Domestic energy production fuels economic growth. A 2011 Pennsylvania State University study on the economic benefit of the Marcellus Shale forecasted major economic development throughout the Marcellus Shale region because of extraction activities. Marcellus producers plan to spend significantly more in 2011 and 2012, generating more than $12.8 billion in value added in 2011 and another $14.5 billion during 2012. This higher economic activity generates almost $2.6 billion in additional state and local tax revenues during those same years. Employment in the State of Pennsylvania is projected to expand to over 180,000 jobs during 2012 in Marcellus related and supporting jobs. This dramatic increase in Marcellus drilling activity has occurred even during a period of slow economic growth and relatively low natural gas prices. Natural gas production from the Pennsylvania Marcellus will likely average 3.5 billion cubic feet per day during 2011 and could exceed 6 billion cubic feet per day during 2012.

The emerging Utica shale is spurring statewide economic development in Ohio. More than 204,000 jobs will be created or supported by 2015 due to exploration, leasing, drilling and connector pipeline construction for the Utica Shale reserve. With the substantial pace of development, economic output will increase by over $22 billion and wages by $12 billion by 2015. In the year 2015, local government wage tax revenues from Utica related activities may amount to $240 million. This estimate does not count the severance or ad valorem taxes that will be levied upon producers of crude oil and natural gas.

Beyond the drilling and extraction professions, hydraulic fracturing provides employment opportunities in many other fields including pipeline construction, research and development, and chemical processing. For example, ethane is produced when processing plants remove the natural gas liquids found in "wet gas" from methane. The ethane is then "cracked" to form ethylene, the basis of plastics. West Virginia, which rests above the Marcellus Shale, is working to attract an ethane cracking plant. According to a March 2011American Chemistry Council analysis titled "Shale Gas and New Petrochemicals Investment: Benefits for the Economy, Jobs, and US Manufacturing" an ethane "cracker" would represent an investment of $1.5 billion or more. If West Virginia attracts a cracker, about $3.2 billion would be invested in the downstream chemical facilities that would make products like dyes, paints, coatings and plastics, and according to the Council's analysis would generate $7 billion in additional chemical industry output in that state. Overall about 12,000 jobs would be created in the chemical industry and throughout the supply chain in West Virginia, the Council estimated. Regional job growth, such as the potential manufacturing jobs created by ethane cracking, requires that investors and communities have a strong level of certainty that domestic natural gas extraction will continue to be economically viable and thriving.

WITNESSES

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Director, Office of Wastewater Management
United States Environmental Protection Agency

Dana L. Murphy
Chair, Oklahoma Corporation Commission

Michael Krancer
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Martie Groome
Vice Chair, Pretreatment and Pollution Prevention Committee
National Association of Clean Water Agencies

HYDRAULIC FRACTURING OF SHALE BEDS: ENSURING REGULATORY APPROACHES THAT WILL HELP PROTECT JOBS AND DOMESTIC ENERGY PRODUCTION

WEDNESDAY, NOVEMBER 16, 2011

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:04 a.m. in Room 2167, Rayburn House Office Building, Hon. Bob Gibbs (Chairman of the subcommittee) presiding.

Mr. GIBBS. The Subcommittee on Water Resources and Environment will come to order. I would like to welcome everybody here today. Secretary Krancer is on his way, he is coming through the security line, so he will be here momentarily.

First order of business, I want to ask for unanimous consent: Representative Farenthold of Texas is a member of the Transportation and Infrastructure Committee, but doesn't sit on this committee, and has asked to sit on this committee when he arrives. So I have asked for unanimous consent to allow him to do that.

[No response.]

Mr. GIBBS. Hearing none, so ordered.

I will start here with my opening statement dealing with hydraulic fracturing.

First of all, again, welcome to today's hearing on hydraulic fracturing and natural gas production from shale beds, and ensuring that the regulatory approaches governing these activities will protect jobs and domestic energy production.

Our Nation is blessed with an abundant supply of natural gas trapped in deep underground shale formations. Through a technique known as hydraulic fracturing, or fracking, much more of this domestic energy resource can be extracted from these geologic formations, and used to drive our economy.

Fracking consists of injecting mostly water and sand under high pressure into wells drilled into gas-containing shale strata, causing the shale to fracture. As a result of these fractures, the formation is able to yield much more of the gas that it is holding. Fracking technologies have been used for more than 60 years as a means of increasing productivity from oil and gas wells. However, the technique has recently been applied to gas production in unconventional shale formations with remarkable results.

Just a few years ago, almost no gas was produced from wells and shale formations. And today these produce nearly 15 percent of the U.S. natural gas production. This percentage is expected to grow significantly over the next several decades. As a result of applying the fracking technique to shale gas beds, the United States is transitioning from a natural gas importer to a natural gas exporter.

In numerous areas around our Nation where shale gas formations are found, there has been an economic boom resulting from gas exploration and production. Not only is America getting a relatively cheap and less polluting source of energy, but the activity is generating thousands of direct jobs in the drilling, extracting, and refinement processes.

In Pennsylvania alone, employment is projected to expand by over 180,000 jobs during 2012 in the Marcellus shale formation in the State. And in my State of Ohio, activities associated with energy production from the Utica shale will be responsible for generating more than 204,000 jobs and $12 billion in wages by 2015.

In addition to the clear economic benefits of energy production through fracking, there is a national security benefit, as well. Making greater use of domestic sources of energy reduces our dependence on foreign energy sources that are often unstable and unfriendly.

In addition to gas, most wells and shale formations recover a large amount of water that may contain high concentrations of naturally occurring salts and possibly some naturally occurring radioactive materials and other constituents. Thus, waste water must be properly managed in accordance with the Clean Water Act and other applicable Federal and State requirements.

Currently, the waste water from a well and a shale formation is typically either recycled, or is injected back into the deep underground formations, once the gas has been extracted. This activity is regulated under the Safe Drinking Water Act.

If waste water were to be to discharged to surface waters, it would regulated under the Clean Water Act. This committee has jurisdiction over the Clean Water Act. Discharges to surface waters are currently not approved. Municipal sewage treatment plants are not used for disposal because in many cases the treatment plants are not equipped to handle all the constituents that may be found in the waste water.

Fracking, as a means of enhancing gas extraction from shale formation, needs to be properly and efficiently managed so significant economic benefits and job-producing activities can be realized safely and without environmental risk. Thousands of fracking stimulated wells have been used to extract energy resources in a safe and economical manner. Since fracking began more than 60 years ago, the process has been regulated by the States. Currently, the regulations of the waste water from the well is being done by State agencies, both implementing State laws and applicable Federal requirements.

Last month the U.S. EPA announced that it plans to develop new guideline standards for waste water discharges produced by natural gas extraction from underground shale and coal bed formations. Even though no comprehensive set of Federal standards ex-

ists at this time for the disposal of waste water discharge from natural gas extraction activities, States have been picking up the slack to make sure such activities are conducted safely.

Moreover, the States are constantly improving their efforts to make sure that extraction of these important energy resources are done in a safe and environmentally protective manner.

I am concerned that, given the recent history of the new EPA regulations, these new guidelines will be so needlessly restrictive that the gas extraction operations in Ohio and many other States, and the resulting economic benefits they provide the States, will suffer. The economic and national security benefits that come from safely extracting gas from shale formations are vitally important. We must be sure that the EPA thinks carefully before developing new Clean Water Act standards that would needlessly restrict this important industry, and burden it with an additional layer of duplicative Federal regulations.

I welcome our witnesses to the hearing today, and look forward to hearing from each of you. But at this time I would like to yield to my ranking member, Mr. Bishop, for any statements he might have.

Mr. BISHOP. Thank you very much, Mr. Chairman. Mr. Chairman, I welcome this hearing that highlights an issue of significant importance to my home State of New York, as well as many other States throughout the Nation. In my view, the growing national debate on hydraulic fracturing is less about whether this Nation will develop its domestic natural gas resources, and is more about how natural gas production should be developed and regulated to protect American jobs, public health, and the environment.

In my own State of New York, much of the concern about hydrofracking, or fracking, has focused on how to ensure that the largely unknown cocktail of chemicals and pollutants that are injected into the ground during the drilling process do not contaminate local drinking water supplies and endanger public health or the environment. Where the drinking water sources of New York communities are potentially at risk, the State has taken prudent and necessary steps to protect them.

Regarding the focus of today's hearing, I am not entirely sure what the majority has in mind. From my perspective, today's hearing should focus on the important questions of what to do with the chemicals and other fracking byproducts, once they cease to be of value for natural gas production and need to be disposed of. We will hear testimony about the most common methods of handling drilling waste, such as recycling, underground injection, or disposal at treatment plants.

However, if the intended focus of today's hearings is the potential impacts of EPA regulations on jobs or domestic energy production, then I hope someone can show me which Clean Water Act regulations we are worried about. While oil and gas producers have long been prohibited from directly discharging their waste waters into the waters of the U.S., that sensible restriction clearly has not impacted shale gas production which, according to the Energy Information Administration, has increased by 400 percent over the past 3 years.

So, what is the issue? It is true the EPA has announced it will consider whether a national pretreatment standard for shale gas waste water should be established, but that effort has just begun, and no regulation will be proposed before 2014 if the EPA decides a pretreatment standard is even needed at all.

I hope we can all agree that, so far, EPA's fact-finding efforts regarding hydrofracking waste water disposal can hardly be seen as caustic to business or job creation. Determining whether or not hydraulic fracturing waste water disposal has any potential negative impacts on public health or the environment should not be a cause for alarm. In fact, as policymakers we should want to know all that we can about the potential impacts hydrofracking may have on our communities, our constituents, and our water quality.

Today most treatment plants are ill-equipped to handle the chemicals and other pollutants that may be common to hydrofracking waste water. Without additional efforts, these chemicals and pollutants may pass through treatment facilities and into the surrounding environment, raising significant public health and environmental concerns. This should give us all pause.

These concerns were highlighted earlier this year, when the New York Times ran a front-page article on "how the highly corrosive salts, carcinogens like benzine, and radioactive elements like radium" in drilling waste are typically not removed by sewage treatment plants. According to the article, these chemicals and pollutants typically pass through the sewage treatment plant untreated, and wind up being discharged back into local receiving waters, where they can contaminate downstream drinking water sources in the environment.

In fact, the former secretary of Pennsylvania's department of conservation and natural resources, John Quigley, was quoted in this article as saying, "We are producing massive amounts of toxic waste water with salts and naturally occurring radioactive materials, and it is not clear we have a plan for properly handling this waste."

I, for one, believe we should dig deeper into the questions raised by the EPA, sewage treatment plant owners, and others about the capability of sewage treatment plants to adequately handle fracking waste. For example, how can systems designed with technologies to treat domestic sewage and nutrients be expected to safely remove industrial chemicals and naturally occurring radioactive materials from the waste water stream?

More importantly, how can we expect sewage treatment plant owners to safely operate their systems, when many times they do not even know the chemicals and other pollutants that are contained in the drilling waste they are being asked to treat?

More specific to the topic of today's hearing would be the development of Clean Water Act guidelines for discharges associated with the natural gas industry sector providing a cost-effective, nationally recognized standard for the safe disposal of chemicals associated with natural gas production in the same way as other guidelines for discharge from other industries.

Finally, I am having trouble keeping up with what role the majority intends for State regulatory agencies under the Clean Water Act. As I have stated numerous times, the successes of the Clean

Water Act can be traced to a robust Federal-State partnership in addressing water quality impairments. However, in bill after bill we seem to be undermining this partnership for political expediency.

A few months ago, with H.R. 2018, the Clean Water Cooperative federalism Act, the majority voted to remove any Federal role in establishing certain water quality standards, leaving States to have the final word. Then, just yesterday, the House voted to approve a Coast Guard authorization in which the majority formally rejected any role for the States to protect important local water resources from invasive species. Today I have to assume that we are back to the view that the States are better equipped to protect their local water bodies from the chemicals and pollutants contained in fracking waste.

In my view, this committee and the public would be better served delving into the complex questions of how best to balance our need for domestic fuel production with the protection of public health and the environment in a cautionary manner.

In my view, the issues of how we structure the development of our domestic natural gas resources is very important, and one that needs to be dictated by a modicum of caution. Potentially releasing these largely undisclosed chemicals into our ground waters, our underground aquifers, and our surface waters will have economic, public health, and environmental consequences for generations to come.

We need to be prudent in understanding the implications of our actions before we take them, as the cost of cleaning up our mistakes afterward has the potential to be massive.

I yield back the balance of my time.

Mr. GIBBS. Mr. Cravaack, do you have an opening statement?

Mr. CRAVAACK. Thank you, Mr. Chairman. And thank you, Chairman Gibbs and Ranking Member Bishop, for holding this important hearing on the best way to approach hydraulic fracturing regulation.

I would like to welcome today's witnesses and our panel, and I look forward to hearing your testimony about a vital part of our country's energy future. I understand that fracking is a rapidly growing part of our energy infrastructure, and is projected to continue its growth in the years to come. In times of rising energy costs and high unemployment, the natural gas industry is a major bright spot, providing power to a wide range of industries for a low cost.

I am concerned at some of the steps recently taken to expand regulation and oversight on our industry that has done nothing to warrant such action. I am very interested to see what the EPA's finding are in its upcoming study, and I hope those findings don't lead to an increase in energy costs, fewer jobs, or handcuff an industry that is very much on the rise to reduce our dependence on foreign energy sources.

I look forward to hearing the witnesses and their thoughts on what steps are needed, if any, to responsibly oversee hydraulic fracturing operations. Thank you again, and I look forward to your testimony. And I yield back.

Mr. GIBBS. Thank you. Mr. Altmire, you have an opening statement?

Mr. ALTMIRE. Thank you, Mr. Chairman. I come from Pennsylvania, in a State and a region of the country where this is an incredibly important issue. This is the issue I, by far, hear more about when I travel around than any other issue. It is a limitless opportunity, economically, and—in creating jobs for Pennsylvania. And I am very grateful for our EPA representatives who are here to discuss this issue, because I know it is important to you, as well. And we have Secretary Krancer, and everyone else who is here.

I am most interested in learning about the unique geography that Pennsylvania has. As a Democrat, I think that Governor Corbett in Pennsylvania has done a very good job in managing the balance that needs to be struck in making sure that we take advantage, economically, from a jobs perspective, of this very unique circumstance that we have in Pennsylvania, and balancing it to make sure that we do it in as clean and safe a way as possible.

So, what I would like to learn today from all of our witnesses—but especially our EPA witnesses—what can we do better? What would be your vision, moving forward, and in particular the unique geography of Pennsylvania in dispensing of the fracking fluid and the waste water?

And I believe—and I have been very public about this—I think the State is in a much better position to make those decisions on the regulatory environment, and how we meet those unique challenges, based upon the circumstances that are unique to Pennsylvania, as a State, compared to any other State.

So, I am here to listen and to learn and to participate. And I again want to just reiterate, Mr. Chairman, this is a very important issue to the district I represent, and to the State where I come from. And I am grateful that we are holding this hearing today.

Mr. GIBBS. Thank you. Mr. Harris?

Dr. HARRIS. Thank you very much, Mr. Chairman. And I want to thank you for holding this hearing. As you know, we have held hearings on this subject in my subcommittee, Energy and Environment Subcommittee in science and technology. In fact, tomorrow afternoon we will hold another one about some of the underlying science on the studies involved.

The context in which we have to discuss this is, you know, making perfect the enemy of good. And we have a 9 percent unemployment rate in the United States. You know, to say that there is a public health implication of the possibility of contaminating water with hydrofracturing fluid—although in testimony in front of my subcommittee, or in my committee, science and technology, you know, I asked the panelists very simply, as I will ask the panelists today: Does anyone know of any documented circumstance of hydrofracturing contaminating drinking water? So all of you, that is a heads-up, you are going to get the question. Because I couldn't get an answer. The answer I got was no on the last panel I asked that question.

Now, we know that with a 9 percent unemployment rate there are public health implications of that. We know, because we can't fund adequate health care in this country. We know part of it is the economic situation we are in, and we know we have got to get

out of that situation. One of the keys clearly are using the energy resources of this country to get out of the economic situation we are in—9 percent unemployment, $3.50 a gallon of gas—all of which compounds the problems.

Now, if you look at the growth of the natural gas resource reserves in the United States in the last 10 years, it is striking. Exponential growth in reserves, mostly due to the discovery of the reserves that exist within the shale formations.

Now, they are not easy to get to. We have some under the western part of my State. So I went out and wanted to visit one of the locations where they are exploring and producing. Unfortunately, I couldn't go in my own State. I had to go to the State of Pennsylvania because in my State they have decided to have a moratorium. Fortunately for Pennsylvania, they haven't, because when you visit those areas of the State, they are boom towns. They are what the entire United States could be if the administration had a reasonable economically based policy with regards to using our natural reserves to get us out of the economic mess we are in.

Now, I wish I shared the ranking member's enthusiasm that this is only a matter of not whether we are going to ever use these resources, but how. And if they want—if anybody wants any better proof of how important that question is, it is called Keystone Excel. Because the question up until a week ago was, well, you know, it is not whether it is every going to be built, but how and where. Now it is a question, actually, of whether it ever will need to be built, because Canada is going to go ahead and build a pipeline to their port terminals and ship that natural resource to Asia, instead of the United States, where we desperately need low-priced, petroleum-based energy to fuel an economic recovery.

The question with Keystone Excel might be now not even a question of whether. And that is the problem, that we don't exist in a global vacuum with regards to energy. And if we don't make use, and we don't do everything we can to facilitate the access to these—to this shale formation natural gas, it may be an opportunity we may never get again.

So, sure, we want to have clean drinking water. But I actually stood on a property in western Pennsylvania where this drilling and exploration is going on, and it is on a reservoir property where through the trees you see the drinking water of the local community. Now you got to tell me that nobody, nobody sitting inside a bureaucratic white tower, ivory tower in Washington, DC, with EPA on the door, is going to have any more concern for the drinking water in that community than someone who drinks the water in that community.

And that is what this hearing is going to be all about. It is going to be about who best knows about how to protect the local drinking water. I got to tell you, I don't come down on the person sitting in Washington making a decision for western Maryland, or western Pennsylvania, or eastern or western any State in this country. And that is what it is about.

So I am going to be asking, you know, the EPA representative, you know, how are they going to make sure that when they come up with this study or these guidelines, that they don't do that?

So, Mr. Chairman, I thank you very much for holding the hearing. It is an incredibly important subject for this country, and I look forward to what the panel has to say. Yield back.

Mr. GIBBS. Thank you. Representative Napolitano, opening statement?

Mrs. NAPOLITANO. Thank you, Mr. Chair. And I have—I am grateful for the hearing, because it is an issue that I have been involved with for not quite 13 years that I have been in Congress, but a good part of that.

As ranking member of the Natural Resources Water and Power Subcommittee, we have had numerous hearings that deal with the contamination of the ponds, the pools of water left by those that do hydrofracking, and then expect the citizens, the taxpayers, to clean them up. And while it may not be contaminated for a whole area, it is possible that the leaching could go into the aquifers and contaminate the drinking water of these communities.

We must continue to investigate the impact that it has on our water supply, and especially our ecosystem. The pools that are left behind may contain corrosive salts, benzine, radioactive elements. And unfortunately, the sewage plants sometimes may take some of that residue, that leftover waste water, may not be able to deal with the chemicals that are present in those waste waters. And then they contaminate that water that is being produced as secondary, whether it is tertiary-treated water, et cetera.

So, in the many years that I have worked on this issue, I have great questions about whether it may not directly contaminate the aquifers, but it certainly is a process that is being questioned.

And let's not forget that ground water is the most vital resource for all our water agencies that provide this gold. Water is now gold for business, for agriculture and especially for the communities that bank on us, EPA, putting the regulations that are going to provide them with clean, potable water.

So it is really a vital thing for my area, for my State. We have a superfund site list that has been—and cleanup—because of contaminations. At least 20 years, and it has got another maybe 10 or 15 to go. It is the biggest superfund cleanup in—well, in California, probably the United States. So I have a great issue on not being able to have the EPA and the States have the ability to deal with their own contamination, and how they can go after the PRPs, the potential responsible parties.

So, with that, I look forward to hearing from the witnesses on this topic, and I thank the chair and the ranking member.

Mr. GIBBS. Representative Shuster, you have an opening statement?

Mr. SHUSTER. Yes, I do. Thank you, Mr. Chairman. Thank you for holding this hearing. And also, thank you to the witnesses for being here today.

I would like to associate my remarks and—with the remarks of the gentleman from Pennsylvania, Mr. Altmire, for two reasons. One, because I agree with everything he said, and second, to demonstrate what bipartisan support that this development of shale gas in Pennsylvania has in the United States Congress. And we worked across the aisle, I worked with Secretary Krancer and others in the State of Pennsylvania to fight the Federal Government,

to fight the EPA and the Corps of Engineers from expanding into Pennsylvania and taking over some of the functions that the Pennsylvania Department of Environmental Protection has done for decades, and has done it successfully, in protecting the environment, in protecting the drinking water of Pennsylvanians.

And as Mr. Harris pointed out, I don't believe somebody sitting in Washington, DC, is more—is better equipped or more dedicated than the folks at Pennsylvania Department of Environmental Protection, or our local elected officials in protecting the water of our citizens.

Marcellus shale is a tremendous opportunity, not only for Pennsylvania to create employment and to regain our stature in the States as one of the economic powerhouses in the United States, but it is also important for America, for us to reduce our dependence on foreign oil, which we every year, to the tune of over $100 billion, we are sending to countries that, quite frankly, hate us. So it is extremely important.

Now, I have heard the President talk about expanding our energy, using natural gas. But his rhetoric doesn't support his actions. And just as the Keystone Pipeline is a perfect example of that, here we have a great opportunity to get oil from a great ally, our neighbor, Canada, and we have pushed it off for another year, and there is questions as to if it will ever be built in this—to support the United States and our needs for energy.

Again, the President's actions don't support. He talks about improving the environment for businesses and reducing regulations, but yet one of his agencies—whether it is the Corps of Engineers or the EPA—they turn around and are expanding their efforts and their regulatory reach into places like Pennsylvania.

And the word that is out there—my good friend from New York, he talks about caution. It is not caution that is out there, it is hysteria. Leading newspapers in America are putting out false information, or misinformation out there. The documentary—so-called documentary—"Gasland," was filled with misinformation. And yet the extreme left in this country, and Hollywood, celebrated it. And again, when you go through it, there is not much truth to it. And we hear this misinformation, this hysteria, going on all around the country.

As I said, I have now joined with my colleagues across the aisle here in Congress, in the Pennsylvania delegation, to fight the Corps of Engineers, for instance, that is reaching out there to try to take in the permitting of pipes over small streams. The department of environmental protection in Pennsylvania has done it for 40 years, and done it quite successfully. Yet the Corps of Engineers is now reaching out there, trying to take on this responsibility. I believe they are doing it because some bureaucrat sitting in the Corps of Engineers figures this is how they can justify their existence for the next 40 years, because of the huge potential for Marcellus shale in Pennsylvania and for the country.

So, we are fighting that on a daily, weekly basis, joining with our great secretary of the department of environmental protection, Mr. Krancer, Secretary Krancer, to slow that down and to turn that around so that Pennsylvania can decide how best to regulate its emerging gas industry.

So I appreciate the hearing today. I think this is going to be a very interesting and maybe somewhat lively discussion here today, but I look forward to hearing from all the witnesses. And again, Mr. Chairman, thank you for holding this. I yield back.

Mr. GIBBS. Mr. Bucshon, you have an opening statement?

Dr. BUCSHON. Thank you, Mr. Chairman. I would initially like to comment on and thank the chairman for holding this hearing. And the question was brought up: Why hold this hearing today, when we may not see anything from EPA until 2014? Well, let me go over briefly the history of the EPA under this administration, as it relates to fossil fuel.

Coal dust regulation through mine safety, and EPA put into place for ideological reasons with no science backing it up—I am a thoracic surgeon, and I can tell you there was no science behind that. Coal ash regulation now, which would cost billions and billions of dollars in cleanup and also job loss across this country. Again, coal ash twice previously declared non-hazardous material by the EPA in previous administrations.

Boiler emission requirements that would require billions of dollars of changes. In fact, there will be coal power plants in my district—specifically in Terre Haute, Indiana—that will have to close, costing us hundreds of jobs, and potentially risking not only just the cost of energy in Indiana, but whether or not there is energy out there in the grid to supply the demand.

And then, most recently, of course, the administration's bowing to environmental groups that both the President and Ms. Jackson apparently agree with, stopping the Keystone Pipeline, which multiple people agree has been proven and studies have shown to be environmentally safe, not only jeopardizing this country's future for energy independence, but also our relationship with Canada, and resulting in Canada's selling its oil to China, rather than to the United States.

And finally, why hold this hearing based on what the EPA might do? Well, because we are seeing taxpayer dollars directed, for ideological reasons, to corporations like Solyndra, even in the face of multiple people telling the administration that this company was financially unstable.

So, Mr. Chairman, I think it is a very, very timely hearing. We need to get ahead of these problems.

And lastly, I would like to say what the States are doing on this issue, as it relates to clean water and clean air. In Indiana, the percentage of Hoosiers that live in counties that meet the Federal and State air quality standards are 99.99 percent. The percent of Hoosiers that receive water from facilities in full compliance with safe drinking water standards Federal and State, 98.46 percent.

And we heard at previous hearings in this committee from State EPA directors, saying that they are having a very difficult time dealing with the EPA under this administration. So the hearing should be held. I believe that the States should be heard on this. I think the States are doing a good job. I agree with Mr. Shuster. And I have significant concerns about the U.S. Federal Government getting involved in a situation that it appears that the States are adequately handling.

I do think it is about ideology, not science. And I am looking forward to all the testimony today. Thank you. I yield back.

Mr. GIBBS. Mr. Lankford, you have an opening statement? And feel free, after your opening statement, to make an introduction.

Mr. LANKFORD. Thank you. Thank you, Mr. Chairman. Thank you for holding this hearing, as well. I do think this is a very important conversation to have.

We've talked for decades about a national energy policy. In the 1970s, the Federal Government warned that we were running out of natural gas, and encouraged States and power generation to be done with coal or with nuclear. As a response to that, many of our energy production companies switched over from natural gas, because we were running out. Now we see our country is awash with natural gas. The supply has dramatically increased, the prices have dropped, and great-paying jobs are popping up all over the Nation dealing with energy production.

Today's hearing focuses on the water relationship to that. Now, to be clear, water is used in dramatic quantities in almost every form of energy production. There is a direct relationship between water and energy production, as there is with hydraulic fracking and natural gas exploration. But to be clear as well, 99 percent of what is used for hydraulic fracking is water and sand. One percent or less is actually the additional chemicals that are added in the treatment process.

So, when we talk about all these chemicals being pumped into the ground, we need to keep the perspective together on it. Ninety-nine percent is just water and sand.

Water is a significant issue, though, for all involved. It is significant in both the energy production, and it is significant to people that live around that area, to the industries there, the residents. It is significant because many of the drilling locations are very remote. And so it is significant to the industry itself. And getting that much water to that spot, it uses about the same amount of water as an Olympic-sized swimming pool, so it is a significant amount of water involved in a frack job. So they have to be able to have that amount of water there. And so storing it is significant.

State and local leadership, and their elected leadership and oversight and regulators, it is very significant to them, as well.

But our economy is built on inexpensive energy. Every sector is dependent on the fact that we can keep the price of energy down, whether that be food production, whether that be housing, whatever it may be. So this is important, that we don't mess this up, that we don't do what we did in the 1970s and tell the Nation we are running out of it and we can't use it, let's shift to coal, and then 40 years later say, "Oops." So we better get this right.

Energy production is also a big deal for all of us in the economy in just basic great-paying jobs. Many, many, many high-paying jobs are around the energy segment. There are a lot of other service-related jobs—hotels, food service, manufacturing—that is around hydraulic fracking, as well.

If you come to Oklahoma City, you are going to find in Oklahoma City we have the lowest unemployment rate of any metropolitan area in the Nation. Number one lowest unemployment rate. We have great companies that serve our community, that are very in-

volved, and are very responsible. We are a great example of a community that knows exactly what hydraulic fracking looks like, has functioned with it for decades, has managed it well, and has reaped the benefits of that.

And so it is an interesting thing for us to be able to watch all the different studies that are currently happening on hydraulic fracking and to ask the question—we would invite you to come to Oklahoma. We have done hydraulic fracking in Oklahoma over 100,000 times, and we would invite you to come drink our water, breathe our air, and see our beautiful land. It is a great place to be, and it is a great place to live.

We understand exactly what fracking—what it looks like, how it occurs, and how to regulate it. A great example of that is corporation commissioner Dana Murphy that is here, is one of the great regulators in the Nation. She regulates this industry, and is tenacious about it. You can have great regulation and great cooperation, and still high employment in the Nation and great low prices, as well, in your energy.

So, I do look forward to this conversation. I am interested to see all of the interchange and the decisions that come out of this, as well. But I do want to say this. When we deal with a national regulation of fracking, we should be clear. No two areas of our beautiful dirt across our Nation are the same. Geography matters. And a one-size-fits-all approach to what happens underground, how deep and what that dirt looks like underground, will not work.

The closer you can get to the actual frack site, and the people that are used to that land and those rock formations, the better you are going to be in being able to understand exactly how to be able to regulate that. So, whatever comes out of this, I would encourage we get regulations and regulators as close to the well site as possible, so that they are familiar with what happens around that.

And with that, I welcome Commissioner Murphy to this panel. I look forward to your comments, as well as the comments of the others, and I yield back the balance of my time.

Mr. GIBBS. Thank you. It is time we introduced our panelists. We have Mr. Hanlon, he is the director of the Office of Wastewater Management for the United States Environmental Protection Agency.

Accompanying him is Ms. Dougherty, who is the director of the Office of Ground Water and Drinking Water of the U.S. EPA. Mr. Hanlon will be doing the testifying, and I think you are there to help if it comes up to answering additional questions, especially in regard to the Safe Drinking Water Act, where—that falls on the jurisdiction of the Energy and Commerce Committee—welcome.

Also we just introduced Chair Murphy, from Oklahoma. And I am going to call Representative Shuster for any comments for the next introduction.

Mr. SHUSTER. Well, thank you, Mr. Chairman. And it is a great pleasure for us to have here today, I believe, Secretary Krancer. And I think it is important that I point out that he is a political appointee, but he is not just a political appointee. He is someone with tremendous background in environmental law.

Before becoming Secretary Krancer he was Judge Krancer, and he was on the Pennsylvania environmental hearing board, who heard cases that—about people that were dealing with the DEP across Pennsylvania. He was—been on the board for several years. He was not only on that board as a judge, but he was the chief judge and chairman.

Prior to that, he was a law partner in Blank and Rome, and handled environmental litigation. So tremendous experience there, in the courtroom. And then, after that, he became the assistant general counsel to Exelon Corporation, dealing with complex environmental, safety compliance, and litigation for Exelon, which is one of our major nuclear producers in this country, as well as other types of power.

So, we have a real true expert here today, DEP, and I look forward to hearing from him and continue working with him, because I think it is well known in Pennsylvania that he is not only well-equipped and will protect the citizens of Pennsylvania and their drinking water, but if there is any bad actors that come into Pennsylvania, they can fear that Secretary Krancer will not tolerate bad actions in Pennsylvania. So I am proud that he is here with us today, and proud that he is our secretary of department of environmental protection. And I yield back.

Mr. GIBBS. Thank you. It is appropriate for me to introduce Mr. Stewart from Ohio. He is president of the Ohio Oil and Gas Association. And I have known Mr. Stewart for a number of years.

And I just want to give him kudos for what happened while I was in the State Senate about 3 years ago. The industry came to the legislature and asked to reform regulatory laws regarding oil and gas production, and volunteered to pay more fees to bring on more regulators, because they were concerned that the regulations in place weren't adequate to protect the environment. And Mr. Stewart led the issue there, and as a result, Ohio has one of the foremost standards to protect the environment in oil and gas exploration.

So again, welcome, Tom. Good to see you here.

We also have Ms. Groome. She is from the Pretreatment and Pollution Prevention Committee of the National Association of Clean Water Agencies. She is the vice chair. Welcome.

At this time, Mr. Hanlon, the floor is yours. I was reading through your testimonies, everybody's testimonies, and they are very good. But try to keep them within 5 minutes or so; we have more time for Q&A. Welcome.

TESTIMONY OF JIM HANLON, DIRECTOR, OFFICE OF WASTEWATER MANAGEMENT, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY CYNTHIA DOUGHERTY, DIRECTOR, OFFICE OF GROUND WATER AND DRINKING WATER, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY; DANA L. MURPHY, CHAIR, OKLAHOMA CORPORATION COMMISSION; MICHAEL L. KRANCER, SECRETARY, COMMONWEALTH OF PENNSYLVANIA, DEPARTMENT OF ENVIRONMENTAL PROTECTION; THOMAS E. STEWART, EXECUTIVE VICE PRESIDENT, OHIO OIL AND GAS ASSOCIATION; AND MARTIE GROOME, VICE CHAIR, PRETREATMENT AND POLLUTION PREVENTION COMMITTEE, NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES (NACWA)

Mr. HANLON. Good morning, Mr. Chairman and members of the committee. I thank you for the opportunity to share information on EPA's role in ensuring that public health and the environment are protected during natural gas extraction and production activities.

EPA strongly believes that domestic natural gas production is critical to our Nation's energy future. The natural gas resulting from well-designed and managed extraction from shale formations has the potential to improve air quality, reduce greenhouse gas emissions, stabilize energy prices, and provide greater certainty about future energy reserves. Advancements in technology have increased a number of economically accessible gas reserves in the U.S., which has, in turn, benefitted energy security and jobs.

While this increase in activity and resources is beneficial, it is important that it be conducted in a way that ensures protection of drinking water supplies and surface water quality.

I would like to discuss a few recent and upcoming actions by EPA related to shale gas extraction. EPA's current activities include development of treatment standards for waste water dischargers, a research study on the potential impacts of hydraulic fracturing on drinking water resources, guidance for permitting when diesel fuel is used in hydraulic fracturing, and guidance on water quality permitting and pretreatment.

On October 20th of this year, EPA announced that it was beginning a rulemaking to set technology-based pretreatment standards to regulate discharges to publicly owned treatment works produced by natural gas extraction from underground shale formations. We will pursue this effort in coordination with our Federal partners, and with input from industry experts, States, and public health organizations.

What we know is that shale gas extraction, in some instances, can generate large volumes of waste water, and that this waste water can potentially contain high concentrates of salts, radionuclides, heavy metals, and other materials that are potentially harmful to human health and the environment.

EPA will be soliciting data and information on the types and characteristics of the pollutants in shale gas waste waters, the volumes and concentrations of pollutants, and instances of pass-through of pollutants, or upsets related to shale gas waste waters at publicly owned treatment works.

EPA is also seeking information on documented impacts of these pollutants on aquatic life and human health.

Finally, EPA plans to collect cost data on treatment technologies to determine the cost and affordability of these treatment options. EPA's current plan is to issue a proposed rule for shale gas waste water standards in 2014. EPA will propose regulations that are affordable. In the coming months EPA will carefully consider the impact of regulatory costs to the industry, and to subsets of stakeholders, such as small businesses and State and local governments. EPA will also consider potential impacts on jobs and local economies.

At the request of Congress, EPA launched a research project last year to study the relationship between hydraulic fracturing and drinking water resources. The study plan was released on November 3rd of this year. The research will consider the entire life cycle of water use in hydraulic fracturing, and will look at five stages of water use, including water acquisition, the mixing of chemicals, injection at the well site, flow-back in produced water, and the disposal of waste water. EPA will release the first report on the study in 2012, which will include analysis of data, results of the modeling of potential impacts, and studies on the formation of disinfection byproducts, and an environmental justice assessment.

Hydraulic fracturing flow-back can produce water disposal through underground injection or delivery to a publicly owned treatment works, or a centralized waste treatment facility—is regulated under the Safe Drinking Water Act or the Clean Water Act.

EPA is currently working on guidance on permitting the use of diesel fuel in hydraulic fracturing, as well as guidance on water quality permitting and pretreatment. Those documents will provide technical information and recommendations for State and EPA permit-writers to consider, based on current statutes and regulations, but will not be binding requirements.

In conclusion, EPA is committed to supporting the safe and responsible development of natural gas resources to create jobs, promote energy security, and reduce energy impacts associated with energy production and use. In so doing, we will use our authorities, consistent with the law and the best available science to protect communities across the Nation from potential impacts to water quality, human health, and the environment that may be associated with natural gas production activities. We will continue to coordinate our activities with our State, Federal, and local partners as we move forward.

Thank you for the opportunity to testify today, and I look forward to any questions the panel may have.

Mr. GIBBS. Ms. Murphy, the floor is yours. Welcome.

Ms. MURPHY. Thank you. It is a great pleasure to be here, representing my State, and also here on behalf of Congressman Lankford. I had let the panel know that in addition to being a statewide elected official, I serve with two other corporation commissioners. I am also a geologist. I have served as a former administrative law judge at the corporation commission. And I have also worked in oil and gas law for many, many years.

So, as the holder of a statewide office and chair of the commission that actually regulates oil and gas drilling and development, I know too well the danger of regulation for regulation's sake. Any meaningful debate about regulation needs to be focused on what

the regulation is intended to accomplish. Protection of water and the environment and the beneficial development of the Nation's resources of oil and gas are not mutually exclusive goals. Oklahoma is proof of that.

My fundamental point today would be to encourage that the States are the appropriate bodies to regulate the oil and gas drilling industry. I am going to provide the basis for that, and also give several examples.

I would also point out to the committee that just recently released is the National Petroleum Council study, "Prudent Development—Realizing the Potential of North America's Abundant Natural Gas and Oil Resources," resulting from the efforts of over 400 participants, over half of which were non-industry-related individuals. And here is the statement that actually comes from that recently released report: "Regulation of oil and gas operations is best accomplished at the State level. A one-size-fits-all approach to regulation is not a viable option to ensure the highest level of safety and environmental protection."

Why are the States the appropriate bodies to actually regulate and work in conjunction with the Federal agencies? Because extensive knowledge of geological conditions, topography, the drought in my State this year, seasonal climate changes which vary State by State and actually within the States themselves. We have the most experience to ensure that wells are properly constructed, operations are conducted safely, and all with a minimal environmental footprint.

Our State has base of treatable water maps, where the water tables are actually looked at, and the appropriate amount of surface casing is cemented and put in place. We are the ones that live in closest proximity to conduct the inspections, respond not just quickly but with the most appropriate response in any given situation, to oversee and enforce local regulations, and target new regulations to promote safety and environmental performance.

The States are those best able to coordinate, cooperate, and share among each other evolving technologies and rules and regulations and standards that can best help all the producing States, especially since numerous companies are operating in multiple-State jurisdictions.

State officials are directly accountable to residents of the State and the people of Oklahoma. They know the buck stops with us. It is important to us to keep focused on the mission of protecting our State's water, its land, and the health and safety of its citizens.

A couple of the examples that I would point out—and I will start from a national level and go down to a smaller level. In 2009, the National Association of Regulatory Utility Commissioners, utility commissioners comprised from all 50 States with very divergent backgrounds, actually passed a resolution that called on the States to be the appropriate bodies for regulating oil and gas industry. Why would a group of utility regulators who do not regulate the oil and gas industry call upon the States to be the appropriate bodies? Because they know gas is important for direct heating and for power generation, and they know that the facts speak to the issue of State regulation.

I would also point out, too, the Interstate Oil and Gas Compact Commission, which is headquartered and was started, actually, in Oklahoma, comprised of 30 member States and 8 associate members, working in conjunction with the Ground Water Protection Council, who have created an Internet chemical registry ability called "FracFocus," for companies to actually disclose the chemicals.

I will note in Oklahoma this year, in our rulemaking, we are actually taking up adoption of FracFocus into our rules to mandate upon the companies. I would also note that in the 2 years it has taken the EPA to put together their study on hydraulic fracturing, there are five States—Pennsylvania, Ohio, Louisiana, Colorado, Oklahoma, and most recently, Arkansas—that have submitted to the STRONGER review process comprised of environmentalists, State regulators, and the industry to review State regulations on hydraulic fracturing.

The last point I would emphasize, we would not have reached this place among all the States if the map and the track had already been laid out. It is just as important for us to cooperate and collaborate together to deal with innovation.

My closing statement would be the best thing that I feel like the Federal Government and the Federal agencies can do is encourage and facilitate the States to work together to come up with good rules and regulations for their appropriate States and across the regions.

Thank you for this opportunity.

Mr. GIBBS. Thank you.

Secretary Krancer, the floor is yours. Welcome.

Mr. KRANCER. Yes. Thank you very much. Honor to be here. And thank you, Congressman Shuster, for having me here.

I have been committed from the beginning to be governed by science and facts, not by fiction and emotion. And one of the important things to note is why we are here. Why we are here, as I understand it, partially because of the pretreatment regs.

Why are they on the table? They are on the table—and this is an object lesson for all of us—because the State took a lead and the Feds followed. We have various facilities in our State that are—in a pretreatment program that are in a Federal program. They are not regulated by the State. We pointed this out to the Feds, because we are doing it right in Pennsylvania with our facilities. I think we are here partially because we gave them a cue.

I was very shocked to hear Representative Bishop refer to my fellow State person John Quigley—who said we had no plan? I have to challenge that. I am not sure when John said that. It must have been early on, or either that or I am not sure John knows what was going on in his own building, because I was in the department of energy a couple of months ago in which my predecessor testified with great pride about the program and the plan that his administration started to put into place, and is in place, and we followed up on it.

And that plan is very detailed. It involves regulations on total dissolved solids into waterways. So it is a total fiction. It is a total fiction that sewage treatment plants are discharging these terrible substances into the waterways. Certainly in Pennsylvania, that is

a fiction. And we, as an administration, made a call on the drilling community to stop delivering waste water to those facilities that were grandfathered by the prior regulations, and that call was answered immediately. So, we have undergone a sea change in Pennsylvania to virtually no such discharges. So that is a fiction.

I also heard a reference to the New York Times. And that had to make me chuckle a little bit. I came into office, and the New York Times was promulgating what I thought was—and I wasn't the only one, even my predecessor thought was—extremely irresponsible, fear-mongering type of journalism, journalism which, by the way, was censured by its own newspaper or its own editors. And I am not understanding why that fellow was still writing, or why people are still buying that newspaper. It is beyond me.

But in any event, the sine qua non of it was about 3 weeks or 4 weeks after that fear-mongering article was written all about radiation and how we were supposed to be afraid, and this is horrible, and the sky is falling down, well, the department, pursuant to its normal testing procedures that it monitors, released data showing that radioactivity was at background levels. So all they had to do was make a phone call to us to figure out what was really going on, but they neglected to do that.

In terms of water use—and I heard several folks talk about that—and the point is well taken. The water used for fracking in Pennsylvania, it ranks nine out of ninth. Here is the chart, it is in my testimony. And there is another chart that is important. I think Representative Lankford talked about this: 99.51 percent of the water is—frack water—is water and sand. And this myth that somehow these terrible chemicals are getting into the ground water is completely myth. It is bogus.

Let me read you an article, a snippet from a paper, Harrisburg Patriot, from an author who was no friend of our administration, frankly, and no friend of what we are doing all the time. He says, "Industry representatives say the chemicals are the same as you would find under your kitchen sink, but [this gentleman] said, 'You don't want to take the stuff from your kitchen sink and mix it in a glass of water you are going to drink, and that's basically what's going on.'" The reporter says, "But it's not."

And that is the point. It is not what is going on. Fracking occurs 8,000 feet beneath the surface. ground water in Pennsylvania—and that may vary between States, and that is an important point—is at several hundred feet. So the myth, the myth out there, is just rampant.

I have to also agree with what Representative Altmire said. I think the unique geography is important. Pennsylvania is different. We are not Texas, we are not Oklahoma. We are very different. We know what our State is like. We know our unique geography. And I also certainly agree with him that Governor Corbett is doing a good job regulating the industry, and we are, as well.

And I have to also agree with Representative Shuster. We have very high standards in Pennsylvania of conduct for the folks who do business here. My boss, the Governor, is a former attorney general and former United States prosecutor. I am a former judge. If you can't meet the standards in Pennsylvania, you are not welcome to be in Pennsylvania and do business here.

So—and one other comment that struck me was a comment that one of the representatives was saying, that 99 percent of his constituency lives in areas of attainment. Well, I wish I could say that about Pennsylvania. But I will tell you one thing. If we can exploit and take this natural resource and use it, we will be in that position in Pennsylvania, because these are the ADCs of Marcellus shale. It is abundant, it is available, it is domestic, it is cheap, and it is clean.

Right now, I am told by my friends at PECO that PECO is spending $300 million less per year for natural gas, and millions of dollars are being saved by consumers. Electricity prices are lower.

I also heard a comment about the unemployment in the United States, 9 percent. Well, we in our State have certain counties that rank third and sixth in job growth in the entire country, of all countries. Williamsport, seventh largest growing city in the United States.

And I see I am over time, and I apologize, and I will welcome questions when they come.

Mr. GIBBS. Thank you, Mr. Secretary.

Mr. Stewart, the floor is yours.

Mr. STEWART. For over a century-and-a-half, Ohio has been blessed with production of plentiful oil and natural gas resources. At each critical point in our industry's history it has been changes wrought by technology that have provided producers the ability to explore new horizons and expand the resource base.

Today, the ability to horizontally drill deep underground reservoir with exacting precision, exponentially exposing the face of the reservoir rock to the wellbore has created massive efficiencies in our ability to produce oil and gas. Ohio is now beginning a new era of oil and gas exploration made possible by technologies. It is unlocking reservoirs that, until now, were not accessible.

For our entire history we explored for oil and gas in reservoirs where it had been trapped after migrating over the eons from source rocks where the oil and gas had been formed and cooked in nature's kitchen. Now, industry is drilling into the actual source rocks where most geologists believe 95 percent of the oil and gas still remains in place, even after feeding the traps that have produced all the oil and gas that we have found to date. This is a radical departure of America's understanding of energy dependency, and resets the clock on available domestic oil and gas resources.

Today the industry is providing natural gas priced at 22 percent of its intrinsic energy value, a trend that the marketplace indicates will continue into the future. It is enticing the chemical industry to re-enter the United States and build new chemical manufacturing facilities, jump-starting job growth downstream of the wellhead.

Since 1860, Ohio has produced 8.5 trillion cubic feet of natural gas, and 1.14 billion barrels of crude oil. The State's geologist recently provided a volumetric calculation to estimate the recoverable reserve potential of the Utica shale—our shale opportunity. He reported that should producers extract 5 percent of the oil and gas in place, the Utica would generate 15.7 trillion cubic feet of natural gas, and 5.5 billion barrels of crude oil. That is an astonishing

number and an enormous, perhaps once-in-a-lifetime opportunity for Ohio.

An economic impact study commissioned by the Ohio oil and gas energy education program determined that the Utica shale will lead to the creation of over 204,000 Ohio-based jobs over the next 5 years. Investments by oil and gas companies will reach $34 billion to fund development activity and infrastructure. Producing wells are projected to generate $1.6 billion of royalty income to Ohio landowners.

Perhaps most significantly, the Utica shale can make Ohio an exporter of energy. Coupled with the readily available and affordable energy resource, development of the Utica shale may be the most significant positive economic event to take place in Ohio for decades.

Clearly, America's opportunity to use the shale gas and shale oil resources hinges on the regulatory structures that allow its development. Managing environmental risk has been a key part of both State and Federal regulation. It remains important to keep an appropriate balance between these Government roles. States have historically been the regulator of well construction and completion. They have the expertise to permit new wells, and should continue to be the regulatory authority.

States and Federal agencies share the responsibilities of regulating waste discharges. States typically issue direct permits under broad Federal guidelines. This balance is appropriate, and should be continued, because States understand the potential unique issues of each area. Because of the diversity of conditions associated with oil and natural gas production, the regulatory process must be flexible, and reflect the unique conditions in a State or areas within a State. It requires the technical expertise that has been developed in each State, and which does not exist within EPA.

For this reason, Federal law has generally deferred to the States for the regulation of this industry. The States have a process available to them to demonstrate effective regulatory ability, identify regulatory gaps, and find ways to close those gaps and improve the respective regulatory programs.

The State Review of Oil and Natural Gas Environmental Regulations, STRONGER, is an independent stakeholder governing body that manages State review process. The overall process of the State review process is to help oil and gas regulatory programs improve. The key innovative aspect of the process are the teams made up of equal representation from the environmental community, State regulators, and industry come together to conduct an authentic peer review critique of the State's regulatory program, benchmarking the program against a national set of guidelines that itemize the critical elements necessary to protect the public interest and the environment.

STRONGER recently updated the review guidelines to include a specific section focusing on hydraulic fracturing. Over the past year, STRONGER has done frack-specific reviews in six States. In Ohio, following implementation of new law, STRONGER conducted just such a survey that concluded that the Ohio program was overall well managed, professional, and meeting its program objectives.

That provides the public interest faith and trust in the regulatory process.

Both the Secretary of Energy's advisory board on shale gas production subcommittee, interim reports, and the recent national petroleum report on shale gas has specifically commended the State review process. The State review process demonstrates that the States are the best and most efficient point to regulate the industry's waste streams. The process provides for a system of constant and ongoing improvement, and an opportunity to share and promote new and unique regulatory concepts among the States, while maintaining the flexibility needed to meet individual States' needs.

With the current intense focus on shale development, I would recommend to the subcommittee that we focus our efforts to support positive, collaborative efforts that work to efficiently improve programs that protect health, safety, and the environment, instead of relying on Federal control that will only work to stifle economic opportunity.

Mr. GIBBS. Thank you, Mr. Stewart.

Ms. Groome, the floor is yours. Welcome.

Ms. GROOME. Chairman Gibbs, Ranking Member Bishop, and members of the subcommittee, my name is Martie Groome, and I am the laboratory and industrial waste supervisor for the City of Greensboro Water Resources Department in North Carolina. It is a great privilege to be here to testify on how local clean water agencies implement the national pretreatment program, and how this program may affect the disposal of waste water from shale gas extraction.

In addition to my duties at the city of Greensboro, I serve as the vice chair of the pretreatment and pollution prevention committee for the National Association of Clean Water Agencies. And it is my pleasure to be testifying on NACWA's behalf today.

NACWA's primary mission is to advocate on behalf of the Nation's publicly owned waste water treatment works, and the communities and rate payers they serve. The employees of these agencies are true environmentalists, who ensure that the Nation's waters are clean and safe, meeting the strict requirements of the Clean Water Act.

The national pretreatment program is often recognized as one of the most successful Clean Water Act programs for its role in reducing the amount of pollutants discharged into sewer systems and into the Nation's waters. Since 1983, the national pretreatment program has placed public utilities in the realm of local regulator for the industries that discharge waste water to their sewer systems. It is the local waste water utilities that are responsible for enforcing both national pretreatment standards and any additional limits developed at the local level needed to protect POTW operations and local water quality.

To prevent potentially harmful pass-through of pollutants to the environment or interference with the waste water treatment process, the Clean Water Act requires EPA to establish national pretreatment standards for industrial and commercial facilities that discharge waste water to the sewer system. Pretreatment standards are currently in place for more than 50 industrial cat-

egories, and POTWs regulate over 20,000 significant industrial users.

Industries with unique waste water treatment needs and challenges have arisen consistently since the passage of the Clean Water Act. And clean water agencies have maintained a strong record of addressing these new challenges. While NACWA does not have a position on fracking, per se, the fracking industry is merely another industry similar to the others before it. And POTWs will act as public servants in appropriately addressing the discharges from this industry.

Even in the absence of national pretreatment standards, POTWs can tailor local limits to the particular needs of the POTW and the industrial user. With local limits, POTWs may regulate discharges from any industrial or commercial facilities, not just the categorically regulated by national pretreatment standards.

The pretreatment program has been so successful because it gives local POTWs the authority to control the pollutants in waste water from any industry, using both national pretreatment standards and local limits. National pretreatment standards have the benefit of leveling the nationwide playing field for discharges to sewer systems. However, national pretreatment standards can at times be stricter than is necessary to protect a particular POTW, and the waters they discharge into. Implementing national pretreatment standards also requires a significant commitment of resources by the local POTW. Any national pretreatment standards for the fracking industry should be carefully developed and implemented to avoid unnecessary cost to the public clean water agency and its industrial customers.

It is NACWA's hope that EPA's pretreatment standard will yield a scientifically and economically sound set of standards. It is equally critical that the public understand that any POTWs that accept fracking waste water during this interim phase must meet their permit requirements and set local limits for the industrial user, if necessary. In many cases, local POTWs have effectively regulated industries for years before a national pretreatment standard was developed by EPA.

If a POTW does not have the capacity to establish such local standards, or fails to develop the necessary limits or controls to prevent pass-through or pollutants of treatment plant—or treatment plant interference, then the POTW should not accept this waste. EPA's announcement that it will develop a national pretreatment standard for the shale gas extraction industry does not prevent POTWs from accepting hydraulic fracturing waste water now, after working with their State permitting authority to ensure the protectiveness of this practice.

POTWs also have the authority to stop taking an industry's waste water immediately if it causes any problems with the waste water treatment process. Discharge to a POTW is only one of several options for the shale gas extraction industry. If a national pretreatment standard can ensure that such discharges to a POTW are safe, it may be a more commonly used option.

NACWA does not have a position regarding the use of fracking to meet the Nation's growing energy needs. A scientifically and economically sound national pretreatment standard for the shale gas

extraction industry may provide protection to both the industry and to POTWs. It would provide a nationally acceptable baseline for treatment of hydraulic fracturing waste water.

NACWA intends to work with EPA as the Agency studies the industry and develops a pretreatment standard that is protective and not unnecessarily burdensome.

Thank you for this opportunity to appear before you today. And I look forward to any questions the subcommittee may have for me.

Mr. GIBBS. Thank you. I will start some of the questions off.

Chair Murphy, I see your testimony. You state that there is over 100,000 oil and gas wells in the State of Oklahoma, and at least 95,000 of them have been fracked. Is there—was there any incidents where the fracking caused the problem, or well construction was the problem? Can you elaborate on what is happening in your experience in Oklahoma?

Ms. MURPHY. Yes. By way of background, I would actually just say there have been over 500,000 wells actually drilled in Oklahoma. About 185,000 wells are actually producing oil and gas, and we have about 10,000 disposal wells. We treat our water and handle waters differently than some of the other States.

But there have been no documented instances of the occurrence of pollution to the waters that you spoke about.

Mr. GIBBS. For neither poor well construction nor fracking?

Ms. MURPHY. No.

Mr. GIBBS. OK. Secretary Krancer, I believe there is a little over 3,500 Marcellus shale wells in Pennsylvania, which obviously are all fracked. What is your record?

Mr. KRANCER. We have about 4,000, you are right.

Fracking has never caused ground water contamination in Pennsylvania. Actually, Lisa Jackson was in front of the House Committee on Oversight and Government Reform on May 24th and said the exact same thing. Fracking simply doesn't do that. And there is still not a documented case.

Mr. GIBBS. Mr. Stewart, what is your experience in Ohio?

Mr. STEWART. There has been over 80,000 wells that have been hydraulically fractured in the State of Ohio since 1952. Nearly every well drilled in the State of Ohio is hydraulically fractured. Before the resources committee of the Congress 2 years ago our State regulator testified that in his 25 years of investigating ground water contamination, he has not once correlated hydraulic fracturing to ground water contamination.

Mr. GIBBS. Thank you. Mr. Hanlon, what is the EPA's thought on implementing the Clean Water Act, working with State EPAs? How do you view your role, as the U.S. EPA under the authority of the Clean Water Act?

Mr. HANLON. Under the authority of the Clean Water Act, EPA has entered into contracts, basically, to authorize 46 States to implement the point source clean water permitting program. And basically, in those States, we expect the States to do a good job. They issue permits, they review the permits, they do inspections, they do compliance, they do enforcement where it is necessary.

On an exception basis, EPA sort of does oversight for those programs. Basically, we go in, we take a look at State permits, we do quality reviews. We will do site visits on occasion. And across the

board, the States do a good job. That is our role in the authorized States.

There are four unauthorized States where EPA holds the pencil. We actually write the permits in those States, and then we implement the whole program, in terms of permitting, compliance, and enforcement.

Mr. GIBBS. What would be your role? Would you expect to put out guidances to the States? My understanding on the point source pollution, the 46 States that are participating, they have a 3-year plan, and the U.S. EPA approves that. Is that correct?

Mr. HANLON. In the authorized States, in order to sort of gain authorization, it is a fairly lengthy process. We recently completed it in Alaska 3 years ago. And basically, the State has to demonstrate it has the legal authorities, it has the set of implementation authorities, in terms of regulations, you know, review procedures and protocols, and a trained staff to actually deliver the program.

And so, once they do that, basically the State then takes over the——

Mr. GIBBS. So do you feel, then, the States are equipped and are capable to protect the environment? We are talking about the shale development, the fracturing. Do you have confidence in the States to have the ability to do it?

Mr. HANLON. We have the authority—we have the expectation that every State does a good job in implementing and——

Mr. GIBBS. And clearly the record has shown that? Because fracking has been going on for about 60 years, correct?

Mr. HANLON. With fracking, I think the, you know, testimony this morning and our experience has been—certainly in Oklahoma, Texas, et cetera—there are hundreds of thousands of wells that have been drilled. And the experience there has been that essentially all of the produced water has been re-injected. Basically, it never sort of finds the surface water. And that has been a longtime successful experience that we have had in our region six offices down in Dallas.

I think the recent concern over the last 2 or 3 years is that, as the Marcellus formation has begun to be explored and the resource used, that it is a part of the country where there—you know, it has not been as much experience, certainly in shale gas exploration, and basically the availability of re-injection sites is not the same as the availability of re-injection sites in Oklahoma and Texas.

So, I think both EPA and the States have been on a learning curve over the last several years, in terms of, OK——

Mr. GIBBS. Well, my time is——

Mr. HANLON [continuing]. My drill is—now that we got the gas out, what do we do with produced water?

Mr. GIBBS. My time is up. I just—one quick question. Do you believe that the States are setting the standards and the guidelines to manage it right, or do you think guidelines coming out of Washington, DC, one size fits all, would be—is the way to go?

Mr. HANLON. If you are referring to the guideline for pretreatment standards, basically that will affect waste water from shale gas production that will go either to a waste water treatment

plant or to a centralized waste treatment facility. As things stand today, as I understand it, Ohio bans that. Basically, it says——

Mr. GIBBS. Yes, that is correct.

Mr. HANLON [continuing]. "You can't send that to a POTW." Pennsylvania had suggested or encouraged that their POTWs not do that. And so, if you are a truck driver, and have 5,000 gallons of shale gas water in southwestern Pennsylvania, in an hour you can get to West Virginia, you can get to Ohio, you can get to Pennsylvania.

The objective of the guideline is to say that, for the pretreatment standards, that 5,000 gallons will have the same expectation when they show up at a small POTW, knock on the door and say, "I got 5,000 gallons of salty water. And here is a check will you take it." And basically, it will provide that operator with assurety in terms of what that—the quality of that water is.

Mr. GIBBS. OK, thank you. Mr. Bishop.

Mr. BISHOP. Thank you very much. And to all the panel, thank you very much for your testimony.

Secretary Krancer, in your testimony you say that the current preference for fracking waste water disposal is through existing waste water treatment plants, but you also indicate that the plants do not have the technology necessary to remove fracking pollutants like total dissolved solids.

You then go on to say that Pennsylvania's new chapter 95 regulations, which were adopted last year, are intended to completely address the cumulative impacts of waste water discharges. And you also note quite proudly—and I would say just justifiably so—that they are the first of their kind in the country. And you indicated in your comments that you see this hearing in some ways as a response to the leadership that Pennsylvania has demonstrated. And you seem to take pride in that, and I would encourage you to do so. I think that that is something you should be proud of.

But my question is, in light of Pennsylvania's leadership, do you not see Pennsylvania as a model for the rest of the country? And do you not see the legitimacy of a minimum national standard that would emulate Pennsylvania's, or perhaps be less stringent than Pennsylvania's, but at least be a minimum standard, and that in accordance with how we handle other Clean Water Act regulations, Federal Government establishes a minimum standard, States are then free to exceed those standards?

Mr. KRANCER. Well, let me answer that this way. Pennsylvania is a role model, and it is a model, and we have had visitors from foreign countries come to see us, and we do have the new chapter 95 regulations, total dissolved solids, which does address the issue of those plants that formerly could not treat the water appropriately. Now they can, now they are required to.

And as I said, there was a grandfather clause. We closed that when we came into office, by issuing our call. And now, as I have testified——

Mr. BISHOP. If I may, all of that sounds to me to be perfectly reasonable and laudable. My question is, why would you not want your neighboring States to have the same concern that Pennsylvania has made so clear?

Mr. KRANCER. Well, I think that is a red herring. Quite honestly, the question here is whether the States are capable and whether the States can do a good job. The answer has been yes—I heard that from the EPA here today—I have heard that from EPA's——

Mr. BISHOP. If—again, if that is true, then what is wrong with a minimum national standard?

Mr. KRANCER. Well, because not every State does it, number one. Not every State does it the same way, number two. Number three——

Mr. BISHOP. If I——

Mr. KRANCER [continuing]. Not every State has the same geography. Number four—should I go on?

It is also a matter of philosophy. Should we have the Federal Government establishing—and what would happen would be lowest common denominator, that would be the case——

Mr. BISHOP. Well, don't we have lowest common denominator right now, if a truck can drive around until it finds a State that is going to take the water?

Mr. KRANCER. Well, again, I think you are posing a red herring here. You can't do that in Pennsylvania, you can't do that in Ohio. Both States are on top of what they are doing. Oklahoma is on top of what it is doing. Louisiana is on top——

Mr. BISHOP. But you seem to be questioning the fundamental premise of the Clean Water Act. If you——

Mr. KRANCER. Oh, no, no. You are misunderstanding me. That is absolutely false.

Mr. BISHOP. OK. Then——

Mr. KRANCER. This—the Clean Water Act, as many Federal environmental statutes do, set a Federal-State partnership. No question about that.

Mr. BISHOP. Correct.

Mr. KRANCER. OK. But you know what? Number one, fracking has never been regulated by the Federal Government. I have a section in my testimony about the so-called Frack Act, and about the other myths that are surrounding that issue——

Mr. BISHOP. What is being contemplated here is the regulation of the waste water from the fracking.

Mr. KRANCER. Mm-hmm. I am sorry, go ahead, I——

Mr. BISHOP. Is that OK?

Mr. KRANCER. I misunderstood. Go ahead.

Mr. BISHOP. OK. Look, I am not trying to be difficult, I am trying to understand something here.

If New York, which is part of the watershed of the Delaware, part of the watershed of the Susquehanna, if New York decides that they don't care about environmental standards at all, and they are not going to adopt the standards that Pennsylvania has adopted, or be anywhere near as concerned as Pennsylvania is, does that not have impact on Pennsylvania's waters?

Mr. KRANCER. Yes, certainly it does, Representative. But you and I, I think, are having a fundamental philosophical disagreement that probably goes back to 1787, when the Constitution was formed. I have a certain idea of federalism and where the State's role is, and yours apparently is not where mine is, nor is it where

other—even the EPA's is, because even the statutes establish a State primacy system.

Mr. BISHOP. OK. I am not prepared to have a philosophical discussion with you. I just want to know what would Pennsylvania do if New York, in the highly unlikely eventuality would say, "Pennsylvania is far too stringent, far too strict, we are not doing this." What impact does that have on Pennsylvania's waters, and what would Pennsylvania's response be?

Mr. KRANCER. Well, Representative, I have been a litigator and a judge far too long to be able to answer complete hypothetical questions.

Mr. BISHOP. Thank you. All right. I will ask one more question.

How many jobs were lost when chapter 95 regulations were put into place?

Mr. KRANCER. Well, I don't have an answer for that, but I think jobs have been increased, quite honestly, because what——

Mr. BISHOP. OK, so——

Mr. KRANCER. Let me finish. What I have seen is a rush of capital coming to Pennsylvania to answer the call that was set when we established those standards. I have seen new businesses come to Pennsylvania, new jobs created by this——

Mr. BISHOP. So——

Mr. KRANCER [continuing]. New opportunity, where the invisible hand of the marketplace is taking control to bring jobs.

Mr. BISHOP. I appreciate your response. You simply have illustrated that not all regulations are job-killing regulations. Some regulations are grounded in science and in good sense, and in prudent public policy.

Mr. KRANCER. Well, quite honestly——

Mr. BISHOP. I yield back the balance of my time.

Mr. KRANCER [continuing]. I don't think that is the point here today, whether certain regulations create jobs or don't create jobs. I think the point we are talking about is these particular regulations and the way the States handle waste water, which I think in my State is handled very well. In Ohio I have heard it is handled very well. In Oklahoma I have heard it is handled very well. And I have heard the EPA say the States handle it very well.

Mr. BISHOP. Then you would have nothing to fear from a national standard. I yield back.

Mr. GIBBS. Representative Shuster?

Mr. SHUSTER. Thank you very much, Mr. Chairman. I think we would have something to fear from a national standard because I think that, as Secretary Krancer pointed out, it would be lowest common denominator, and what happens in Oklahoma it may—is very different than Pennsylvania.

So I think there is a real problem with the continued expansion of regulations by the Federal Government. When the States, based on what we heard from EPA today, what we heard from—previously, in some cases—from Administrator Jackson, that the States are doing a very, very good job of that.

I wondered, Secretary Krancer, if you could just talk through a little bit about—I mentioned earlier about the Corps of Engineers, and the definition of single and complete projects. And can you talk to us about—you know, here is a situation where the Corps of En-

gineers has reached out and have changed the rules, have changed the interpretation. Can you tell us what impact that has had on Pennsylvania and the economy, and your views of what they are doing?

Mr. KRANCER. Well, it is a good question. We are working through that with the Army Corps now to certainly put a stopper on some pipeline projects, pipeline projects that Pennsylvania had regulated for years and years. And not just—linear projects aren't just pipelines, they are roads, they are electric lines, so on and so forth.

The bottom line is that we need to get this resource to market, and we need the pipelines to do that. And, at the end of the day, of course, pipelines are buried, they are—invasiveness is very low. They are like electric lines: emotional at the time, but when it is all over you never know they were even there.

Mr. SHUSTER. Thank you. And Chairwoman Murphy, can you talk a little bit about your view on the national standard? Do you believe we need one, or do you believe that what is happening today, the States are doing well and there is no need for the EPA to come in and set these minimum national standards?

Ms. MURPHY. I will note that I came directly here from the National Association of Regulatory Utility Commissioners conference in St. Louis. And one of the common denominators there was the collaboration among the States in working together to actually have best practices in working with the industry.

It just seems to me, just from my basis as a regulator, we have an open rulemaking process where environmentalists, landowners, everyone comes. We have technical conferences. It is very open, lots of dialogue before any particular rule is proposed. It seems like the way that the Environmental Protection Agency goes about some of their rules, they propose rules, then you have comments, then time passes and then here is the rule. And it seems like maybe it is a better approach—and I think the States, certainly Oklahoma, does it—where you have the dialogue first, and get some ideas before you start proposing rules for people to comment on. So, I think it is a different approach.

But all that said, I believe that the States individually, and the States working in collaboration through STRONGER, through the IOGCC, through some of these other groups, are the best approach.

Mr. SHUSTER. Mr. Stewart, you care to comment on that, your view of EPA putting a minimum standard out there?

Mr. STEWART. The problem with a minimum standard is we have already discussed how State geology and geography all matters in how you set minimum standards at the Federal level. Most minimum standards are set focused on a particular source point.

The problem is that the source points for this particular concept are individual wells and formations that can drastically change in their characteristics well to well to well. So I concur with Congressman Lankford, that the best way to have this type of regulation is the people that are closest to the wellhead, the people that are the boots on the ground, that understand what that waste flow coming from that individual well or individual play means when it comes to standards on effluent discharge.

Mr. SHUSTER. Right. And Mr. Hanlon, the EPA, do you have that same view, that the geology is different in Pennsylvania/Ohio versus Oklahoma/Texas? Is that the EPA's view, that it is very different?

Mr. HANLON. The geology is different. As I said earlier, the regulation that we began last month is one that would deal with pretreatment requirements for waste water that go to either municipally owned waste water treatment plants, or to centralized waste treatment facilities. So it is basically—the water that comes up, should it be pretreated? And if so, at what level before it goes to either of those waste water treatment plants?

It has nothing to do with what happens in the well. It has nothing to do with sort of how that water is taken out. But rather, whether it needs to be pretreated before it goes to a municipal plant or a centralized waste treater, and whether some baseline technology should be applied to that, which is really irrelevant, in terms of the geology.

Mr. SHUSTER. My time has run out, but the chairman would indulge me for one more question, and have Secretary Krancer comment on what Mr. Hanlon just said, and your view on that.

Mr. KRANCER. I am not sure how it fits in, to be honest with you.

And again, Pennsylvania took care of its POTW, CTW end of things. The reason we are here today is because EPA was trying to give us free advice on things we had already done, and we pointed out to them, hey, instead of commenting on our house, why don't you get your own house in order on your Federal end, the ELGs, and that is why we are here.

Mr. SHUSTER. Thank you very much, and thank you, Mr. Chairman.

Mr. GIBBS. Mrs. Napolitano. Representative? Do you have questions?

Mrs. NAPOLITANO. Thank you, Mr. Chair. To Ms. Groome, it is my understanding that your recent survey found that the majority, if not all of your members, are currently refusing to accept fracking fluids at their plants. And is that accurate?

And then I have a followup on that. The Federal Register says most treatment plants do not have technology to treat fracking waste water. It also states that, independent of the Clean Water Act requirements, it is uncommon that sewage plants have established local limits for the pollutants or parameters of concern in the shale gas waste water, nor have they established water quality-based effluent limits for such parameters.

Then, if you can, give us some examples of other industrial waste discharges that have had national pretreatment standards established that have been effective in protecting the operations of the sewage plant treatment and protecting water quality. It is a mouthful.

Ms. GROOME. Yes, it is. I have been with the city for 35 years, so I was with Greensboro before the pretreatment program ever began. So I did see all of the categorical standards come through. So, as I have said in my testimony, nothing prevents a POTW from taking fracking waste water now, unless the State itself has prevented it.

The organic chemical industry, for instance, we had several in Greensboro long before the national pretreatment standard came out. We had been accepting waste water from them. We had developed local limits. So you certainly can develop——

Mrs. NAPOLITANO. But has your survey found that most of them do not want to take that treated waste water, or the waste water?

Ms. GROOME. I think until they can characterize the waste water, they probably will say no. But we can certainly ask. We want a complete characterization of this waste water. We will do studies at our particular treatment plant to see if we can handle it.

The local limits process can be used for any pollutant. Do we currently, most of us, have total dissolved solids, local limits? No. But that does not mean that you cannot use the local limits process in order to develop them, if you need to.

Mrs. NAPOLITANO. OK. Re-injecting the waste water, of course, has some contaminants that, if they put in a truck and send it down to the waste treatment plants, my understanding is some of them may not be able to effectively remove all the contaminants that they are—that they should be required to do.

Ms. GROOME. That is indeed true. I think there will be waste water treatment facilities in this country that cannot handle fracking waste water without pretreatment. There may be others that will be able to. A lot of it depends on the size. There are treatment plants—Chicago's is 1 billion gallons. Of course there is no fracking going on around there. But a small treatment plant may not be able to handle it, that is correct.

Mrs. NAPOLITANO. Thank you. Mr. Hanlon, Mr. Stewart asserts in the testimony that developing an effluent limit guideline for pretreatment of fracking fluids before they are disposed of at pretreatment plants would likely be meaningless, because every well and formation will be so different. And hence, determining what will be in the fracking fluid will have no consistency from one well to the next.

But aren't there certain chemicals that are routinely used in hydraulic fracking—in fracturing that you will be looking at to determine whether pretreatment standards are warranted? And, furthermore, aren't there certain effluents, like total dissolved solids, that we already know to be a problem? And isn't that why Pennsylvania adopted new regulations related to fracking waste water, and why the secretary in the department of environmental protection in the State asked EPA to update its effluent limit guidelines for total dissolved solids and bromides for centralized waste treatment plants?

Mr. HANLON. It is true that the produced water, flow-back water, from individuals wells are not the same. Basically, there is a distribution. For example, for total dissolved solids, the ranges we have seen are as low as 300 and as high as 345,000 parts per million. Some parameters of that high TDS waste stream are—some parameters tend to sort of dominant the TDS profile in Marcellus formation—chlorides for example, basically salts—tend to be very high, as high as 190,000 parts per million.

So, there are sort of similarities that we have seen in the limited data to date, in terms of the flow-back water that comes from shale

gas operations, and that the thinking and the reason for initiating the process for the guideline—and this is what the data collection will show us over the next 2 or 3 years, as we develop the proposal—is are there technologies out there that will provide a consistent, affordable level of treatment to those flow-back waters prior to their being sent to either a centralized waste treatment facility or a municipal plant.

Mrs. NAPOLITANO. And my time is almost—in fact, it has run out. But has there been any new R&D done on the ability to utilize whether it is the membranes or other systems to be able to take care of those new——

Mr. HANLON. My understanding is the industry is, in fact, doing that research. EPA is, you know, from a research standpoint and budget constraints, would not likely be doing that.

Membranes are very difficult, because at 200, 300 parts per million, the energy cost for sort of moving water across a membrane would be very high. In fact, my understanding is, on site, there are companies using distillation technologies that basically take the water out, and basically you have a solid waste, then, that you can send to a landfill, et cetera.

So that is the thought process of—conventionally designed municipal waste water treatment plants using activated suspended growth process do not take out the parameters that are in shale gas flow-back water; all they do is dilute it.

Mrs. NAPOLITANO. Thank you, Mr. Chair, for your indulgence.

Mr. GIBBS. Mr. Bucshon?

Dr. BUCSHON. Thank you, Mr. Chairman. I think all of us would agree that we all want clean water, clean air. I just want to state that upfront.

But what I want to focus my questioning on is timing. And I guess we have been fracturing for about 60 years. And so I guess I would ask Mr. Hanlon. It says in here that you—EPA received a request from Congress in March of 2010 to review this process. Who requested it, and I—so was it a committee? Was it a specific Member of Congress? I would like to know who specifically requested it, and if you have any documentation of that request being sent to EPA.

Ms. DOUGHERTY. If it is OK, I will answer that question. It was requested, actually, by EPA's appropriation committee. And we usually——

Dr. BUCSHON. OK, EPA appropriation committee. So that was the appropriations—who, specifically? It says Congress requested it, and I want to know——

Ms. DOUGHERTY. Well, it was the appropriation——

Dr. BUCSHON. You know, "Congress" implies to me that some Members of Congress thought this was a problem, and they requested EPA review it.

Ms. DOUGHERTY. I believe it was requested in the fiscal year 2010 appropriation conference committee report. But it might have been in other—it might have been the bill language. But I think it was in the report language.

Dr. BUCSHON. OK. Can you——

Ms. DOUGHERTY. It says—I can read it to you. So it is "The conferees urged the Agency to carry out a study on the relationship

between hydraulic fracturing and drinking water, using a credible approach that relies on the best available science, as well as independent sources of information. The conferees expect the study to be conducted through a transparent peer-reviewed process that will ensure the validity and accuracy of the data. The Agency shall consult with other Federal agencies, as well as appropriate State and interstate regulatory agencies in carrying out the study, which should be prepared in accordance with the Agency's quality assurance principles."

Dr. BUCSHON. OK. So it is in a conference report. Was that related to a specific bill that was trying to be passed from the——

Ms. DOUGHERTY. I don't have the bill—the number of the law. It was the fiscal year 2010 appropriations——

Dr. BUCSHON. Because I would be interested in knowing what that was, and whose—if it was a conference report on a specific piece of legislation, who sponsored the legislation——

Ms. DOUGHERTY. Well——

Dr. BUCSHON [continuing]. And who was on the—who were the conferees——

Mr. BISHOP. Doctor——

Mr. GIBBS. Representative, would you yield for a second?

Dr. BUCSHON. Yes, yes.

Mr. BISHOP [continuing]. Bucshon, would you——

Dr. BUCSHON. I will yield.

Mr. BISHOP. Thank you for yielding. Please correct me if I am wrong, but it was in the energy and water appropriations bill for fiscal year 2010 conference committee report.

Dr. BUCSHON. Yes, OK.

Mr. BISHOP. Means it was agreed to by a majority of the conferees——

Dr. BUCSHON. Right.

Mr. BISHOP [continuing]. And then passed by both chambers.

Dr. BUCSHON. Yes, I understand.

Mr. BISHOP. I am sorry, I just——

Ms. DOUGHERTY. I can get you the——

Mr. BISHOP. Not energy and water, interior.

Dr. BUCSHON. OK, thank you.

Ms. DOUGHERTY. I will get the——

Dr. BUCSHON. And so, with that—OK, I understand that. I was just—my ears hear that—hear, you know, "requested by Congress," I want to know more specifically who requested it and why.

And I guess that leads into my next question, is do you know—was there—are there specific incident somewhere in the United States that spurred on this request? I mean is there—it is again about timing. Because I am—as you probably gather, I am a little bit skeptical about the timing on some of these things, as it relates to the Federal EPA in the last—since I have been here in Congress. So I am trying to see if there is, you know, some background information to provide the reason why this was requested, and why the—I guess the conferees, I suspect, most likely—that don't agree with me on environmental issues requested it. Is there any—do they have background in their request?

Ms. DOUGHERTY. I am not aware of specific background related to that, but I can check for the record——

Dr. BUCSHON. So I guess the question begs to why. I mean I guess—Mr. Hanlon, can you answer that, why EPA—I mean usually when I do things at my office—and I was a heart surgeon before—I usually want to know why. Why specifically now? I mean why do we need—you know.

And it seems like, to me, that you should have the answer to that, which means—to me it either has to be there was a specific incident related to a problem related to fracking, there was evidence of ground water contamination somewhere in the 50 States, a specific reason why the Federal Government would all of the sudden decide that it needs to try to usurp the State's role in regulating their environment in their own State. I mean I want to know specifically why.

Mr. HANLON. We are not—I am not aware why Congress put that request in the appropriations report for EPA to conduct the study. It was congressional request to the EPA in our appropriations report. We are very sensitive and responsive to requests of the appropriations committee.

Dr. BUCSHON. OK, thank you. I yield back.

Mr. GIBBS. Mr. Altmire?

Mr. ALTMIRE. Mr. Hanlon, I am going to ask about the bromide level in western Pennsylvania waters. There was a recent Carnegie Mellon University study and others that have shown an increased level of bromides. Some have equated that in a cause and effect relationship to the fracking process.

And I wondered if you were prepared to offer an opinion on is the increased level of bromides in any way related to hydraulic fracturing? Does that in any way endanger our drinking water? Is it definitely caused by the fracking? And if not, does the EPA also monitor other heavy industries and the release of bromides into the water?

Mr. HANLON. We are sort of following the issue of bromides in drinking water. My understanding is that potential sources of bromides into surface waters include shale gas flow-back water, mining operations, a potential source of water, as well as power plants, especially those that are installing flue gas to de-sulfurization units and the waste water that results from that.

The complication is that, as bromine increases in surface waters that then become intake waters for drinking water treatment plants, it significantly increases the potential for creating brominated trihalomethanes, which are carcinogens. They are more toxic than chlorinated trihalomethanes. They are less volatile. That means sort of when—they are more difficult to evaporate. And so they are on our radar screen.

I know the States, including Pennsylvania, are looking closely at these issues.

Mr. ALTMIRE. But do——

Mr. HANLON. Cynthia and I were in our region three office in Philadelphia last month and received a briefing in terms of the work that is ongoing regarding bromine, where it comes from, to alert drinking water treatment plants to test more regularly for this, and then to look at enhancements, potential enhancements, to the drinking water treatment process where there are elevated levels of bromine in the intake water.

Mr. ALTMIRE. But you listed a whole bunch of things that could be the cause. Do you think that fracking is one of the causes?

Mr. HANLON. I believe so, yes.

Mr. ALTMIRE. When you, the EPA—it probably was not you, specifically—the EPA testified before the Senate about the natural gas waste water standards recently, and they were asked—the witness was asked the reasoning for developing the standards, and they responded to the Senate that it was because of a request from Pennsylvania in dealing with the POTW issues.

Pennsylvania, of course, now has a zero discharge standard on that. So I am wondering if you feel that moving forward with the request to pursue these standards, given the fact that the entity that requested you look into this has now made a decision to no longer do the discharge into the POTWs, if you think the question is now moot.

Mr. HANLON. I believe the EPA witness that you refer to is sitting to my left.

Mr. ALTMIRE. OK. Well, maybe Ms. Dougherty, and then you could answer the question.

Mr. HANLON. In that case, basically the decision to initiate work on an effluent guideline was, in part, responsive to the position taken by the State of Pennsylvania. Again, my understanding is that their current policy is to suggest or encourage that publicly owned treatment works not take shale gas flow-back water. It is not a regulatory requirement.

And, you know, we have talked about Pennsylvania's recommendation to POTWs, we have talked about Ohio's ban on POTWs taking flow-back water. There are dozens of States that are sort of managing shale gas, shale gas protocols, production, and flow-back water. And so this isn't a Pennsylvania-Ohio-West Virginia issue, it is a national issue.

And that is why we made the decision to initiate the process—again, we are not publishing a proposed regulation next week—but to collect the data, look at sort of the issues of where the flow-back water is going, does it in fact pass through—interfere with the waste water treatment process or contaminate the biosolids, and if so, what technologies are available, what are the cost of those technologies, and then use that to inform a rulemaking process.

Mr. ALTMIRE. Thank you. And lastly, in your opening statement, your testimony, you say that the study, which you expect to be out, will include a modeling of potential impacts to these issues that we are discussing. And I was wondering. Is one of the impacts that the EPA considers—or do they consider—jobs created or lost as a result of these regulations? And when they issue a ruling, do they consider the economic impact to the community and to the State?

Mr. HANLON. The reference to the study was—the study that was, again, done at the request of the appropriations committee, or the appropriations report, and basically that is looking—is more focused on hydraulic fracturing fluids and sort of the water continuum that I described.

The effluent guideline, the regulation that we announced the initiation of last month, will absolutely consider the economic impacts. The standard in the Clean Water Act is the best available technologically economically achievable. And so those impacts are consid-

ered—will be considered in this deliberation, as they are in every effluent guideline. We have done technology-specific guidelines for over 50 industrial categories over the last 35 years, and we have initiated the process to look at this one.

Mr. GIBBS. Thank you. Mr. Harris?

Dr. HARRIS. Thank you very much. Mr. Hanlon, let me ask you a question. The testimony was—I think it was the fiscal year 2010—is that right, the appropriations bill—that had this language, fiscal year 2009, fiscal year 2010. Which one was it, fiscal year 2010?

Do you have any idea how much your budget is lower this year than the fiscal year 2010 budget in the upcoming year?

Mr. HANLON. I don't have that number at my fingertips. I would be happy to get back to you through——

Dr. HARRIS. It is lower, though, isn't it? Didn't we lower the EPA budget?

Mr. HANLON. Currently we are operating at the fiscal year 2011 level under a continuing resolution, as you understand——

Dr. HARRIS. Sure.

Mr. HANLON [continuing]. But we expect it to be lower——

Dr. HARRIS. Lower.

Mr. HANLON [continuing]. Than it was in fiscal year 2010.

Dr. HARRIS. So there is really no need to look for work, is there, over at the EPA?

Mr. HANLON. We have plenty to do every day.

Dr. HARRIS. You do, don't you?

Mr. HANLON. Yes, sir.

Dr. HARRIS. The language in that appropriations bill, it is not binding language, is it? It doesn't say the EPA shall do it—because, actually, I don't think you can do that in an appropriations bill—but it is not binding language, is it?

Mr. HANLON. I would have to sort of refer to my general counsel's office, in terms of——

Dr. HARRIS. Ms. Dougherty, what is the language—you quoted the language from the bill. What does it say?

Ms. DOUGHERTY. It says "the conferees urge the Agency."

Dr. HARRIS. Urge. Wow. Secretary Krancer, you are a judge. If somebody came to a court and said that that implied somehow that the EPA was forced to do it under the authority of law, what would you do?

Mr. KRANCER. I would have to throw them out——

Dr. HARRIS. It would be summary judgment, right?

Mr. KRANCER. Yes.

Dr. HARRIS. Because there is no—it says "urge." Why is the EPA looking for work to do when your budget is being cut, and this language is clearly not mandatory language?

In fact, you said it is being responsive to the appropriation committee request. That is what the EPA likes to do. Did the current appropriation committee put any similar language, perhaps even more binding language, in this year's appropriation bill coming out of this appropriation committee, which, I assume, is the one you would be most like to be responsive to?

Mr. HANLON. I am not aware of a similar request in the—if this was in the fiscal year 2010 language—in the fiscal year 2011 language.

Dr. HARRIS. Sure.

Mr. HANLON. The fiscal year 2012 process is pending. And——

Dr. HARRIS. It is not—I will cut to the chase. It is not in the bill.

Ms. DOUGHERTY. Well, but——

Mr. HANLON. Across the board, we are responsible——

Dr. HARRIS. So we have—what we have is we have a situation where EPA is obviously looking to create work to do when their budget is being cut. This is fascinating. Because I am going to ask the question that I asked before. Anybody on this panel know of a documented case of contamination of drinking water by the hydrofracturing technique?

[No response.]

Dr. HARRIS. I don't see a yes anywhere on the panel. There are—Chair Murphy, 100,000 instances nationwide of hydrofracturing, 200,000, 300,000? How many do you think? How many wells have been hydrofractured in the U.S.?

Ms. MURPHY. I can speak to my State, and my State is close to 100,000.

Dr. HARRIS. Oh, 100,000. So let's say it is a 200,000, 300,000, 400,000, 500,000 wells——

Mr. STEWART. 1.2 million.

Dr. HARRIS. 1.2 million wells. Now, in medicine this is called post-marketing surveillance, when you look for things that have happened in something that looks like it appears to be safe, like in the case of a drug. So you have administered 1.2 million treatments, and you are telling me there is not a single case? Now, even the FDA, which some people have problems with, too, would take no action against something where you had 1.2 million applications and nothing happening.

Now, Mr. Hanlon, you know I just love it when people come here and say there is radiation going on, and there is bromine, and things like this that just sound terrible. Isn't bromine a swimming pool chemical? Mr. Hanlon, isn't it used in swimming pools that my children go in to swim in?

And I am going to ask you a specific question, because you are all about clean water.

Mr. HANLON. Bromine is——

Dr. HARRIS. What is the level in the hydrofracturing fluid that comes out, compared to the swimming pool level? It is a simple question. You said that you are all concerned. You have got to have bromine levels on this stuff. And I know my kids swim in swimming pools with bromine in it. Can you get back to me on what the level is in a swimming pool, compared to what it is in a hydrofracturing fluid that comes out of a hydrofractured well?

Mr. HANLON. We would be happy——

Dr. HARRIS. Just to justify, you know, how you are going to spend a whole lot of taxpayer dollars looking at bromine, because it is just fascinating to me. I mean, given the setting we have.

The Duke paper—I think Secretary Krancer—was it—did you—one of you had referenced the Duke paper in your testimony. Is it

true that they would not reveal the locations of their—of the sources of their samples?

Mr. KRANCER. That is a tremendously timely question. I have said in the past that they have treated what they have done, where they have done it, their data, kind of like a Mike Krzyzewski game plan, that's secret. And of course I think I read the other day that Mike Krzyzewski just won his whatever-thousandth game.

Dr. HARRIS. Sure.

Mr. KRANCER. They have been very, very secretive. It has been like trying to get information from the CIA.

Dr. HARRIS. Well, that is pretty interesting. Because, like the CIA, they actually get Federal funding to do some of this work. And, you know, the taxpayers, if they are going to spend money on things, I think they do deserve to know that. As a scientist, I think it is unbelievable that a group purporting to do scientific, carefully done research, which is frequently quoted, would not be willing to share that data.

Anyway, I thank you very much, Mr. Chairman.

Mr. GIBBS. Mr. Lankford.

Mr. LANKFORD. Thank you, Mr. Chairman. There are a lot of issues, obviously, dealing with fracking. And I thank all of you for coming. You spent a lot of time in travel and preparation, and I thank you for all your written materials and your oral testimony and answering questions. I am sure this is the most fun part of your day at any point, is coming to talk to a congressional committee on it.

Let me just go through just a couple questions, just to pull some additional information out.

Mr. Hanlon, you had mentioned before just—the EPA and the study, and I understand all the study and the background, and some of those things on it. Have you been to a frack site before, personally, to walk around on a frack site?

Mr. HANLON. I have personally never been to a frack site. My staff has.

Mr. LANKFORD. OK. That would be helpful, to walk around and get a chance to see. And I would just encourage you to walk around on it. When you go to a frack site and you see the operation, the group of professionals that are there, and the way the water is handled, and the transition of it, I think it will be very enlightening. So I would encourage you to go and to watch the process, as it works its way through.

You listed off five areas—and I am going to go to a different area, because I was going to ask you about several things, but since you haven't been to a frack site, I am not going to ask you about those things—but you listed five areas: the acquisition of the water, the mix of the chemicals, the injection, the flow-back, and the waste water.

There are a couple areas in here. Obviously, when you are dealing with the water that gets into a drinking water source, and as it moves into a stream, or if it is just taken out of the well and dumped straight into someplace, obviously that would cause major concerns. That is not what is happening at this point.

In 2005, Congress did enact a law that excluded hydraulic fracking in the permitting, in the safe drinking water, except in a

couple areas. One is diesel is used. Do you know if diesel is still being used in many hydraulic fracking jobs, or what percentage of jobs are still using diesel? Yes, ma'am?

Ms. DOUGHERTY. I don't know percentage, but we do know that diesel fuel is being used in hydraulic fracturing fluid from statements that have been made by—in public forums by—or in public discussions with members of the industry and other information. It has been——

Mr. LANKFORD. So—but in the study of this, are you limiting your study to only those that use the diesel fuel as a part of it, or is your study for every area? Because I understand the diesel fuel is a restriction——

Ms. DOUGHERTY. I believe that the study is for hydraulic fracturing, overall, and the use——

Mr. LANKFORD. OK.

Ms. DOUGHERTY [continuing]. And the water cycle related to hydraulic fracturing, overall.

Mr. LANKFORD. So, because safe drinking water—because it specifically notes that it is excluded from that, from regulating it unless it uses diesel, but the study is studying all of it. And so is the hope that they will come back to Congress and say, "We have done this study, here is this information, Congress. If you want us to regulate these areas, here are the information," and assume there will be new laws that will be passed on that? Because I am trying to figure out—if there is not an assumption you are going to do a study and begin regulations when it has been specifically excluded in the law.

Ms. DOUGHERTY. Well, there are two different—we might be getting confused. There is a study that will be done in terms of collecting information related to the effluent guideline that Jim Hanlon has been talking about.

Mr. LANKFORD. Right.

Ms. DOUGHERTY. But the study that our research office is doing is related to the use of water and hydraulic fracturing, and the impact on drinking water resources.

Mr. LANKFORD. Right——

Mr. HANLON. We understand——

Ms. DOUGHERTY. And so they are looking overall——

Mr. HANLON [continuing]. The results of that study could not result in a regulation of injection, but for the diesel exclusion.

Mr. LANKFORD. Right.

Mr. HANLON. Basically, that is excluded by the 2005 law, and we understand that.

Mr. LANKFORD. Correct. So the study assumes that you are going to provide information and research, but not new regulations based on that——

Ms. DOUGHERTY. Yes.

Mr. LANKFORD [continuing]. Because of the exclusion?

Ms. DOUGHERTY. Yes.

Mr. LANKFORD. OK. The peer review that is in the statement as well that is from the fiscal year 2010 appropriations piece, it does, you know, obviously encourage. But it also says it must be scientifically based and peer reviewed. How is EPA fulfilling that peer review? Are you allowing industry, outside watchdog groups, environ-

mentalist groups, to be able to tag along when a study is done at various—do you all take a sample, they take a sample?

I raise the assumption at the end of the day, when the study is released, you allow people to be able to review it. That peer review, how is that being fulfilled currently?

Ms. DOUGHERTY. I—it is probably better to get some information for you for the record. But the Agency is going through a significant process to make sure we do peer review at many different steps.

We did a peer review with the scientific advisory board of the Agency and took public comments on the initial draft study plan. We are doing, under our normal quality assurance requirements, quality assurance project plans for each of the pieces of the study, including the case studies that are being done. Some of the prospective case studies are being done in concert with industry, because we have got to do it at——

Mr. LANKFORD. Sure.

Ms. DOUGHERTY [continuing]. A well where they are doing work. The retrospective will be laying out the information. But—and we have been discussing the plans with landowners and State and local and industry representatives. But I believe we will be as transparent as we can be, but we won't be having industry necessarily follow us around as we do our work.

Mr. LANKFORD. Great. Is that—Mr. Chairman, could I request this committee request of EPA that there is a—the peer review portion of this, that that is something they submit back to us, what the process is, and how the transparency—and I appreciate the openness and the transparency on that, but that we get the actual document that shows the peer review process, and how that is being fulfilled, just as a part of our oversight role?

Mr. GIBBS. Yes, we will request that.

Mr. LANKFORD. Thank you. With that, I yield back.

Mr. GIBBS. Ms. Dougherty, you have to leave at noon, and you are excused, and thank you for being here.

At this time, Ms. Beutler, do you have questions?

Ms. HERRERA BEUTLER. Yes. Thank you, Mr. Chairman. This is pretty simple, and I kind of smile because I am sitting in between two doctors, like a heart surgeon and a—I mean this is a simple question, which I am sure anyone here can answer. But it would help me understand.

You know, in the move to look at possibly requiring a pretreatment standard before it goes to a POTW—and what I was hearing was, well, what if a—this potable water is driven to Virginia or outside of Pennsylvania or, you know, who knows—maybe they want to drive it to Washington State, probably get sent back at the border.

But does a POTW not have the ability to say we can't or won't treat that, go somewhere else? And wouldn't someone who is driving that water, right, who is probably with the company who is doing the fracturing, say, "Hey, maybe we should figure out where we are going to take this"? Isn't that kind of pretty—I would assume that is somewhat prearranged. You know you are taking it somewhere where they can handle what you are going to take. Is that way beyond——

Mr. KRANCER. Well, let me take a shot at that. I think you are essentially—maybe more than essentially—very correct. POTWs, CTWs have certain permit limits that they must meet, and they must meet them. So whatever comes in on the outside has to meet the permit limits. So, ergo say in Pennsylvania, for example, we now have the new total dissolved solids regulations that apply to this particular waste stream, 500 milligrams per liter. So, whatever goes in has to be able to meet 500 milligrams per liter on the way out.

Now, those folks who are taking it in will know whether it can or can't. And if it can't, then that is a no-no, and they are not supposed to do that. That is the way the system works. So I think you have very accurately described it, as far as I can see.

Ms. HERRERA BEUTLER. So if a State has a concern about the level or quality of this waste water, they could simply choose to not allow it to be disposed of in their—in a facility or in their locality?

Ms. GROOME. Yes, and the State does not have to be the one that makes that determination. Each local municipality has the authority, just as you said, to say, "No, we are too small to take it, we haven't done those studies that we need to, to determine whether we can," so you are absolutely——

Ms. HERRERA BEUTLER. Or even, "We don't like this, we don't like fracking, we don't like what you're doing, go somewhere else," right?

Ms. GROOME. Certainly. You can——

Ms. HERRERA BEUTLER. OK.

Mr. STEWART. You want some followup on that? In the State of Ohio it has been the law since 1985 that all produced water from oil and gas production that include flow-back must go down to a class two well, pursuant to the Safe Drinking Water Act, and as regulated by the Ohio department of natural resources, under their primacy agreement with U.S. EPA.

There has been one POTW facility that set up in the city of Warren that was taking waters from the State of Pennsylvania, operating under a permit issued by Ohio EPA. That permit has been withdrawn. It is somewhat controversial. The industry in the State of Ohio supports the disposal of produced waters down class two wells. But wee have great formations to take it, and we have a regulatory structure backed up by delegation to support the development of that resource.

Other States are not as fortunate on that, and they need flexibility in the ability to manage this in order for this play to develop. Pennsylvania finds themselves in that situation.

Ms. HERRERA BEUTLER. Yield back. Thank you.

Mr. GIBBS. Thank you. I just got a couple more questions for Mr. Hanlon. You know, it sounds like the EPA is moving forward on a number of activities. Obviously, there is the studies and potential rules and guidances. Are there any other initiatives that you can talk about that might be underway by the EPA you can kind of briefly outline what the thinking is moving forward, in regard to oil and shale gas extraction?

Mr. HANLON. We have talked about the effluent guideline, we have talked about the study—I am going by our office of research and development and response to the appropriations request. The

written testimony summarizes a set of questions and answers that we issued in March, in terms of how does shale gas work within the construct of the NPDS program, both pretreatment and the regular sort of base program, so that is out and available on our Web site.

We are—and I mentioned in the testimony—we are working on two other guidance documents related to Clean Water Act responsibilities, one guidance for permit writers—again, this is voluntary guidance that says if you are writing a permit for a centralized waste treatment facility, if you are writing a permit for a publicly owned treatment works, here are the kind of questions you should be asking to EPA and State permit writers, as they are dealing with this relatively unique waste stream.

Again, in the southwest, in Oklahoma and Texas, permit writers haven't dealt with this because they have all gone down disposal wells. So, in areas where the option is being actively considered in terms of whether POTWs should take this stuff, what should be the questions that are asked. So that is one guidance document.

And the other one is sort of as we develop the pretreatment regulation, the Clean Water Act requires that in the meantime, until there is—in the instance there is not a national regulation, basically there is a decision process laid out under current regulations that has been there for 30 years, where permit writers make sort of best professional judgment decisions in terms of whether any pretreatment should be required on a case-by-case basis. And so that is the second guidance document we are working on that was covered in the testimony.

Mr. GIBBS. What is your thought on how you kind of work with the States and stakeholders? Do you have public hearings? I am concerned about having duplicative regulations and cost to stakeholders in the industry that is going to stifle the development.

I have a bill working on pesticides, and duplicate regulation is really, it is a problem. What is U.S. EPA's intent working with the States and working collaboratively, and stakeholders?

Mr. HANLON. Again, the target audience for those two items of guidance are the State and regional permit writers. So, basically, we will be consulting with them as the guidance is developed.

Mr. GIBBS. OK. Another question, quickly. I understand that the EPA's Federal authorities are developing best management practices for controlling erosion and sediment from storm water runoff at oil and gas drilling sites under construction. What is the EPA's planning with respect to storm water and sediment controls? Are you planning to do guidances—States are implementing certain things; what is happening in that area?

Mr. HANLON. A number of years ago—and I believe it was the 2005 Energy Policy Act exempted oil and gas exploration and production activities from storm water regulation.

Mr. GIBBS. That is correct.

Mr. HANLON. And so, basically, that exemption is in place, except that—and there were two exceptions—to the extent that runoff from an oil and gas construction site results in a violation of a State water quality standard. And the State sets a standard. If there is a violation of a standard, then basically that site is in violation—is discharging in violation of the Clean Water Act.

Or, if there is a discharge that results in a reportable quantity of a constituent of production—so if there is an oil sheen, some of the oil is getting out and getting into the creek, then basically that is also not covered by the exemption. We are not—you know, as a matter of course—and we have sort of dealt with oil and gas construction sites across the country—there aren't issues.

My understanding—and I talked to our water director in region three in Philadelphia this morning—they have done a series of inspections sort of in the Mid-Atlantic region, and they have visited a number of sites where the well pad itself is constructed in the stream bed. I would suggest that if they have done that, there was probably runoff as they were constructing that into the stream that probably violated State water quality standards.

Again, I wasn't there, I didn't observe that. But if that happened, then I think we would—I would sort of assert that sort of that is a violation, and that site would not enjoy the exemption.

Mr. GIBBS. Mr. Stewart, do you have any comments on that? Do you have any issues in Ohio with site selection with the EPA, in regard to storm water runoff?

Mr. STEWART. There was two instances in the State of Ohio as the shale was getting underway last year, in which an operator had a location that was very approximate to a stream. They violated the law, they were cited, and faced censure by both the department of natural resources and Ohio EPA.

Mr. GIBBS. So State regulation in place took care of the problem. I thought so.

Mr. STEWART. Yes.

Mr. GIBBS. OK.

Mr. HANLON. Just, again, a clarification on that point. In an example like that, both Ohio and Pennsylvania are authorized to implement the NPDS program. That would be a discharge in violation of the Clean Water Act. As I said earlier, those States would take appropriate Clean Water Act actions.

Mr. GIBBS. I've got one final question, I guess.

The EPA's regional offices, they have authority to develop their own policies and guidance under the Clean Water Act. Do they have that authority?

Mr. HANLON. The Clean Water Act—and I have sort of said this publicly many times—was elegant in its design. So the designers back in the early 1970s, I think, came up with very elegant design. It is tedious in its implementation, there are a lot of moving parts. And so it is common that regional offices, when they work with States, will basically deal with, sort of on a State by State, sort of site by site basis, interpretation of the statute, of the regulations, and of national guidance that is——

Mr. GIBBS. Do you know of any specific examples of any regional offices taking steps related to this issue?

Mr. HANLON. Not that I am aware of.

Mr. GIBBS. OK. I yield to Mr. Bishop.

Mr. BISHOP. Thank you very much, Mr. Chairman. And I will be brief. I thank you all.

I just want to thank you, Mr. Hanlon, for responding on behalf of the EPA to the interior committee conferees request that you

conduct a study. And I understand that we did not use the highest order of imperative there. We did not say "shall."

But we hear routinely from our friends on the other side of the aisle about faceless Washington-based bureaucrats arrogating to themselves authority that they do not have or ought not to exercise. If we are at the point where these same faceless Washington-based bureaucrats are going to arrogate to themselves the authority to ignore the clearly express will of the Congress, such will being a bipartisan expressed will of the Congress, then we are in a sorry state of affairs, indeed.

So, I thank you on behalf of the EPA for responding to that request.

And I also just—again, I don't think any one of us ought to fear data. You are conducting a study on drinking water—by the way, not the subject of this hearing—you are conducting a study on drinking water, which will be presumably based in sound collection of data. And your effluent guidelines work right now is, right now, engaged in the compilation of data. That is something that we all ought to welcome. We ought not to speak disparagingly about it. We ought not to fear it. We ought to welcome it. And I thank you for conducting it. I yield back.

Mr. GIBBS. Just one final comment. I think data is important, to collect the data and make sure it is done in a scientifically way—based way. I think the purpose of this hearing was to bring out in the open to make sure that the U.S. EPA and their respective State EPAs can work collaboratively, and we can develop this natural resource.

And it is a huge economic boom in job creation, and it is a national security issue because we spend almost $1 trillion overseas for oil, and we don't really need to be doing that. And we have a huge opportunity that is in our lifetimes to experience—especially in my area in Ohio, with the Utica shale, we are really excited about it.

And, you know, I am confident—it was good to hear the regulators from Oklahoma and Pennsylvania stating the experiences they are having, the excellent environmental record that they have had to protect the environment, and we can move forward, I think. But I want to make sure that the Federal regulators are doing their part to not have duplicative regulations, duplicative costs, and making sure that they are doing their—I think the Clean Water Act is supposed to be implemented by the States under the auspices, authority, oversight, of the Federal Government, but let the States do their thing. If they are doing their thing, let's let it happen. And that is what I think——

Mr. BISHOP. Very quickly, I hope this is not going to be hard, since it is just you and me left, but I am asking for unanimous consent to enter into the record a statement from the San Juan Citizens Alliance regarding this issue.

Mr. GIBBS. So ordered.

[The information follows:]

SAN JUAN CITIZENS ALLIANCE

1022½ Main Avenue
PO Box 2461
Durango, CO
81302

970.259.3583
970.259.8303

Chairman of the Subcommittee on Water Resources and the Environment, Rep. Robert Gibbs
Ranking Member of the Subcommittee on Water Resources and the Environment, Rep. Tim Bishop
Committee on Transportation and Infrastructure
Room 2165 Rayburn House Office Building
Washington, D.C. 20515

November 15, 2011

Comments submitting for the record on the hearing:

"Hydraulic Fracturing of Shale Beds: Ensuring Regulatory Approaches that Will Help Protect Jobs and Domestic Energy Policy"

Hydraulic Fracturing (Fracking) and Water Concerns in the Southwest

In southwest Colorado and northwest New Mexico, development of gas fields has been occurring for decades in both conventional and coal bed methane (CBM) plays. Within the last three years, the ability to develop the Gothic and Mancos shale formations has begun to look more and more feasible. While the impacts of conventional and CBM wells are well documented, it is still unclear what the impacts of shale development will be. Chief among the concerns about these impacts center around water, from both the quantity and source, and the quality perspective.

As to the former, quantity and source. Our region is semi-arid and subsequently, water is seen very differently here, as throughout the West, than it is where the Marcellus shale is being developed. Here, water is considered to be a finite and variable resource, and how much water is available annually is not a perennial given. Water availability is an annual assessment based on many factors. Sometimes there is water; sometimes there is not. Consequently there are several important questions to ask when considering shale gas development.

Where does the water come from in this finite system, and how does it affect other users in that system, mostly agricultural and residential users? This is an important question because of the tremendous volumes of water necessary for shale gas development; if water is used for this kind of industrial development, then it will not be used for food and fiber production, and it will not be available to provide drinking water for human consumption.

The amount of water needed to frack a shale well one time runs into the millions of gallon (estimates vary from 4-18 million gallons) per frack job; on average, less than half that water is recovered as "produced" water or "flowback' (fluid that must be extracted from the formation after fracking in order for the gas to flow). That means that millions of gallons are lost from the system because of shale development; that loss is known as "100% consumptive use". Unlike water that is

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put to agricultural and residential use, where a significant percent is returned for further consumptive use to the usable water system from which it came, water used in fracking is taken from the system of usable water and gone for good. Jobs can be created; water cannot. When water is gone, all the non-regulated incentives for employment the Congress can muster is not going to bring it back. Without a system of regulation that identifies sources of water that will be utilized for the development and through the life of a shale play, identifies the quantities of water necessary for this development, and does a water budget that assesses whether or not there will be adequate water to meet all the needs of the usable water system on a sustainable level, the damage to a region could be irreversible and catastrophic. This kind of impact cannot be weighed against some employment metric.

Like quantity issues, water quality are also of great concern. As referenced above, 'flowback' water is brought back out of the formation as part of the fracking operation. "X" amount of water goes into the formation; " 'X' " minus 50-70%" comes back out. The reason that this "X" minus 50-70% is lost to consumptive use is that it is now hyper-saturated not only with whatever fracking chemicals were initially used in the process, but it also contains whatever indigenous-to-the-formation substances it has encountered and activated during the frack, under high temperature and pressure. However, that is not where the problems stop. The frack fluids also encounter and activate naturally occurring radioactive materials (NORMs) found down hole.

This is a matter that is highly significant to proposed development in the Gothic and Mancos shales as well as other shale plays in the West. Given that southwestern Colorado and northwest New Mexico are known to be rich sites for radioactive material, just how "hot" the field is needs to be determined in order to establish how development should proceed. Development will occur not only in formations where significant deposits of radium, thorium and uranium can be found, but drilling will go through thick overburden formations (such as the Morrison and Salt Wash formations) that can contain these same NORMs at varying concentrations. An analysis will be necessary to determine how disposal of radioactive drilling and fracking waste is handled, whether that waste is drilling solids or flowback fluids.

That is one of the roles of regulatory agencies: to ensure that solid waste is not allowed to just pile up and be left, and that fluid waste are not discharged onto the surface with no thought of consequence to waterways and aquifers.

Currently, in our region, produced water is re-injected or stored in production pits, instead of being treated at waste water treatment facilities; there are two reasons for this. Given the rural nature of our region, there are a very limited number of such facilities; and those that we do have are built to treat residential and commercial, not industrial, waste. To date, no one from the industry has stepped up to construct a facility that would treat this waste. Thus, given the poor quality of the produced water, which is high in total dissolved solids (TDS), extracted volatile organic compounds, and potentially NORMs, treatment and surface discharge are not feasible at this time.

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That leaves re-injection and storage pits, both of which are problematic as well. Re-injection means more wells going through drinking water aquifers and therefore there is potential for contamination of those aquifers if the well cement casing is inadequate. Re-injection also means that the formations into which the millions of gallons of flowback are being injected need to be assessed for receptive capacity as well as discreet formation integrity to ensure that there is no communication between formations or to the surface, as has happened in La Plata County, Colorado. Storage pits must be adequately lined to ensure no seepage into ground water aquifers and must be located well away from water courses to prevent contamination of surface water should the pit overflow or leak as has also happened.
These are not hypothetical concerns; these are not concerns to be dealt with on the honor system. These are concerns that need regulation.
On November 10. 2011, the EPA released a report in which there was evidence of contamination of a drinking water aquifer in Pavillion Wyoming as a result of fracking. That is an aquifer upon which people rely for the water they use in their homes for drinking, cooking and bathing; it is now contaminated. This points out the need for regulations about adequately cementing well casings through drinking water aquifers, impermeable lining of production pits, and safe disposal of produced and flowback water, either through injection wells or treatment of this water prior to surface release.

The issues associated with shale gas development are extremely complicated and impactive. To frame any discussion in the simplistic context of jobs and domestic energy production simply does not begin to deal with this complexity. In the recently released Department of Energy Shale Gas Production Report, it states:
"Americans deserve assurance that the full economic, environmental and energy security benefits of shale gas development will be realized without sacrificing public health, environmental protection and safety."
If this committee is looking for standards by which shale development should proceed, this assurance is essential.

Thank you for allowing me to submit these comments; I appreciate the opportunity to participate in this discussion. If you have any questions, please feel free to contact me: (970) 259-3583 or josh@sanjuancitizens.org.

Respectfully,

Josh Joswick
Colorado Energy Issues Organizer
San Juan Citizens Alliance
PO Box 2461
Durango, Colorado 81302

Mr. BISHOP. Thank you. I yield back.

Mr. GIBBS. And again, I want to thank the witnesses for coming and preparing. And we look forward to developing these resources.

The committee is adjourned.

[Whereupon, at 12:15 p.m., the subcommittee was adjourned.]

NACWA
A Clear Commitment to America's Waters

Testimony of:

Martie Groome

Laboratory & Industrial Waste Supervisor
City of Greensboro Water Resources Department
Greensboro, North Carolina

Pretreatment & Pollution Prevention Commitee Vice Chair
National Association of Clean Water Agencies
1816 Jefferson Place, NW
Washington, DC

Subcommittee on Water Resources and Environment
House Transportation and Infrastructure Committee
U.S. House of Representatives
November 16, 2011

Introduction

Chairman Gibbs, Ranking Member Bishop, and members of the Subcommittee, thank you for the opportunity to appear before you today. My name is Martie Groome and I am the Laboratory and Industrial Waste Supervisor for the City of Greensboro Water Resources Department in North Carolina. It is a great privilege to be here to testify on how local clean water agencies implement the National Pretreatment Program and how this program may affect the disposal of wastewater from shale gas extraction.

In addition to my duties at the City of Greensboro, I serve as the Vice Chair of the Pretreatment and Pollution Prevention Committee for the National Association of Clean Water Agencies (NACWA) and it is my pleasure to be testifying on NACWA's behalf today. NACWA's primary mission is to advocate on behalf of the nation's publicly owned wastewater treatment works (POTWs) and the communities and ratepayers they serve. NACWA public agency members collectively treat approximately 80 percent of the nation's wastewater. The employees of these agencies are true environmentalists who ensure that the nation's waters are clean and safe, meeting the strict requirements of the Clean Water Act (CWA).

Background on the National Pretreatment Program

The National Pretreatment Program is often recognized as one of the most successful CWA programs for its role in reducing the amount of pollutants discharged into sewer systems and, as a result, into the nation's waters. Since 1983, the National Pretreatment Program has placed public utilities in the role of local regulator for the industries that discharge wastewater to their sewer systems. It is the local wastewater utilities that are responsible for enforcing both national pretreatment standards and any additional limits developed at the local level needed to protect POTW operations and local water quality.

To prevent potentially harmful pass through of pollutants to the environment or interference with the wastewater treatment process, the CWA requires EPA to establish national pretreatment standards for industrial and commercial facilities that discharge wastewater to the sewer system. Pretreatment standards are currently in place for more than 50 industrial categories, and POTWs regulate over 20,000 significant industrial users. New industries with unique wastewater treatment needs and challenges have arisen consistently since passage of the CWA, and clean water agencies through their implementation of the National Pretreatment Program have maintained a strong record of addressing these new challenges. While NACWA does not have a position on fracking per se, the fracking industry is merely another industry similar to others before it and POTWs will act as public servants in appropriately addressing the discharges from this industry.

It is important to underscore, that even in the absence of national pretreatment standards, POTWs can tailor local limits to the particular needs of the POTW and the industrial user. Local limits may be applied to any pollutants that may pass through or interfere with the treatment process or cause a negative impact on water quality. With local limits, POTWs may regulate discharges from any industrial or commercial facilities, not just the categories regulated by national pretreatment standards.

Regulating Industries through the Pretreatment Program

The pretreatment program has been so successful because it gives local POTWs the authority to control the pollutants in wastewater from any industry, using both national pretreatment standards and local limits. National pretreatment standards have the benefit of leveling the nationwide playing field for discharges to sewer systems, preventing industries subject to categorical standards from locating in a municipality that might allow more pollutant discharge than another. However, national pretreatment standards can, at times, be stricter than is necessary to protect a particular POTW and the waters they discharge into. Implementing national pretreatment standards can also require a significant commitment of resources by the POTW. Any national pretreatment standards for the fracking industry should be carefully developed and implemented to avoid unnecessary costs to the public clean water agency and its industrial customers.

EPA has wisely made the decision to take time to study the various elements relevant to developing pretreatment standards and it is NACWA's hope that this will yield a scientifically and economically sound set of standards. It is equally critical that the public understand that any POTWs that accept fracking wastewater during this interim phase must meet their permit requirements and set local limits for the industrial user if necessary. POTWs can make sound technical decisions about whether or not to accept wastewater from a particular industry by conducting research and testing to determine how much of a pollutant their treatment facility can safely handle. In many cases, local POTWs have effectively regulated industries for years before a national pretreatment standard was developed by EPA. If a POTW does not have the capacity to establish such local standards or fails to develop the necessary limits or controls to prevent pass through of pollutants or treatment plant interference, then the POTW should not accept this waste.

Application of the Pretreatment Program to Shale Gas Extraction

EPA's announcement that it will develop a national pretreatment standard for the shale gas extraction industry does not prevent POTWs from accepting hydraulic fracturing wastewater now after working with their state permitting authority to ensure the protectiveness of this practice. POTWs also have the authority to stop taking an industry's wastewater immediately if it causes any problems with the wastewater treatment process. Discharge to a POTW is only one of several options for the shale gas extraction industry. If a national pretreatment standard can ensure that such discharges to a POTW are safe, it may become a more commonly used option.

Conclusion

NACWA does not have a position regarding the use of fracking to meet the nation's growing energy needs. A scientifically and economically sound national pretreatment standard for the shale gas extraction industry, however, may provide protection to both the industry and to POTWs by providing a nationally accepted baseline for treatment of hydraulic fracturing wastewater. NACWA intends to work with EPA as the Agency studies the industry and develops a pretreatment standard that is protective and not unnecessarily burdensome or onerous.

Thank you for the opportunity to appear before you today, I look forward to any questions the Subcommittee may have regarding my testimony.

TESTIMONY OF
JIM HANLON
DIRECTOR
OFFICE OF WASTEWATER MANAGEMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES

November 16, 2011

Good morning, Mr. Chairman and Members of the Committee. I thank you for the opportunity to share information on EPA's role in ensuring that public health and the environment are protected during natural gas extraction and production activities.

EPA strongly believes that domestic natural gas production is critical to our nation's energy future. The natural gas resulting from well designed and managed extraction from shale formations has the potential to improve air quality, reduce greenhouse gas emissions, stabilize energy prices, and provide greater certainty about future energy reserves. Advancements in technology have increased the number of economically accessible gas reserves in the U.S. which has in turn benefited energy security and jobs. While this increase in activity and resources is beneficial, it is important that it be conducted in a way that ensures protection of drinking water supplies and water quality as well as adequate availability of waste disposal.

Natural gas holds promise for an increasing role in our energy future. As outlined in the President's Blueprint for a Secure Energy Future, the Administration is committed to addressing concerns about the potential for adverse environmental and health impacts of natural gas development and ensuring that production proceeds in a safe and responsible manner. We firmly believe that we can protect the health of American families and communities while reaping the

benefits of our expanded reserves of natural gas. Access to energy resources and clean water are not mutually exclusive. Both states and federal agencies have critical, complementary roles in ensuring that shale gas extraction occurs safely. States have important responsibilities deriving from their delegated authority under federal environmental laws as well as separate state authorities relating to oil and gas production. EPA likewise plays a central role because the Agency has oversight responsibilities when states are implementing federal laws and in some cases direct authority under federal statutes such as the Safe Drinking Water Act and the Clean Water Act.

I would like to discuss a few recent and upcoming actions by EPA related to shale gas extraction. EPA's current activities include: development of treatment standards for wastewater discharges, a research study on the potential impacts of hydraulic fracturing on drinking water resources, guidance for permitting when diesel fuel is used in hydraulic fracturing, and guidance on water quality permitting and pretreatment.

On October 20, 2011, EPA announced that it was beginning a rulemaking to set technology-based treatment pre-treatment standards to regulate discharges to publicly owned treatment works (POTWs) produced by natural gas extraction from underground shale formations. We will pursue the rulemaking process in coordination with our federal partners, and- informed by the input of industry experts, states, and public health organizations- we will work to ensure the needs of our energy future are met safely and responsibly.

We know that shale gas extraction in some instances can generate large volumes of wastewater and that this wastewater can potentially contain high concentrations of salts, radionuclides, heavy metals, and other materials that are potentially harmful to human health and the environment. Current rules prohibit direct discharges of this wastewater to surface waters,

and most of the wastewater is reused or re-injected underground. However, a significant amount is delivered to POTWs or commercial treatment facilities, where it is discharged to surface waters after treatment. EPA has heard concerns that those facilities may not employ treatment technologies that are effective at removing the contaminants in this type of wastewater, and we will be investigating both the constituents of the wastewater and available treatment technologies as part of the rule making process. Because of these concerns over potentially high amounts of pollutants in the wastewater from shale gas extraction and the fact that shale gas production is projected to grow significantly nationwide, EPA believes the initiation of a rulemaking, including the data collection necessary to better understand environmental impacts and available treatment option in support of such a rule, is an appropriate step. A call for data and information on the pollutants generated by the shale gas extraction industry is included in the October 20, 2011 announcement. In particular, EPA will be soliciting data and information on the types and characteristics of pollutants in shale gas wastewaters, the volumes and concentrations of pollutants, the fate and transport of pollutants to ground or surface waters, and any known instances of pass-through of pollutants or upsets related to shale gas wastewaters at POTWs. EPA is also seeking information on documented impacts of these pollutants on aquatic life and human health. EPA will also reach out to affected stakeholders and collect information to better characterize shale gas wastewaters and the efficiency of various treatment, re-use, and disposal technologies that will reduce shale gas wastewater pollutant discharges, including those technologies currently used in public and private treatment plants. Finally, EPA plans to collect cost data on treatment technologies to determine the cost and affordability of treatment. EPA's current plan is to issue the proposed rule for shale gas wastewater treatment standards in 2014. Although the number of treatment plants accepting shale gas extraction wastewater is small

relative to the number of disposal wells, we believe the issuance of national technology standards will help to ensure regulatory certainty, national consistency and a level playing field for industry. Under the Clean Water Act, EPA must adopt standards that reflect the best available technology economically achievable. EPA will propose regulations that are affordable. In the coming months, EPA will carefully consider the impact of regulatory costs to the industry and to special subsets of stakeholders such as small businesses, state and local governments, and communities. EPA will also consider potential impacts on jobs and on local economies.

At the request of Congress, EPA launched a research project last year to study the relationship between hydraulic fracturing and drinking water resources. The study plan was released on November 3, 2011. The research will consider the entire lifecycle of water use in hydraulic fracturing. EPA's study, which is being conducted by our Office of Research and Development, will look at the five stages of water use, including: water acquisition, the mixing of chemicals, injection at the well, flowback and produced water, and the disposal of wastewater. EPA will release the first report on the study in 2012 which will include analysis of data collected from multiple sources, results of the modeling of potential impacts of various aspects of hydraulic fracturing, studies of the formation of disinfection by-products during the treatment of hydraulic fracturing waste waters, portions of the retrospective case studies that have been completed, and an environmental justice assessment. A second report, scheduled to be released in 2014, will provide additional scientific results on these topics and report on prospective case studies and toxicological analysis.

While Congress has specifically exempted selected oil and gas production activities from several environmental laws, a number of environmental protections continue to apply. For example, while the Energy Policy Act of 2005 excluded hydraulic fracturing for oil and gas

production from permitting under the Safe Drinking Water Act's (SDWA) Underground Injection Control (UIC) Program, the exclusion does not extend to those activities when diesel fuels are used in fracturing fluids or propping agents. Hydraulic fracturing flowback and produced water disposal through underground injection is still regulated under the SDWA. Injection is the primary method of disposal in all areas except the Marcellus Shale region.

In addition to EPA's oversight role for state permitting authorities under the Clean Water Act and Safe Drinking Water Act, the Agency also acts in an advisory role to state permitting authorities. One example of this is the Frequently Asked Questions (FAQs) document we released in March of 2011. The FAQs are intended to serve as CWA guidance to state and federal permitting authorities within the Marcellus Shale region in addressing treatment and disposal of wastewater from shale gas extraction. The FAQs discuss the wastewater issues and pollutants associated with shale gas extraction and how they can be addressed under existing regulations. Relevant regulations that are discussed cover oil and gas extraction, centralized waste treatment, acceptance and notification requirements for publicly owned treatment works, pretreatment, and storm water. The FAQs should assist EPA and state personnel as they work with the regulated community to address shale gas extraction wastewater.

EPA is currently working on water quality permitting and pretreatment guidance as well as guidance on permitting the use of diesel fuel in hydraulic fracturing. Those documents will provide technical information and recommendations for permit writers to consider, based on current statutes and regulations, and will not be binding requirements. These actions are related to programs where states are implementing Federal programs and EPA has an oversight role under the statutes, or where EPA is the permitting authority. They do not apply to activities that are solely governed by state law.

Conclusion

In conclusion, EPA is committed to supporting the safe and responsible development of natural gas resources to create jobs, promote energy security, and reduce energy impacts associated with energy production and use. In doing so, we will use our authorities, consistent with the law and best available science, to protect communities across the nation from potential impacts to water quality, human health, and environment that may be associated with natural gas production activities. We expect to continue to coordinate our actions with our federal, state, and local partners as we move forward. By addressing potential adverse environmental impacts, we can ensure that natural gas production proceeds in a responsible manner to enhance our domestic energy options. We believe that by doing so, as a nation, together we can establish a sound framework that allows for the safe and responsible development of a domestic energy resource.

Thank you for the opportunity to testify today, I look forward to any questions you may have.

Natural Gas Drilling: Pennsylvania's Perspective
The States' Regulation of the Natural Gas Industry

Testimony of
Michael L. Krancer
Secretary
Commonwealth of Pennsylvania
Department of Environmental Protection
Before the Subcommittee on Water Resources and Environment,
Committee on Transportation and Infrastructure
Wednesday, November 16, 2011

Members of the Committee, thank you for the opportunity to provide testimony on behalf of the Commonwealth of Pennsylvania, Department of Environmental Protection.

The potential of the Marcellus Shale play has captured the world's attention. Indeed, not since Edwin Drake drilled North America's first commercial oil well in 1859 have so many focused their attention on Pennsylvania as an opportunity for oil and gas development. Increased well drilling has also brought with it unfounded skepticism about Pennsylvania's ability to properly oversee the oil and gas industry.

I say unfounded because just last year the head of EPA's Drinking Water Program said publically that "I have no information that states aren't doing a good job already [regulating fracing]." That is certainly the case for Pennsylvania. Also, our regulatory program was recently evaluated by the independent, non-profit, multi-stakeholder State Review of Oil and Natural Gas Environmental Regulations organization (STRONGER) and received positive marks. STRONGER was only recently recognized by the United States Department of Energy Shale Gas Subcommittee's August 2011 draft report on Shale Gas development as an "exceptionally meritorious" mechanism for improving the availability and usefulness of shale gas information among constituencies. According to STRONGER, "the Pennsylvania program is, over all, well-managed, professional and meeting its program objectives." I would go beyond that and say that Pennsylvania has done an exceptional job managing the new challenges that shale gas development presents while allowing our citizens to enjoy the enormous benefits created by this industry.

There has been a misconception that the hydraulic fracturing of wells can or has caused contamination of water wells. This is false. First, hydraulic fracturing is only a temporary feature of natural gas development which lasts a few weeks. Hydraulic fracturing of wells is not new in Pennsylvania; it has been going on here since about the 1950s and has been standard practice since about the 1980s. In 2010, the head of EPA's drinking water program, Steve Heare, said that despite claims by environmental organizations, he had not seen any documented cases that the hydro-fracing process was contaminating water supplies. EPA Administrator Lisa Jackson said the exact same thing in her May 24 testimony before the U.S. House Committee on Oversight and Government Reform. In a January 2010 article in Platts Gas Daily, Energy Secretary Stephen Chu said that hydraulic fracturing is safe and lawmakers should be cautious in

their efforts to restrict it. My predecessor, former DEP Sec. John Hanger, told Reuters in October 2010 that "Pennsylvania has not had one case in which the fluids used to break off the gas from 5,000 to 8,000 feet underground have returned to contaminate groundwater." Even the limited recent Duke Study of Dimock, Susquehanna County, water samples reports that there was no evidence of fracing fluids in any sample from any of the 68 wells they tested. The study states, "[w]e found no evidence for contamination of drinking-water samples with deep brines or fracturing fluids."

Our ability to unlock the huge clean burning energy source contained in unconventional shale formations will transform Pennsylvania into an energy exporter and move our nation toward energy independence. In addition, we are looking at an economic and energy transformation. We have already seen tens of thousands of new jobs here in Pennsylvania from the industry itself as well as from new industries spawned to support it. These are good paying career jobs in many fields. And that is just the start. There will be hundreds of thousands more good paying skilled and unskilled jobs in a variety of sectors.

While interest in the economic and energy possibilities of the Marcellus is high, my job is to protect public safety and the environment and to do so based on sound science and not fiction or fear. Unfortunately, we have seen some examples of very suspect science lately in this area. There are many examples but let me point out four prominent ones: (1) the May 2011 Duke University Paper regarding methane in Pennsylvania water wells in Dimock; (2) the April 2011 Robert Howarth Paper regarding Greenhouse Gases and Marcellus Shale; and (3) the April 16, 2011 United States House of Representatives Democrats Report, "Chemicals Used In Hydraulic Fracturing" and; (4) EPA's *Greenhouse Gas Emissions Reporting From The Petroleum and Natural Gas Industry: Background Technical Support Document*, 2010.

Our experts as well as other experts are studying all these materials and I will not belabor all the deficiencies with these various reports here but I will highlight a few.

The Duke paper seems to be based on only a few selected samples in a selected area with previously documented problems. This would indicate that the study itself is statistically and technically biased. Also, the fact is that the methane in the area being seen is the product of the shallower, Upper Devonian formation which is about 1,000 to 3,000 feet deep, not the deeper shale formations which are about 7,000 feet deep. Yet the Paper improperly attempts to link the source to the deeper Marcellus Shale. Finally, the authors of the study have inexplicably declined DEP's reasonable request that they share with us their data and their sample locations. This in itself raises credibility questions.

Also, the unbiased real facts are coming in which refute Duke. In October 2011 the Center For Rural Pennsylvania issued its comprehensive study entitled "The Impact of Marcellus Gas Drilling on Rural Drinking Water Supplies". The Center is a bipartisan bicameral legislative agency of the Pennsylvania Legislature. The study was conducted by the Penn State University's College of Agricultural Science. Major findings of the Study include the following:

- Statistical analyses of post-drilling versus pre-drilling water chemistry did not suggest major influences from gas well drilling or fracking on nearby water wells.

- Analyses of the data from both phases of this study generally showed a lack of statistically significant changes in water quality parameters due to Marcellus drilling or fracking when comparing pre- to post-drilling elements of water quality.

- Noting the Duke Study; here dissolved methane did increase at one drilled site but this site also had a moderate level of methane before drilling occurred. Dissolved methane did not increase at fracked sites and was not correlated to the distance to the nearest Marcellus well site.

- Re methane: the research found no statistically significant increases in methane levels after drilling and no significant correlation to distance from drilling.

- Statistical analyses did not suggest major influences of gas well drilling on the water quality of nearby water wells, as evidenced by a lack of statistically significant increases in pollutants that are most prominent in drilling water fluids, such as TDS, chloride, sodium, sulfate, barium, and strontium.

- Results of the water quality parameters measured in this Study do not indicate any obvious influence from fracking in gas wells nearby private water well quality. Data from a limited number of wells also did not suggest a negative influence of fracking on dissolved methane in water wells.

The Study also found some elevated bromide levels in some wells. But, the authors note in this regard that there is no drinking water standard for bromide so such increased concentrations observed alone do not represent a direct health concern. Thus, the authors encourage additional study on this subject.

The United States House of Representatives Democrats paper fails to state what it is not. It is not a toxicological review of chemicals used in fracing and it does not provide a sound scientific assessment of exposures, exposure pathways or risks to human health that might be associated with such theoretical exposure. The paper also fails to note that the fluid that is its subject is over 98% water and sand with only small amounts of the chemicals it attempts to characterize. The paper creates misimpressions by focusing on total liquid volumes and not the amounts or volumes of any additives in the liquid. The paper also is very loose with respect to its use, or misuse, of the label "carcinogen." For example, the paper talks about "diesel fuel" and "sulfuric acid" as carcinogens. However, both have been associated as carcinogens only via the air pathway; in the form of mist in the air for sulfuric acid and as exhaust fumes for diesel fuel.

Robert Howarth is a Cornell University scientist who published a "study" regarding the greenhouse gas impacts of shale gas development. Howarth's supposed study has been rejected by almost every legitimate source in the scientific community. Even Howarth himself admits that the data in his study is, his words, "limited", "unpublished", "really low quality", "lousy" and from "weird PowerPoints." Joe Nocera of the New York

Times points out that even the Environmental Defense Fund has estimates of methane gas emissions that are 75% lower than Howarth's.

In August 2011, Carnegie Mellon University (CMU) published a study, partially funded by the Sierra Club, which demonstrates conclusively that Howarth's conclusions are false, irresponsible and unscientific. The CMU study is a comprehensive life cycle analysis which concludes, among other things, that "natural gas from the Marcellus Shale has generally lower life cycle GHG emissions than coal for production of electricity" and that "natural gas provides lower greenhouse emission for all cases studied whether the gas is derived from Marcellus shale or the average 2008 domestic natural gas system" Also, interesting is that the CMU study concludes that although "green completions" and capturing gas for market that would otherwise be flared or vented could reduce emissions associated with the completion process, "these preproduction emissions, however, are not substantial contributors to the life cycle [emissions] estimates." As lead CMU researcher Paulina Jaramillo said, "we don't think [Howarth] is using credible data and some of the assumptions [Howarth] makes are biased. And the comparison [Howarth] makes at the end, my biggest problem, is wrong."

The fundamental deficiencies of EPA's *Greenhouse Gas Emissions Reporting Technical Document* were recently very well documented in an August 2011 report released by the very well respected energy consulting firm IHS CERA entitled, aptly, "*Mismeasuring Methane: Estimating Greenhouse Gas Emissions From Upstream Natural Gas Development*. The EPA's 2010 *Technical Guidance* inexplicably revised upward by an order of magnitude the prior emissions estimates for GHGs from this industry from studies on this topic from just a few years ago. IHS CERA explains the magnitude of the flaws in EPA's approach. As IHS CERA points out, EPA's methodology behind its 2010 study lacks rigor and should not be used as a basis for analysis or decision making. EPA, bizarrely, based its estimates on methane emissions from well completions from data samples of methane captured (i.e., not emitted) during well completions. Also, EPA based its conclusions on just a couple of slide presentations. Aside from the fundamental deficiency of using incomplete and unreliable data, IHS CERA points out that EPA did not even do the math correctly with the data it did choose to use and that EPA's assumptions in doing the math were unsupportable in the real world. As a result, "the overall amount of methane that EPA assumes is emitted during well completion activities does not pass a basic test of reasonableness."

This Report would seem to confirm that life cycle GHG emissions from unconventional shale operations are similar to current domestic gas operations and that natural gas, as a fuel, presents tremendous opportunities to achieve cleaner air since it emits virtually no particulate matter and much lower amounts of other parameters.

The IHS CERA Report also discusses the Howarth Report. IHS CERA shows, to the extent any further showing on this were necessary, that the Howarth Report is not technically or factually supportable. Indeed, appended to the IHS CERA report is a piece by an IHS CERA principal, Pete Stark, that specifically takes Howarth to task for "misusing and seriously distorting" a previous IHS CERA article published by Mr. Stark. The release of the CMU Study and the IHS CERA Study in such close proximity in time prompted a colorful remark by my immediate predecessor as DEP Secretary, John

Hanger, who had this to say, "bit by bit the Howarth Study is being consigned to the junk heap."

Pennsylvania's Regulatory Program

Pennsylvania regulates oil and gas well operations under several statutes including the Oil and Gas Act, the Clean Streams Law, the Air Pollution Control Act, the Dam Safety and Encroachments Act and the Solid Waste Management Act. As described in more detail below, this network of laws and their associated regulations provides the Department of Environmental Protection (DEP) with the tools it needs to comprehensively regulate everything associated with oil and gas development - from locating the well site, site preparation, drilling the well, fresh water withdrawals and water storage, wastewater management, and site restoration.

Simply put, because of our long history of oil and gas development and comprehensive regulatory structure, Pennsylvania does not need federal intervention to ensure an appropriate balance between resource development and environmental protection is struck.

Well Site Location

The Oil and Gas Act (58 P.S. §§ 601.101 *et. seq*) is the primary law governing well drilling in Pennsylvania. With the exception of wells drilled through workable coal seams, there are no spacing requirements for Marcellus Shale wells. Although spacing restrictions do not generally apply, the Oil and Gas Act, the Dam Safety and Encroachments Act (32 P.S. §§ 693.1 *et. seq*) and the Clean Streams Law (35 P.S. §§ 691.1 *et seq*) regulate where well sites may be located and how the site should be constructed.

Section 601.205 of the Oil and Gas Act prohibits operators from developing a well site within 100 feet of any stream, spring or body of water that is identified on a topo map (small intermittent or head water streams are not always identified). In addition, the site may not be located within 200 feet of buildings or water wells. The department may waive these restrictions if additional protective measures are included as conditions to the well permit. Typical conditions include additional erosion and sediment control measures and measures to deal with the additional fresh water that will be encountered while drilling.

25 Pa. Code Chapter 105 (the Dam Safety and Encroachment regulations) requires well operators to obtain an encroachment permit if a well site or other support facility (such as an access road or water withdrawal pad) is located within a FEMA designated floodway. If FEMA has not designated a floodway (as can be the case for small streams), the operator must obtain a permit if the facility will be within 50 feet of a stream. For Chapter 105 purposes, a stream is anything that has a defined bed and bank – this is much more inclusive than the Oil and Gas Act provisions.

Finally, locating well sites within a floodplain may be regulated by municipalities through the Flood Plain Management Act. Certain ordinances promulgated through this statute are not preempted by the Oil and Gas Act. 58 P.S. § 601.602.

Site Development

Developing a well site outside the location restrictions of the Oil and Gas Act and the Dam Safety and Encroachments Act is regulated under the Clean Streams Law through the Department's erosion and sediment control program.

Stormwater runoff is the leading cause of stream impairment in Pennsylvania. To address this problem, DEP has developed a comprehensive stormwater management program. Pursuant to 25 Pa. Code Chapter 102, all earth disturbance activities must employ "best management practices" like silt fences and road side culverts to control erosion and manage stormwater. Relative to building sites in floodplains, pits and impoundments used to store waste material may not be used if the bottom of the pit will be within 20 inches of the ground water table. 25 Pa. Code § 78.56. In floodplains, the ground water table will be close to the surface and therefore, drilling wastes would need to be contained in tanks if a pit could not be used.

If well site construction will disturb more than 5,000 square feet or has the potential to discharge sediment to High Quality or Exceptional Value waters (so classified pursuant to 25 Pa. Code Chapter 93), the operator must develop and implement an erosion and sediment control plan. This E&S plan must be kept on site for review by DEP. If development of the well site, access roads and other related facilities will disturb 5 or more acres, the operator must obtain erosion and sediment control permit before the site can be developed.

Well Drilling

Drilling any well – even a water well – has the potential to impact fresh groundwater. While this potential may exist, such an impact is not acceptable. Protecting groundwater supplies is of utmost importance and the Oil and Gas Act is particularly strict in this regard. If a well operator impacts a water supply (by pollution or diminution), they *must* restore or replace it and pay for any increased costs of maintaining or operating the replacement supply. 58 P.S. § 601.208.

In fact, if an oil or gas well is drilled within 1,000 feet of a water supply and the water supply becomes polluted within 6 months of drilling, the operator is *presumed* to have caused the pollution unless they took a water sample that demonstrates the pollution was present before the oil or gas well was drilled. 58 P.S. § 601.208(c). Needless to say, taking a pre-drilling water sample from all supplies within 1000 feet of a gas well should be a standard business practice.

Of course, the goal is to avoid groundwater impacts in the first place. To that end, DEP recently promulgated new regulations that significantly strengthen our well construction standards. These new regulations accomplish five things.

First, the regulations will establish more stringent well construction standards for all new wells drilled in Pennsylvania. Second, the regulations impose new requirements on operators to inspect existing wells and report their findings to the Department. Third, the

regulations codify existing caselaw on water supply replacement requirements and clearly describe an operator's responsibilities if they contaminate or diminish a water supply. Fourth, the regulations impose a duty on operators to investigate complaints of gas migration and to mitigate any hazards found in the course of the investigation. Finally, the regulations require reporting of chemicals used to hydraulically fracture wells.

Below is a brief description of the significant new requirements in 25 Pa. Code Chapter 78.

I. New Well Drilling

Properly cementing and casing a well is critical to preventing gas migration. Prior to drilling a well, operators will now be required to develop a casing and cementing plan that shows how the well will be drilled and completed. Use of centralizers (which keep the casing centered in the well bore) must be used at prescribed locations to insure that cement is evenly distributed between the casing and the well bore. Cement meeting ASTM criteria for oil and gas wells must be used. Documentation of the cement quality and cementing practices used at the well must be available for Department inspection.

When cementing a well, if cement is not returned to the surface the operator must install a second string of casing for an added layer of protection. If cement is returned to the surface and the operator intends to only use surface casing (Marcellus operators typically use surface, intermediate and production casing), the operator must demonstrate that any gas, oil and produced fluids cannot leave the well bore.

Used or welded casing must be pressure tested. Casing strings attached to heavy duty blow-out preventers (such as Marcellus intermediate casing) must also be pressure tested.

II. Existing Wells

Operators must inspect all of their wells quarterly and report the findings of the inspections to the Department annually. If defective casing, evidence of leaks, or if excessive pressure within the well bore is discovered, the operator must immediately notify the Department and take corrective action.

III. Water Supply Replacement

The Oil and Gas Act requires any operator who contaminates or diminishes a water supply to restore or replace the supply with one that is adequate in quantity and quality for the purposes served. Case law on these requirements has defined when an operator must provide compensation for increased operation and maintenance costs (when costs are more than a deminimus amount) and for what duration (in perpetuity). The regulations codify these and other relevant holdings to clearly describe the operator's responsibility.

IV. Gas Migration Response

The new regulations impose a duty on operators to immediately investigate a gas migration complaint and to notify the Department if they receive such a complaint. If natural gas is found at elevated levels (10% of the lower explosive limit) the operator must immediately notify emergency responders and initiate mitigation measures (including advisories and controlling access to the area).

V. Reporting Requirements

The practice of hydraulic fracturing has drawn considerable attention recently. One of the primary concerns involves the chemicals used during the process. DEP's new regulations require operators to disclose the chemical additives and the hazardous constituents of those additives on a well by well basis. While DEP has never observed any evidence that hydraulic fracturing has directly contaminated fresh groundwater despite tens of thousands of wells being "fraced" over the past several decades, mandating public disclosure of the chemicals used in the process should end much of the controversy surrounding the subject.

Water Withdrawal

While the volume of water to frac a Marcellus well is greater than the amount required to frac traditional wells in Pennsylvania, the Marcellus industry's use of water is miniscule in comparison with other energy sources and other sources in general. Marcellus fracing is the smallest major user in Pennsylvania using only 0.2% of the daily water withdrawn which ranks it ninth of the top nine water users in the state. Marcellus drilling uses only 1.9 million gallons per day (MGD). This is in stark contrast to power plants which use 6.43 *billion* gallons per day (BGD). Other major uses include public water suppliers (1.42 BGD); industrial users (770 MGD); aquaculture (524 MGD); private water wells (152 MGD); mining (95.7 MGD); livestock (61.8 MGD); and irrigation (24.3 MGD). Thus, shale gas drilling is a very efficient energy production source measured as a function of water usage.

I have attached a graphic which dramatically illustrates this which was prepared by the PA Fish and Boat Commission.

There are three entities charged with protecting water quality by managing water withdrawals in Pennsylvania - DEP, the Susquehanna River Basin Commission and the Delaware River Basin Commission. DEP is on the forefront of protecting headwaters of the Commonwealth's streams in areas outside the Basin Commission jurisdiction by requiring operators to adhere to water management plans which governs their water withdrawal practices. The Basin Commissions were formed by a compact between the federal government, Pennsylvania and neighboring states within the respective watersheds. If a Marcellus well is drilled within the Susquehanna or Delaware River watershed, DEP and Commission approval of the operator's water management plan must be obtained before construction of the well site can begin. If the well is located outside those two river basins, only DEP approval is necessary.

The water management plan is based on low flow conditions and describes where water will be withdrawn how much water will be needed and the amount of water that will be taken at any one time. Evaluation of the plan involves looking both upstream and downstream to assess cumulative impacts, taking into account all other withdrawals and discharges and their impact on the resource, particularly during low flow periods.

Generally speaking, if the water withdrawal is less than 10 percent of the natural or continuously augmented 7-day, 10-year low flow (Q7-10) of the stream or river, a passby (a restriction on the ability to take water during low flow conditions) will not be required. Q7-10 is the lowest average, consecutive 7-day flow that would occur with a frequency or recurrence interval of one in ten years. A 10-year low flow event has a 10 percent chance of occurring in any one year. Accepted hydrologic practices must be used to determine the Q7-10 flow.[1]

Once approved, the plan is valid for each location for five years. Although the Commonwealth has ample water resources, operators will need to cooperate to make sure that access to water is available as more and more plans are submitted for headwater streams.

Water and Wastewater Storage

Once an operator gets the water needed to frac a well, the question becomes where to put it? Even more important, where to put the wastewater that is returned to the surface (called flowback)? A new development with Marcellus wells is the advent of centralized impoundments. Unlike pits located immediately adjacent to the well, centralized impoundments use dam like structures to hold enough water to service multiple wells over an extended period of time. These impoundments can store freshwater, and more increasingly, flowback from a frac job.

Under DEP's dam safety regulations, small freshwater impoundments – similar to a farmer's pond - do not need a permit. However, Marcellus impoundments can hold over 15 million gallons and if they store wastewater, must be permitted and constructed according to DEP standards. Key standards include two impervious 40 mil liners with a leak detection zone and groundwater monitoring wells around the impoundment. Impoundments located where a breach could threaten public safety must undergo a much more stringent engineering review.

Wastewater Management

The most significant issue facing Marcellus operators today is wastewater treatment and disposal. Operators report that approximately 15% of the water used to frac a well is returned to the surface during the initial flowback period. The Department has seen an increase in reuse of this wastewater – industry wide approximately 80% of the flowback

[1] Policy No. 2003-01 Guidelines For Using and Determining Passby Flows and Conservation Releases For Surface-Water and Ground-Water Withdrawal Approvals, November 8, 2002.

is used on another frac job. Thus, the total volume of wastewater that must be disposed is a small fraction of the volume needed to frac the well.

Still, flowback from Marcellus frac jobs contain pollutants of concern – particularly high levels of dissolved salts. Indeed, flowback water is several times saltier than sea water. Thus, Total Dissolved Solids (TDS) represent a growing concern for the Commonwealth's waterways and the Department has developed a proactive strategy to address this concern before widespread impacts are felt.

The best solution for disposing of high TDS wastewater is deep well injection. Unfortunately, the best geology in Pennsylvania for this method of waste disposal is being used for gas storage. Exploration for new injection sites is ongoing but not commercially available yet.

Therefore, the current preference for flowback water disposal is through existing DEP approved wastewater treatment plants. These plants typically do not the have technology necessary to remove TDS from the effluent and instead rely on dilution. The DEP's recently promulgated Chapter 95 regulations completely address the cumulative impacts of oil and gas wastewater discharges.

This new rule is the first of its kind in the country and limits the discharge of TDS to drinking water standards from new or expanded facilities that take oil and gas wastewater. This means that new discharges cannot exceed 250 mg/l for chlorides and that drinking water supplies will never be impaired because of oil and gas drilling. The process of eliminating the TDS will also remove radium – which has been the subject of recent articles. Thus, in addition to reducing the contaminants discharged to our streams, the new Chapter 95 rule will increase the use or recycled water, promote the development of alternative forms of disposal and perhaps promote the use of alternative sources of fracing fluid.

Drinking Water Protection.

I outlined in my April 6, 2011 letter to EPA Region III Administrator Garvin, over the past three years the Commonwealth has been very pro-active in protecting potential sources of drinking water. In addition to the Chapter 95 TDS regulations discussed above there are other measures being implemented. DEP recently announced the results of our in-stream water quality monitoring for radioactive material in seven of the Commonwealth's rivers. All samples showed levels at or below the normal naturally occurring background levels of gross alpha and gross beta radiation. Those tests were conducted in November and December of 2010 at stations downstream of wastewater treatment plants that accept flowback and production water from Marcellus Shale drilling. These sampling stations were installed last fall specifically for the purpose of monitoring stream quality for potential impacts from unconventional gas drilling operations. The raw water river samples were collected above public water suppliers' intakes where the water receives further treatment.

The seven river testing stations are located at the Monongahela at Charleroi in Washington County; South Fork Ten Mile Creek in Greene County; Conemaugh in

Indiana County; Allegheny at Kennerdell in Venango County; Beaver in Beaver County; Tioga in Tioga County; and the West Branch of the Susquehanna in Lycoming County. These stations were chosen because of their proximity to public water supply intakes and at the time, were located downstream of facilities permitted to or proposing to discharge oil and gas wastewater. Future monitoring will include monthly sampling at the Monongahela; South Fork Ten Mile; Allegheny; and Beaver sites and every other month at the remaining three sites. Moreover, gross alpha and gross beta testing was added to a second water quality network station on the Monongahela, in March 2011. This site is further downstream in Allegheny County. All of the results will be frequently evaluated and available to the public via EPA's Modernized STORET database.

There is more. Pennsylvania DEP has taken measures to have additional monitoring of finished water at 14 public water supplies with surface water intakes downstream from wastewater treatment facilities that accept Marcellus wastewater. On March 11, 2011, under Pennsylvania regulation 25 *Pa Code* §109.302, we directed a letter to public water suppliers that have surface water intakes located downstream of one or more facilities that are accepting Marcellus wastewater to immediately conduct testing of radionuclides (i.e., radioactivity) and other parameters including TDS, pH, alkalinity, chloride, sulfate and bromide. A copy of that letter and the list of recipients are enclosed.

In addition, Pennsylvania DEP, on March 18, 2011, under Pennsylvania regulation 25 *Pa Code* §92a.61(g), sent letters to 25 Publicly Owned Treatment Works and Centralized Waste Treatment facilities that currently accept this wastewater calling for immediate twice monthly effluent monitoring for radionuclides and other parameters including TDS, pH, alkalinity, chloride, sulfate, bromide, gross alpha, radium 226 & 228, and uranium.

DEP has shown it is ready, willing and able to act in other important and decisive ways to protect drinking water also. On April 19, 2011, at the direction of Governor Tom Corbett, I called on all Marcellus Shale natural gas drilling operators to cease by May 19 delivering wastewater from shale gas extraction to 15 facilities that then accepted it under an exemption from being covered by last year's Total Dissolved Solids (TDS) regulations. The next day the industry publically stated its commitment to compliance. From what we can see today a dramatic sea change has occurred in Pennsylvania on this as we have virtually overnight gone from millions of gallons being delivered to those facilities and discharged to virtually none. Of course we are still in the process of verifying both from the supply side and the demand side and we will continue to do so as we are seeing full cooperation all of the time. In that regard we sent a letter in July 2011 to approximately 88 drilling operators seeking their certification that they are no longer using any of the "grandfathered" facilities for wastewater from deep gas production. On the demand side, several NPDES permits are in-house for renewal and those renewed permits, if appropriate, will contain specific numerical limits for total dissolved solids.

Some Monday morning quarterbacks questioned DEP's method saying that it should have "ordered" compliance back in April. But any orders would have likely resulted in protracted litigation. We got compliance in 28 hours instead of 28 months.

We have done more. In November, DEP offered new technical guidance designed to ensure compliance with updated wastewater treatment regulations. This guidance explains revisions to Title 25 Chapter 95 of the Pennsylvania Code that require new or expanded sources of natural gas wastewater to treat the wastewater to the federal drinking water standard of less than 500 milligrams per liter of total dissolved solids prior to discharge.

This technical guidance is yet another step in Pennsylvania's continuing efforts to protect Pennsylvania's water resources. The document clearly communicates to any facility seeking to increase its discharge of treated wastewater or to any facility seeking to start accepting wastewater that they must meet certain obligations. The guidance also clarifies that all facilities that accept shale gas extraction wastewater that has not been fully pre-treated to meet the discharge requirements and develop and implement a radiation protection plan. Such facilities must also monitor for radium, uranium and gross alpha in their effluent.

Air Quality Protection

Natural gas holds great promise as a clean burning fuel which could greatly reduce air emissions associated with electricity production and transportation. It has been recognized that combustion of natural gas as either a fuel for generating electricity or a transportation fuel can have very beneficial impacts on air quality. With that being said, Pennsylvania is proactive in minimizing any potential adverse air impacts from extracting this resource.

Pennsylvania has ample authority under our Pennsylvania Air Pollution Control Act and our air regulations to regulate air emissions from Marcellus Shale gas extraction and processing operations and that is exactly what we do. We focus on minimizing emissions of, for example, nitrogen oxides, carbon monoxide, particulate matter, hazardous air pollutants, and volatile organic compounds (VOC) during the drilling, fracturing, gas collection and processing stages.

DEP took the proactive step of launching a short-term ambient air quality sampling initiative in the southwest, northeast and northcentral regions of Pennsylvania in April 2010. This initiative focused on natural gas extraction stages including drilling operations, fracing operations where wastewater was being produced, the flaring of gas for production and gas compression facilities. While concentrations of certain natural gas constituents were detected during these studies DEP did not identify concentrations of any compound that would likely trigger air-related health issues associated with Marcellus Shale activities. DEP also tested for carbon monoxide, nitrogen dioxide, sulfur dioxide and ozone, but did not detect concentrations above National Ambient Air Quality Standards at any of the sampling sites. DEP is currently developing a protocol for a long-term sampling effort to examine the potential chronic impact of emissions from natural gas operations.

Additionally, DEP intends to develop a comprehensive emissions inventory for natural gas operations under its existing statutory and regulatory framework. This data will allow

the Department to develop an accurate inventory to support air quality planning activities including revisions to the Commonwealth's State Implementation Plan (SIP) to achieve and maintain the health-based federal national ambient air quality standards including ozone, fine particulate matter and the recently promulgated 1-hour nitrogen dioxide and sulfur dioxide standards.

Pennsylvania's air quality regulatory program has been in effect since 1972. Our air quality program includes various tools such as Plan Approvals, Operating Permits and General Permits. A Plan Approval is a permission to construct a particular source. The compliment to the Plan Approval is the Operating Permit. An operator must obtain an Operating Permit for the source covered by the Plan Approval once the source is actually constructed. To obtain an Operating Permit the operator must demonstrate that the facility was constructed pursuant to all the terms and conditions of the Plan Approval. In some cases, such as what our regulations refer to as "source of minor significance" or where the source's operations can be regulated under standard conditions (what we call a General Permit), an individual Plan Approval or Operating Permit is not required. Many operations are still regulated under one or more General Permits. A General Permit is used for sources that the Department determines can be regulated under standardized specifications or conditions applicable across the board.

DEP's air regulatory program for this industry has been in effect for over a decade. Currently, certain oil and gas exploration and production activities are not subject to individual Plan Approval/Operating Permit requirements. On February 26, 2011, the Department provided a 90-day public comment period on the proposed revisions to list of exemptions currently in effect that would make the current exemption for certain oil and gas exploration and production activities conditional. We are in the process of reviewing the stakeholder comments to this proposal.

Owners and operators of natural gas-fired production or recovery operations, which includes compressor stations and their components such as internal combustion engines, gas dehydration units, crude oil or brine storage tanks, vents and other equipment, which are non-major sources, are subject to regulation under what we call the GP-5. The formal title of the GP-5 is General Plan Approval and General Operating Permit for "Natural Gas, Coal, Coal Bed Methane or Gob Gas Production or Recovery Facilities".

The Department's written approval is required before construction of any operation which is subject to the GP-5 requirement. The applicant is required to submit in advance detailed information regarding every piece of equipment covered by the permit. The serial number and specific design parameters of each piece of equipment is required. The applicant also must identify the compliance demonstration methods to be used for engines, dehydrators/reboilers and tanks. We also require estimates of fugitive VOC and hazardous air pollutant (HAP) emissions from connectors, flanges, open-ended lines, pump seals, valves, compressor seals, relief valves, diaphragms, drains, meters and other components. In addition, the holder of the GP-5 authorization is subject to comprehensive performance testing, verification and monitoring, recordkeeping and reporting requirements.

The GP-5 itself requires the operation of the facility to be in compliance with the prevailing Best Available Technology for air emissions control so as to be in compliance with certain emissions limits which are contained in the GP-5 for NOx, VOCs, CO, visible emissions, and malodors. The GP-5 applies to smaller engines, those between 100 and 1,500 horsepower. Engines which are larger would need to obtain a Plan Approval and Operating Permit.

DEP has issued authorizations for the construction and operation of approximately 260 natural-gas fired compressor stations across the Commonwealth. DEP just recently, on March 26, 2011, published minor GP-5 revisions which will encourage owners and operators to install and operate cleaner burning and more efficient engines and/or limit hours of operation to lower emissions.

DEP, in consultation with outside experts, is considering proposed revisions to GP-5 which would expand the applicability of the general permit to cover additional sources and activities including wellheads and other emissions units located at natural gas production and processing facilities. The revised GP-5 could cover spark ignition internal combustion engines, condensate tanks, storage vessels, glycol dehydrators, re-boilers, de-propanizers, and equipment leaks. It would make sense to harmonize the GP-5 with the newly promulgated federal EPA proposed and soon to become final New Source Performance Standards (NSPS) applicable to the oil and gas exploration and production sector. The proposed NSPS was published at the end of July 2011 and EPA is under a court ordered deadline to issue the NSPS in final form in early 2012. Thus, we hope to have a proposed revision to our GP-5 published for public comments by sometime in the fall to be able to issue it in final form after EPA issues its final NSPS Regulations.

If the circumstances will not support coverage by the GP-5 (larger facilities or engines larger than 1,500 horsepower) an Air Quality Plan Approval and Operating Permit is required for new sources or modifications to existing sources. For what the law labels "major sources," those that emit 100 tons or more per year of a regulated parameter, they are subject to the "New Source Review" permitting process which the Department administers. Air emissions from different physical locations can be "aggregated" together for calculation of applicability of the threshold if such locations are owned by the same company and are located "contiguous and adjacent" to each other.

Nonroad truck mounted internal combustion engines are frequently used in this industry, especially in association with actual drilling operations. These engines are frequently moving from one site to another. These sources can emit NOx and VOCs. Nonroad engines are subject to federal standards. In 2005, the Department issued the General Plan Approval and/or General Operating Permit for Nonroad Engines (GP -11). The GP-11 is the Commonwealth's embodiment of the federal requirements for nonroad engines and authorizes construction, modification, operation and the subsequent relocation of such engines. On February 26, 2011, DEP solicited comments on a proposed revised GP-11. The revision is aimed at having the GP-11 cover operation of nonroad engines at multiple temporary locations. Stakeholder comments on the proposed GP-11 revisions are currently under review.

Enforcement

Pennsylvania DEP has been very strong on enforcement of rules and regulations in this industry. DEP has shown just this calendar year its agility and decisiveness on the enforcement front in issuing two cease and desist orders as a team within hours when it was appropriate to do so. In one case we issued a "cease drilling order" for non-Marcellus well drilling and in the other case we ordered a stop to pre-drilling well pad preparatory activities which were resulting in sediment being released into a nearby stream upstream of one of the various water intakes of a local water authority. In the latter case we received a letter of thanks from the local water authority for DEP's "immediate" and "prompt response" in doing so. The water authority went on to write "[t]his situation has reinforced our belief that the interest and importance of our water source is of utmost importance to all and that Pennsylvania Department of Environmental Protection works hard to sustain this valuable resource".

In response to the April 20, 2011 well equipment failure and resultant loss of control of a well in LeRoy Township, Bradford County DEP issued an NOV just two days later dated April 22, 2011 in which it required the operator to answer many questions about the incident itself and its root cause and insisting that the company remain on stand-down from well development activities until it could provide DEP technical personnel sufficient assurances that there would be no repeat of the event there or elsewhere. DEP also asked the following important question: why it took nearly 12 hours to address the uncontrolled release of fluids from the well. After three weeks in which the company was in stand-down our technical staff did report to me that they had been provided adequate assurances and the company then did restart well development operations. However, we have more. We have a commitment by the operator that it will from now on engage and use local well control professionals in the very unlikely event that a future well control incident at one of its wells would occur in Pennsylvania. DEP had not asked for that particular measure in its April 22, 2011 NOV but we insisted on this during subsequent discussions and we achieved it.

In May 2011 DEP announced more than $1 million in penalties against an operator to address violations in Bradford and Washington Counties. Through two Consent Orders and Agreement (COA) with Chesapeake, DEP collected $900,000 for contaminating private water supplies in Bradford County, $200,000 of which must be donated to the department's well plugging fund; and another $188,000 for the February 23, 2011, tank fire at a drilling site in Avella, Washington County. The Bradford matter was the highest single penalty ever assessed against any oil and gas operator in the history of the program. In the Washington County matter the fines assessed were the highest allowed by the Oil and Gas Act.

The Pennsylvania Marcellus Shale Advisory Commission Report

I was honored to be a member of the Governor's Marcellus Shale Advisory Commission and co-chair of its Public Health, Safety & Environmental Protection Subcommittee. The Commission assembled experts from within the environmental, conservation, state and local government, academic and natural gas industry communities and its charge was to identify, prioritize and craft a set of comprehensive strategic recommendations regarding

the safe, efficient and environmentally responsible extraction and use of unconventional gas reserves in Pennsylvania.

I can testify personally that the process itself was remarkable. The Commission's approach was grounded in sound science, data and facts, not fiction, emotion or profits. I witnessed an amazing consensus building exercise among representatives of different backgrounds outlooks and opinions. The Commission was transparent in its business. There were 5 full Commission public meetings and 16 work group public meetings. There were 60 expert presentations and 100 citizen presentations. There were hundreds of communications to the Commission from the public.

The final report of the Commission is 137 pages long and contains 96 recommendations.

The United States Department of Energy (DOE) Shale Gas Production Subcommittee August 2011 Ninety-Day Report

In August 2011 the Shale Gas Subcommittee of the United States Secretary of Energy Advisory Board issued its "Ninety-Day" Report. The Board was charged "with identifying measures that can be taken to reduce the environmental impact and improve the safety of shale gas production." The Report contains many conclusions and observations that show Pennsylvania is out in front.

The DOE Report recognizes the significant contribution domestic natural gas is and will play in the future in domestic energy supply. It recognizes that real jobs have been created in the sector.

The DOE Report touts the adoption of best practices for well construction, especially casing and cementing. Pennsylvania's Chapter 78 regulations cover that topic and the industry and the Department have been in ongoing discussions on that topic for some time.

The DOE Report recognizes what I discussed at the beginning of this testimony, *i.e.*, the gap between real science and experience and perception regarding drilling and production of domestic natural gas. In that regard the DOE Report acknowledges the small or minimal risk that fracing itself poses to groundwater. At the same time, it notes the need to protect groundwater resources. I have discussed the lengths that Pennsylvania is already going in that regard.

The DOE Report recognizes the need to maintain collaborative relationships among industry, regulators and the public. The Report suggests there be collaboration among industry and government and the public to educate and gather real data regarding experience as we move forward. This is an effort that we have been undertaking in Pennsylvania for a long time.

The DOE Report, as did our Shale Advisory Commission, notes that local impacts should be considered and accounted for.

The DOE Report also notes as an important issue the potential air related issues associated with this resource and recommends that data be developed to get a handle on that topic and that it be dealt with so as to avoid negative air pollution impacts from the extraction of this resource. I have already discussed Pennsylvania's multi-faceted approach in that area.

Governor Corbett's Legislative Initiative

From the Marcellus Shale Advisory Commission Report, Governor Corbett crafted a robust initiative the legislative parts of which he sent to the Pennsylvania Legislature in October 2011. His initiative is very specific and detailed. It contains various components including environmental protection, transparency, and enforcement provisions. The environmental protection provisions include, among other things: (1) increased setbacks of well sites from private water wells, public water supplies and watercourses; (2) increased bonding; (3) cradle to grave wastewater tracking; and (4) expanded area of liability presumption. The initiative includes these items to bolster transparency: (1) increased requirements for notification of gas well siting; (2) increased disclosure of chemicals used in the fracing process and web posting on DEP's website of this information (much of which is available now through the company's websites or FracFocus); (3) requirements for disclosure of other information such as drilling logs and if methane was encountered during drilling. As for enforcement, the initiative: (1) enhances the "bad actor" provisions of state law which ban repeat offenders from working in the Commonwealth; (2) increased penalty amounts for violations; and (3) requires 24 hour advanced notice of key events in the drilling process including cementing, pressure testing and fracing.

The Myths About the So-Called "Halliburton Loophole" and the FRAC Act

While some say that the so-called Halliburton Loophole is behind what they perceive as a sinister plot to exempt fracing from the Safe Drinking Water Act (SDWA) and allow the pollution of drinking water, the facts are different.

First the context. Fracing is a temporary process of pumping fluids underground for the purpose of extraction of natural gas from deep formations. Indeed, the initial fracing process lasts a few days and while the well may have to be periodically re-fraced, the life span of a producing well can be a century. In addition, the fracing process is separate and apart from the drilling process. In fact, the fracing process, by definition, occurs after the drilling of the well is complete. Also, fracing happens very deep below the surface. For Marcellus and other unconventional gas bearing rock formations, this occurs at about at least 5,000 to 8,000 feet below the surface or more. Fresh groundwater, on the other hand, is located from about less than 600 feet below the surface.

Now the history. Hydraulic fracturing has never been regulated by the federal government. It has always been a matter of state regulation. EPA has never intended or thought that fracing is or should be subject to the SDWA's Underground Injection Well program. It has never before even expressed an interest in regulating the generations old practice of energy extraction *via* hydraulic fracturing under the SDWA Underground

Injection Well program. Instead, EPA, before now, has always been of the mind that the practice was well regulated by the various states in which it was taking place.

In 1997, a court case from the federal appeals court for the Eleventh Circuit issued an opinion involving the state of Alabama, while not finding that fracing was any threat whatsoever, for the first time ever, said that underground emplacement of fluids for the purpose of extraction of gas from coal beds, which are quite shallow compared to Marcellus and other unconventional gas bearing formations, was subject to the federal UIC program. The aberrational case was not binding nationwide; only in the territory governed by that federal court. In response to this court decision, EPA studied the fracing process and it issued a report in 2004 which concluded that fracing poses little or no threat to drinking water. EPA also concluded then that no further study of this process was scientifically justified.

Just like EPA, the United States Congress has never intended that hydraulic fracturing should be subject to the SDWA's Underground Injection Well program. So, in 2005, in the face of the aberrational court decision from the Eleventh Circuit, Congress sought to reassert and reaffirm, through the bipartisan Energy Policy Act of 2005, what had always been its policy, *i.e.*, fracing for energy extraction was not regulated federally by the SDWA's Underground Injection Well program.

It is myth to assert that this was pushed solely by Vice President Dick Cheney. In fact, this provision of the Energy Policy Act of 2005 garnered bipartisan support. It won 74 yea votes in the Senate. Included among its supporters there was Ken Salazar, the current Secretary of the Interior who was then a Senator from Colorado and the current President of the United States, Barak Obama, then the junior Senator from Illinois. In the House, 75 Democrats and 200 Republicans voted for the Bill including the top Democrat members of both the Energy and Commerce and Natural Resources Committees.

Now for the facts about drinking water and surface water protection. The Energy Policy Act of 2005 has no impact whatsoever on the state and federal laws that prohibit oil and gas extraction operations from causing surface water or ground water pollution. The whole of oil and gas operations are subject to the federal Water Pollution Control Act and is prohibited from causing pollution to the waters of the United States. In Pennsylvania, all aspects of oil and gas exploration and extraction, including drilling and fracing operations, are regulated by the state's Oil and Gas Act, the Clean Streams Law and our water protection regulations. The fact is that the so-called and misnamed "Halliburton Loophole" in no way diminishes the statutory and regulatory coverage of our laws as applied to gas extraction.

Hazardous chemicals are not being injected into the drinking water as some say. As mentioned, hydraulic fracing occurs at great depth; about 5,000 to 8,000 feet in Pennsylvania. Fresh groundwater is located a few hundred feet below the surface. So the activity occurs thousands of feet of solid bedrock below where water aquifers are located. Also, fracing fluid is comprised of on average 99.51% water and sand. The rest are components in common everyday uses such as food additives and cosmetics. As a Harrisburg newspaper story succinctly described this false paradigm recently,

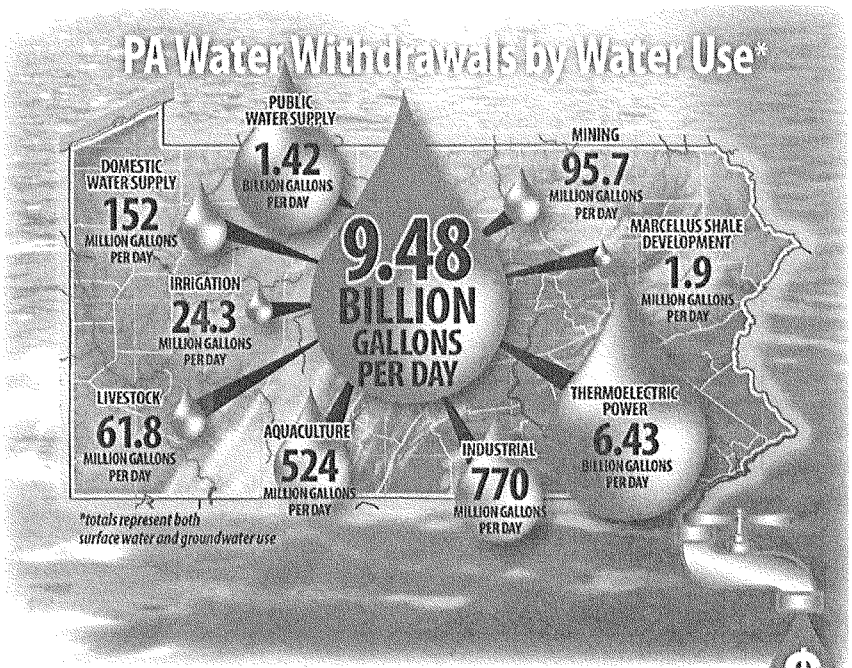
> Industry representatives say the chemicals are the same as you'd find under your kitchen sink, but Surra said "You don't want to take the stuff from under your kitchen sink and mix it in a glass of water you're going to drink, and that's basically what's going on." But it's not.

'*Citizens Shale Commission' Weighs In On Marcellus Policy*, Harrisburg Patriot News, Monday October 24, 2011 (emphasis added).

In conclusion, the case for the FRAC Act has not been made. In fact its proponents neglect, forget or misrepresent the history behind the relationship between fracing and the SDWA UIC program. They fail to mention or account for the fact that the current President of the United States and current Interior Secretary supported the Energy Policy Act of 2005 and that never before the appeals court case did either the Executive or the Legislative Branch intend or assert that fracing for energy extraction was within the SDWA UIC program. Also, the Act has nothing to do with potential contamination of drinking water supplies. The Act does not deal with well construction, cementing and cementing practices. Pennsylvania's state regulations do that.

Conclusion

The Marcellus Shale play along with other domestic unconventional resources can transform world energy markets. This potential will only be realized by avoiding the mistakes of the past. Pennsylvania is already showing that the balance of environmental protection and the development of this world class resource are being accomplished.



Sources: J. F. Kenny, N. L. Barber, S. S. Hutson, K. S. Linsey, J. K. Lovelace and M. A. Maupin. 2009. *Estimated use of water in the United States in 2005.* U. S. Geological Survey Circular 1344. 52 p.

Marcellus Shale Gas Development Water Use: June 1, 2008 - May 21, 2010 Susquehanna River Basin Commission basin-wide reported daily use of 0.99 MGD expanded to statewide estimate. Water sources: 29% Public water supplies/71% Surface water withdrawals
1 MGD daily use in Susq. Basin ÷ wells drilled in Susq. Basin/wells drilled statewide = 1 MGD ÷ (765/1428)

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Water Standards and Facility Regulation

March 11, 2011

PWSID 5020039
Daniel Hufton, Reg. Mgr.
PA American Water Co. - Pittsburgh
300 Galley Road
McMurray, PA 15317-2392

Re: **Important Information About Changes to Your Monitoring Requirements for 2011**

Dear Public Water Supplier:

We are sending you this letter to inform you of some changes to your monitoring requirements for 2011, pursuant to 25 Pa. Code §109.302. According to our records, your surface water intake is located downstream of one or more facilities that are accepting wastewater from Marcellus Shale operations. The Department has implemented several new regulations and controls in the last two years intended to protect the public water supply sources, and other water resources, from high levels of certain contaminants. The changes in your monitoring requirements described below are intended to provide the Department with information on the status of the finished water of your system.

Under authority of 25 Pa. Code §109.302 (relating to special monitoring requirements), you are to monitor as follows:

- **Total dissolved solids (TDS), pH, alkalinity, chloride, sulfate and bromide:** Within 30 days (by April 11, 2011), collect the first of four consecutive quarterly samples of finished water at entry point (EP) **101 & 102**.
- **Gross alpha, radium 226 & 228, and uranium:** Collect an annual sample at **EP 101 & 102** within 30 days (by April 11, 2011). For monitoring that is due in 2011, this annual sample will count as your routine compliance sample. For monitoring with a due date of 2012 or later, this annual sample will count as your routine compliance sample and your monitoring frequency will be re-set, as appropriate.

All samples shall be analyzed by an accredited laboratory using EPA-approved methods. Please contact this office if you need assistance locating an appropriately accredited laboratory. All samples shall be reported to the Department pursuant to 25 Pa. Code §§109.701 and 109.810.

If you have any questions about this letter, please contact me by telephone at 717-772-4018.

Sincerely,

Lisa D. Daniels

Lisa D. Daniels, Chief
Division of Operations Monitoring and Training

cc: Water Supply Program manager

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SECRETARY

January 5, 2012

The Honorable Timothy H. Bishop
U.S. House of Representatives
Attention: Ms. Kathrine Waring
225 Cannon House Office Building
Washington, D.C. 20515

Dear Congressman Bishop:

Thank you for your letter of December 7, 2011, regarding your request of additional questions for the hearing record concerning my testimony before the House Subcommittee on Water Resources and Environment. I offer the following in responses:

Question 1:

a) *Does the Pennsylvania Department of Environmental Protection (PADEP) require limits for the following pollutants in National Pollutant Discharge Elimination System (NPDS) permits for publicly owned treatment works (POTWs) and centralized waste treatment (CWTs) within the Commonwealth: total dissolved solids (TDS); bromide; strontium; and barium?*

For treatment facilities (POTWs and CWTs) that accept industrial wastewater originating from natural gas drilling or production processes (natural gas wastewater), NPDES permit effluent limits are most commonly required for TDS, which comprises the other pollutants mentioned: barium, strontium, and bromide. Under new state regulations (http://www.pacode.com/secure/data/025/chapter95/chap95toc.html), a CWT that proposes new or expanding loads of TDS from natural gas wastewater is assigned stringent effluent limits for TDS, barium, strontium, and chloride. A POTW that proposes to begin accepting new or expanding loads of TDS from natural gas wastewater may only accept wastewater pretreated to stringent limits for TDS, barium, strontium, and chloride.

b) *Does the PADEP require NPDES permit limits for any other fracking fluid constituents from POTWs and CWTs?*

The Department of Environmental Protection (DEP) establishes NPDES permit limits and conditions for any constituents in natural gas wastewater, whether they are hydrofracturing additives or natural substances mobilized by the hydrofracturing process, pursuant to federal and state regulations and as necessary for the protection of public health and water quality, based on site-specific determinations.

c) *Does PADEP require water quality monitoring for any pollutants identified in your prior answers?*

For treatment facilities (POTWs and CWTs) that accept natural gas wastewater, DEP typically requires monitoring for TDS, strontium, barium, chloride, radium 226/228 (combined), gross alpha activity, uranium, and bromide. Other monitoring requirements may apply based on a site-specific determination. Facilities that are subject to stringent treatment requirements for TDS

may not be required to monitor for all pollutants because the additional pollutants would be removed incidental to the required increased treatment.

Question 2:

a) As you noted in your testimony, the PADEP requested that "grandfathered" POTWs and CWTs voluntary stop accepting shale gas wastewater related to the Marcellus Shale formation. Does this request also cover shale gas wastewater that POTWs and CWTs may accept from other natural gas formations?

On April 19, 2011, at the direction of Governor Tom Corbett, Secretary Krancer called upon all Marcellus Shale natural gas drilling operators to cease by May 19, 2011, delivering wastewater from shale gas extraction to 15 facilities that, at the time, could accept it under the special provisions of the 2010 Total Dissolved Solids (TDS) regulations. The call covers shale gas wastewater originating from any shale formation, but not natural gas wastewater from other sources, such as shallow wells. The very next day, the Secretary received a letter from the President of the Marcellus Shale Coalition which stated that "I write to you today to express our commitment to meet the call of DEP to halt the delivery of flowback and produced water from shale gas extraction to the facilities that currently accept it under special provisions of last year's TDS regulations." (A copy of that letter is enclosed hereto as Exhibit A)

b) Has the PADEP codified (or does it plan to codify) this request in the NPDES permits of the "grandfathered" POTWs and CWTs?

There would be no need to do that at this time since the DEP received compliance with the call and we have already accomplished a sea change in Pennsylvania in this regard. In essence, DEP obtained compliance in 28 hours instead of the 28 months it might have taken through attempted litigation or issuance of orders or codification. DEP, of course, is still monitoring the situation. It is important to note that these facilities are not grandfathered, *per se*, from the new regulations. Their preexisting TDS loadings were exempted from the treatment requirements. That is the special provisions referred to that were contained in the 2010 TDS regulations issued under the previous administration. Where treatment facilities have indicated that they no longer accept shale gas wastewater, permit conditions have been or will be included in their NPDES permits to reflect this cessation where appropriate and needed and when supported by the evidence. Should those facilities ever decide to start accepting this wastewater again, they would be subject to the new treatment requirements. Where facilities have indicated that they will continue to accept the wastewater, TDS cap limits have been or will be included in their permits to reflect the limit of the exempted loads. As per the TDS regulations of 2010, any loading of TDS above those caps would be subject to new treatment requirements. A copy of the 2010 TDS regulations are enclosed hereto as Exhibit B for your perusal.

Question 3:

a) Does the PADEP plan to hold all POTWs and CWTs (other than the 15 identified "grandfathered" POTWs and CWTs) to the limit of 500 mg/L TDS in their NPDES permits?

Any treatment facilities that propose to begin accepting natural gas wastewater will be required to treat to 500 mg/L TDS. Any facility assigned an NPDES effluent limit for TDS or any other pollutant is required to achieve that limit.

Question 4:

a) *The Pennsylvania Code contains specific practices for the disposal of drill cuttings at the well site; however, these provisions specifically exclude on-site disposal of drill cuttings that are contaminated with "pollutional material, including brines, drilling muds, stimulation fluids, well servicing fluids, oil, production fluids or drilling fluids other than top hole water, fresh water or gases." How does PADEP monitor whether drill cuttings related to shale gas production are disposed of, on-site, in compliance with the requirements of the Pennsylvania Code?*

DEP performs routine inspections of all activities occurring on well sites before, during and after well drilling and completion, including times when waste disposal practices occur. DEP inspectors are trained to recognize violations of regulations which include regulations regarding onsite waste disposal. If violations are observed during an inspection, they are recorded and remedial action is taken. DEP regulates the disposal of residual waste (including contaminated drill cuttings) produced by the drilling of a gas well on a well site through encapsulation or land application. 25 *Pa Code* Chapter 78 regulations require setbacks and specify soil and waste leachate characteristic requirements. The well owner or operator must develop a control and disposal plan that describes how the cuttings will be handled. All practices must conform to the plan and the plan must be available to DEP upon request. The well owner or operator must notify DEP at least 3 working days before land application is to occur. The well operators are required to submit a well site restoration report to DEP within 60 days of restoration of the well site. The well site restoration report must include specific information regarding waste production and disposal at the well site. The well site restoration report must identify the location of any area used for land application or encapsulation of the waste and, if requested by DEP, the results of the chemical analysis of the waste soil mixture. A copy of 25 *Pa. Code* Chapter 78 is enclosed hereto as Exhibit C for your perusal.

b) *Does the PADEP have any concern on the environmental consequences of on-site disposal of drill cuttings?*

The drilling techniques and formations currently being used for unconventional natural gas drilling and production, including Marcellus Shale production, are significantly different than those used for conventional gas production. Information regarding the leachate characteristics of Marcellus Shale drill cuttings is limited. DEP is currently in the process of evaluating the need for any additional controls that may be required, as well as revisions to applicable regulations that control the handling and disposal of waste drill cuttings at or off the well site.

Question 5:

a) *On July 26, 2011, you wrote to the Environmental Protection Agency (EPA) Regional Administrator for Region III in response to a May 12, 2011 letter from EPA. In this letter, you stated that the PADEP was "reviewing the current permits of some facilities that are up for renewal to determine what, if any, new permit provisions would be appropriate" to address wastewater from shale gas extraction. You noted in this letter that the initial phase of that process would take "about 60 days". As a result of this review, did the PADEP identify any facilities where "more stringent limitations or conditions may be needed"?*

The initial phase of the review mentioned in the referenced letter to Regional Administrator Garvin focused on determining the status and permit conditions of certain treatment facilities that have accepted natural gas wastewater, including shale gas wastewater, in the past. Since then, the review has been completed and final action implemented in the form of a new Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids (TDS) – 25 *Pa. Code* § 95.10. A copy of this Policy and Procedure is enclosed hereto as Exhibit D for your perusal.

This Policy and Procedure will assist DEP's permitting staff in implementing the new TDS effluent standard for discharges of treated natural gas wastewater. The revised Chapter 95 regulations ensure that drinking water, waterways, and watersheds in the state are not impacted by high levels of total dissolved solids. The most common TDS in Pennsylvania are chlorides and sulfates. The Policy and Procedure also clarifies that all facilities that accept shale gas extraction wastewater that has not been fully pre-treated to meet the discharge requirements must develop and implement a radiation protection plan. Such facilities must also monitor for radium-226, radium-228, uranium and gross alpha radiation in their effluent.

b) *If so, please identify for the record, the facility, and what "more stringent limitations or conditions" will be included in the facility's discharge permit.*

Essentially all facilities are or will be subject to the requirements listed in (5a) above when their NPDES permit is next amended or reissued. For facilities that were authorized to receive natural gas wastewater from conventional or shallow well formations, but were never authorized to receive shale gas wastewater, a prohibition on the receipt of shale gas wastewater is added to the permit.

Should you additional questions or wish to discuss this in more detail please contact Tom Santanna, Director of Legislative Affairs, by e-mail at tsantanna@pa.gov or by telephone at 717.783.8303; Alisa Harris, Acting Special Deputy Secretary, by e-mail at aliharris@pa.gov or by telephone 717.787.6490; or Kelly Heffner, Deputy Secretary for Water Management, by e-mail at kheffner@pa.gov or by telephone at 717.787.4693.

Respectfully,

Michael L. Krancer
Secretary

Enclosures

cc: The Honorable Bob Gibbs
The Honorable Bill Shuster

Exhibit A

MARCELLUS
SHALE COALITION

April 20, 2011

Secretary Michael Krancer
Pennsylvania Department of Environmental Protection
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101

Dear Secretary Krancer:

On behalf of the Board of Directors of the Marcellus Shale Coalition (MSC), I write to you today to express our commitment to meet the call of the Department of Environmental Protection (DEP) to halt the delivery of flowback and produced water from shale gas extraction to the facilities that currently accept it under special provisions of last year's Total Dissolved Solids (TDS) regulations. Our members are carefully reviewing their operations and support achieving this milestone by May 19, 2011. The MSC shares the DEP's dedication to the protection of public water supplies and is taking this action as a clear demonstration of that commitment. This decision is a further reflection of our Guiding Principles for responsible natural gas production – including our focus on state of the art environmental protections and increased transparency in our operations throughout the Commonwealth.

This action was spurred by our exposure to new research on increased levels of bromide in western Pennsylvania waterways and coming to a better understanding of how our industry can mitigate bromide loading. We expect to be actively involved with you and your department as we develop and implement the technologies and processes that will allow for the additional increase in water reuse and treatment in such a short period of time. Concurrently, we encourage you and your department to conduct additional evaluation of the various sources of bromide in the Commonwealth's waterways and their role in contributing to trihalomethane (THM) formation downstream. With this holistic approach, the residents of the Commonwealth can be satisfied that the issue will be addressed in a sustainable way.

The MSC recognizes the historic opportunity before the Commonwealth at this critical juncture. To maximize the benefits of this opportunity for future generations, we understand that we must continue to operate responsibly with regard to our most important resources, notably Pennsylvania's environment.

Thank you for your leadership on this issue. The MSC and its members look forward to working with you and your staff on a successful implementation of this ambitious and worthy pursuit.

Sincerely,

Kathryn Z. Klaber
President
Marcellus Shale Coalition

Cc: Mr. Patrick Henderson, Energy Executive

TESTIMONY OF DANA L. MURPHY
CHAIR, OKLAHOMA CORPORATION COMMISSION
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
OF THE U.S. HOUSE OF REPRESENTATIVES COMMITTEE ON
TRANSPORTATION AND INFRASTRUCTURE

Hydraulic Fracturing of Shale Beds: Ensuring Regulatory Approaches that Will Help Protect Jobs and Domestic Energy Production

Wednesday, November 16, 2011

I very much appreciate the opportunity to testify today before the Subcommittee on Water Resources and Environment of the House Committee on Transportation and Infrastructure concerning regulation of hydraulic fracturing. It is a pleasure and privilege to be here to represent my state of Oklahoma.

I would like to compliment the Subcommittee for its focus on the question of what regulatory approaches will help protect jobs and domestic energy production. As the holder of a statewide elected office and Chair of the state agency that has regulatory responsibility not only over the oil and gas industry but also other key areas of Oklahoma's economy, such as public utilities, I know very well the danger of "regulation for regulation's sake." Any meaningful debate regarding regulation must include what a given regulatory approach is expected to accomplish. Protection of our water and the beneficial development of our nation's oil and gas resources are not mutually exclusive goals.

Oklahoma is proof of that. The oil and gas industry's annual operations in Oklahoma generate $51.7 billion in goods and services, nearly one-third of Oklahoma's gross state product. The industry directly employs more than 65,000 Oklahomans, and its activity means many more jobs in other sectors of the state's economy as well. One in seven jobs in Oklahoma is directly or indirectly supported by the oil and gas industry. Oklahoma's oil and natural gas producers will pay an estimated $800 million in gross production taxes to the State of Oklahoma in the current fiscal year. Those funds are spent by the state on education, roads, bridges, and other essential programs and infrastructure. All of this has occurred without any compromise in our environmental protections.

Recent technological developments have given us access to natural gas and oil resources held tightly in shale formations. The impact of this should not be underestimated. In a few short years America has gone from a nation that appeared doomed to eventually be entirely dependent on fuel sources from foreign countries—many of them unfriendly—to one with a bright energy future. With this change come huge new opportunities for energy security and economic development. Of course we welcome this. But we also recognize the challenges such a significant change can

bring, particularly to those of us who work on a daily basis to manage and protect our precious water resources.

The challenges in protecting our limited, precious water resources while producing the hydrocarbons that fuel our economic engine and give us a measure of independence from foreign state and terrorist powers are profound. But we must meet these challenges because failure will bear dire consequences on many fronts.

The challenges also arise on the personal level in Oklahoma. If I may present a personal example: I am a Corporation Commissioner, an attorney, and a petroleum geologist. As a fifth generation Oklahoman whose family has been involved in farming and ranching for generations, water and water use is crucial for our lives and our livelihood. At an early age, my grandparents and parents taught my brothers and me the value of being good stewards of water and land all while making a living from that water and land. Oklahoma's land and water, its diversity of wildlife and vegetation, is our history and our legacy. Certainly, this is not unique for just me and my family. There are millions of others like my family in Oklahoma and the other producing states. To put it simply, who better to develop the necessary regulations than those who drink the water and whose livelihood depends upon water?

To address these challenges, states across the nation are actively reviewing and updating their regulatory standards and procedures to ensure that shale gas drilling and production operations are conducted safely. States are also continually testing, evaluating, and strengthening the mechanisms they have in place to develop, implement, and enforce sound regulations.

In Oklahoma, these regulatory changes are being developed in a new, more democratic manner. Abraham Lincoln's phrase "of the people, by the people and for the people" is more than a platitude; it is the genius of American government sought by so many around the world, including revolutionaries in the recent Arab Spring. At the Oklahoma Corporation Commission, we regularly strive to incorporate Lincoln's understanding of government into our rulemaking procedures, formal and informal.

Rather than proclaiming regulation from on high or convening an oligarchy of technocrats to impose rules on the many industries we regulate, the Corporation Commission has in recent years engaged in a much broader discussion of issues before us with a vastly wider array of stakeholders. From this approach, we have found it is, indeed, possible to reach consensus among divergent opinions and interests—so long as everyone is literally face-to-face in the same room and fully engaged.

We have found better yet, a more efficacious regulatory product is manufactured and a greater acceptance of the rules is obtained through our collegial approach. From our experience, we know Thomas Jefferson was correct when he said, "That government is the strongest of which every man feels himself a part."

When we saw that new technology, evolving use of old technology and adaptive business practices required an updating of Commission rules and state oil and gas statutes, we knew our efforts could profoundly affect the environment, Oklahomans' jobs, our state's economy, the rights of producers and landowners, as well as our nation's energy independence—we are after all the third largest producer of natural gas in the country, and the sixth largest in oil production.

The Commission, therefore, did not draft rules or suggest language for a statute and then sit back as stakeholders commented on our efforts. Instead, we invited oil and gas operators, property owners, environmentalists and a host of interested parties to explore the options with us before a single word was committed to paper. We and our stakeholders actually sat in the same room together around a ring of tables and argued with each other, pleaded with each other, explained to each other what we needed to accomplish, what we wanted to avoid and how we should proceed.

We met often and for long hours. At times it felt we would never reach agreement. Occasionally we wanted to strangle one another. But sitting face-to-face, without the armor of anonymity we worked to find solutions. We found them. There were no pronouncements from on high. There was give-and-take, there was the genuine good feeling of working through difficulties together and reaching consensus.

We produced both legislation and rules that are recognized as some of the most important legal developments in the oil patch in at least the last twenty years. We produced agreement among diverse groups, and these collaborative efforts resulted in a bill that unanimously passed our state house, senate and the Governor to become law in April 2011. This single piece of legislation allows for increased access to shale formation reserves through the use of longer horizontal laterals, thus cutting costs and reducing the environmental footprint, as there are fewer vertical boreholes and surface locations. We have had many requests for copies from around the country.

We have protected our underground water supplies and continue to guard our surface water. We have protected existing jobs and in a time of economic doldrums, we have actually promoted new jobs.

Frankly, we could not have reached this place if the map had already been drawn in the form of proposed rules or proposed statutes. The trek, the surveying of the ground, the process was as important as the end point.

The states can more easily engage in this face-to-face effort than the federal government. On the national level, the number of players is too voluminous and, as a geologist I can say, the geology is far too diverse from the Atlantic Coastal Plain to the Appalachians to the Great Plains to the Rockies to the Redwood Coast for a one-size fits all approach.

On July 22, 2009 the Board of Directors of the National Association of Regulatory Utility Commissioners (NARUC) adopted a resolution a fellow Commissioner and I were

privileged to bring before NARUC regarding hydraulic fracturing (*see* Attachment 1). The resolution supports continued state regulation of hydraulic fracturing. To say that NARUC is made up of members with diverse opinions would be an understatement, including opinions regarding domestic energy production. Why did the resolution win approval from such a diverse group? Because its members know that the facts show these matters are best handled by the states.

NARUC, which is composed of utility regulators, not oil and gas regulators, recognizes the importance of natural gas as a clean-burning fuel for the direct heating of our homes and for electric generation. It also recognizes that the states are the place where geological differences can be best addressed and where the people directly affected—whether environmentally or economically—can best be heard.

Oklahoma has been working in collaboration with other states on these issues. State regulatory agencies routinely compare notes with their counterparts in other states as to their experiences in responding to new developments in technology, the economy, and public policy. Oil and gas regulators from different states regularly communicate with one another to share information on regulatory approaches and emerging issues.

Collaboration among states for the mutual benefit of all when it comes to domestic oil and gas production is nothing new. Oklahoma led the effort to form the Interstate Oil Compact Commission (now the Interstate Oil and Gas Compact Commission (IOGCC)) in 1935. In its 75 years of existence, the group, consisting of 30 member states and 8 associate member states, has an established history of promoting the safe recovery of domestic oil and natural gas resources while protecting the environment. In addition, there are several other national organizations that facilitate this process, including the Ground Water Protection Council (GWPC), and State Review of Oil and Natural Gas Environmental Regulations, Inc. (STRONGER).

STRONGER is an organization particularly worth noting. It serves as a multi-stakeholder collaborative effort to benchmark state regulatory programs; develop guidelines for effective state regulatory programs; and conduct reviews of state regulatory programs against those guidelines.

STRONGER's board is made up of representatives from each of three stakeholder groups: state regulators, environmental organizations, and oil and gas producers. In fact, the director of the Commission's Oil and Gas Conservation Division, Lori Wrotenbery, is a representative on STRONGERS' board. Likewise, all STRONGER efforts, such as the teams that review a state's hydraulic fracturing regulations, involve the same balanced representation of the stakeholder groups.

When STRONGER reviews a state's hydraulic fracturing regulations, the STRONGER stakeholder review team takes the time to review the materials provided by the state describing its hydraulic fracturing regulations, listen to a presentation by the state on its standards and procedures, and discuss with the state how the state addresses the key program elements laid out in the STRONGER hydraulic fracturing guidelines. The

review team then prepares a report. All of the STRONGER hydraulic fracturing reports are posted on the STRONGER website (www.strongerinc.org).

Most importantly, the reports contain specific recommendations for improvement and the STRONGER stakeholder organization looks forward to returning to the states to learn how they have responded to the STRONGER recommendations.

It is worth noting that in the two years it has taken the Environmental Protection Agency (EPA) to finish simply discussing how it will go about a study on hydraulic fracturing, STRONGER has completed five state reviews of hydraulic fracturing regulations, made recommendations, and states have been implementing the recommended changes.

Another example: While there has been much debate over federally required disclosure of the chemicals used by a company doing hydraulic fracturing, the states have been working with the Groundwater Protection Council to develop FracFocus, a site that provides not only full information on hydraulic fracturing, but a listing of the chemicals used by participating companies on a well-by-well basis. Moreover, in its upcoming rulemaking slated to begin in January, the Oklahoma Corporation Commission will be considering adoption of FracFocus into our state regulations, mandating that companies participate.

These examples are not meant to be critical of the EPA, an entity that my agency strives to work with cooperatively and successfully in a variety of areas every day. This is not an "us vs. them" debate. State regulatory bodies do not claim to be perfect. It is simply a question of what proven strengths and experience the states possess that make them the clear choice for hydraulic fracturing regulation. As the preceding examples show, the ability to respond quickly is one. Simply by virtue of their more limited size and scope of their area of jurisdiction, states can and do move much more quickly than can a large federal agency like the EPA. Oftentimes, speed and the appropriate response is of the essence in regards to tackling the huge changes and advancements in domestic energy production. For example, the regulatory responses of the states to the water protection issues raised by shale gas development demonstrate the unique ability of the states to respond quickly and appropriately to the special circumstances within their own borders.

Hand in hand with responsiveness is accountability. State officials are directly accountable to the residents of their state. In Oklahoma, if someone has an issue he or she can contact not only personnel with our Oil and Gas Conservation Division directly, but my office as well. My fellow Commissioners and I personally address complaints and inquiries from Oklahomans across our state. When it comes to those areas that we are responsible for, the buck stops with us, and the people of Oklahoma know that.

Openness is also something the states have to offer. This applies not only to such things as information, but the actual regulatory process. In Oklahoma, our rulemaking process is open to all, and we actively work to be sure all stakeholders are involved. Further, we know who those stakeholders are, because they are part of our state.

"Openness" applies to logistics as well. States can be far more flexible in scheduling meetings and taking other steps to be sure all voices are heard.

The knowledge stakeholders can bring to the table in an open, inclusive process cannot be underestimated. They have an intimate knowledge of their state. While there are some common issues shared by all states when it comes to hydraulic fracturing, there are many concerns that are unique to a particular state, and can only be addressed by unique rules formulated by those with the necessary knowledge regarding the state, and with a vested interest in that state. A "one size fits all" approach simply will not work.

Experience is yet another element. Oklahoma, for example, currently has about 185,000 oil and natural gas wells. Hydraulic fracturing has been routinely done in Oklahoma for some 60 years—in approximately 95,000 wells. Today, 80 percent of the oil and gas wells drilled in the state are completed using the hydraulic fracturing process. We know what we're doing. We have a proven track record. We continue to improve our processes and are working harder than ever with all the various stakeholders to implement good regulatory practices that consider the health and safety of Oklahomans as well as protecting the Oklahoma environment.

Central to ensuring regulatory practices that do not just protect, but promote jobs as well as protecting and promoting domestic energy production is collaboration. It is key to dealing with innovation. The states are the best models for facilitating on-going dialogue and relationships among such diverse stakeholders as industry, surface and mineral owners, environmentalists, businesses and manufacturing and fundamentally, individuals and groups from the public. Protecting and promoting jobs and the economy can be harmonious with protecting and promoting public safety, health and the environment if we can collectively try to do what individually we may not be able to do. One of the best steps the federal government and agencies can take is to support and encourage the states and the working relationships among the states in ensuring the best regulatory practices are put in place for various states.

ATTACHMENT 1

Resolution Supporting State Regulation of Hydraulic Fracturing

WHEREAS, The National Association of Regulatory Utility Commissioners has observed with great concern the current debate in Congress over the appropriate method for regulating the use of hydraulic fracturing to complete oil and gas wells; *and*

WHEREAS, Hydraulic fracturing is a proven technology with a long history of environmentally safe use in the completion of oil and gas wells; *and*

WHEREAS, The oil and gas producing States regulate hydraulic fracturing as a component of their regulatory programs for the drilling, completion, operation, and plugging of oil and gas wells; *and*

WHEREAS, The reservoirs that produce oil and gas are highly variable geologically and separated geographically across the oil and gas producing States such that State regulatory agencies are best suited by local expertise and experience to effectively regulate hydraulic fracturing; *and*

WHEREAS, State regulatory agencies are the most appropriate regulatory bodies to provide oversight and protection of hydrologically and environmentally sensitive localities as they relate to hydraulic fracturing; *and*

WHEREAS, The regulation of hydraulic fracturing under the federal Safe Drinking Water Act would add burdensome and unnecessary regulatory requirements to the drilling and completion of oil and gas wells, thereby increasing costs of producing domestic natural gas resources without any ancillary benefit to public health, safety or the environment; *and*

WHEREAS, The increased cost of producing domestic natural gas resources will reduce domestic supplies of natural gas, increase utility prices, and other costs to consumers, reduce tax and royalty revenues for local, State, and federal governments; and increase the nation's dependence on foreign energy imports; *and*

WHEREAS, The Interstate Oil and Gas Compact Commission (IOGCC) conducted a survey of oil and gas producing States, which found that there were no known cases of ground water contamination associated with hydraulic fracturing, and set forth its opposition to federal regulation of hydraulic fracturing under the underground injection control program in Resolution 09.011, dated January 7, 2009, "Urging Congress Not to Remove Exemption of Hydraulic Fracturing from Provisions of the Safe Drinking Water Act;" *now, therefore be it*

RESOLVED, That the Board of Directors of the National Association of Regulatory Utility Commissioners, convened at its 2009 Summer Committee Meetings in Seattle, Washington, supports continued jurisdiction of the States to conserve and properly regulate oil and gas production in their unique geological and geographical circumstances.

Sponsored by the Committee on Gas
Adopted by the NARUC Board of Directors, July 22, 2009

The United States House of Representatives

112th Congress

Committee on Transportation and Infrastructure

Subcommittee on Water Resources and Environment

The Honorable Bob Gibbs

Chair

Testimony Regarding

Resource Shale: Ensuring Regulatory Approaches That Will Help Protect Jobs and Domestic Energy Production

Thomas E. Stewart

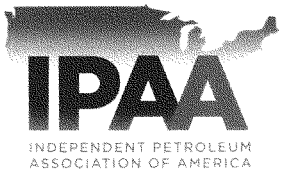
Executive Vice President

Ohio Oil & Gas Association

in cooperation with

Independent Petroleum Association of America

November 16, 2011



Chairman Gibbs, Ranking Member Bishop and Committee Members of the Subcommittee on Water Resources and the Environment, good morning. I am Thomas E. Stewart, Executive Vice President of the Ohio Oil & Gas Association (OOGA), a state-based trade association representing the common interests of over 1,750 members who are engaged in the exploration and production of crude oil and natural gas resources within the State of Ohio. The association has represented the Ohio industry since 1947. The Association also is an active cooperating association in alliance with the Independent Petroleum Association of America (IPAA), based in Washington D.C. IPAA represents thousands of independent petroleum and natural gas producers throughout the nation.

Today's hearing is focused on the development of the resource shale play and the regulatory approaches that will help protect the vast new amounts of reliable and efficient energy as well as the economic engine - the jobs - that are being realized from development of this resource. My comments will focus on how these events are impacting Ohio; the relationship between federal and state-based regulatory policy; and the process that validates the long-standing principle that the states are best suited to regulate the industry in order to protect the public interest and ensure protection of human health, safety and the environment.

For over a century and a half Ohio has been blessed with production of plentiful oil and natural gas resources. At each critical point in our industry's history it has been changes wrought by technology that have provided to producers the ability to explore new horizons, expand the resource base, and establish new reserves. Significant events include the development of the rotary drill bit, seismic technology lending an eye to what's underground, and the development of hydraulic fracturing in 1947 that by 1953 revolutionized the productive capacity of wells in Ohio and across the nation.

Today, the ability to horizontally drill a deep underground reservoir with exacting precision, exponentially exposing the face of the reservoir rock to the wellbore, has created massive efficiencies in our ability to produce oil and gas. Combined with the ability to hydraulically fracture the source rock at intervals along the horizontal lateral wellbore, America's producers are using advanced technologies to reset the clock on available domestic oil and natural gas resources.

Ohio is now beginning a new era of oil and gas exploration made possible by a triumph of technology that is the key unlocking reservoirs that until now were not accessible. Along with horizontal drilling there has been a seismic shift in our thinking about where to find oil and gas. For our entire history we explored for oil and gas in reservoirs where it had been "trapped" after migrating over the eons from "source" rocks where the oil and gas had been formed and cooked in nature's kitchen. Now, we are drilling into the actual source rocks where most geologists believe 95% of the oil and gas still remains in place even after feeding the traps that have produced all of the oil and gas that we have found to date. This is a radical departure in the exploration industry. It is a radical departure in America's understanding of energy dependency and the availability of reliable and efficient energy. For Ohio, the result will be the development of vast new supplies of dependable energy and the creation of a multitude of jobs in the oil and gas sector as well as other business sectors that are counting on this resource to expand authentic economic opportunity.

In Ohio the Upper Ordovician Utica/Point Pleasant Shale (Utica) is the source rock for much of the oil and gas that has been produced in various conventional reservoir traps. The Utica is the newest member of the resource shale play that is revolutionizing oil and gas production in the United States.

Economic Impact: Already production from the resource shales has fundamentally changed domestic energy markets. Generally it takes 6 Mcf (thousand cubic feet) of natural gas to equal the energy found in one barrel of oil. So, over time and absent disruptive events natural gas has traded at about a 6:1 ratio to crude oil. That is until now. Today crude oil is trading at $98.00 per barrel. The historic trend says that natural gas should be priced at about $16.00 per Mcf. However natural gas is trading at $3.65 per Mcf or about 26:1. The new and efficient development of natural gas from the resource shale plays is providing the American consumer an incredible energy bargain providing a fuel priced at 22 percent of its intrinsic energy value, a trend that the marketplace indicates will continue into the future. It is also enticing the chemical industry to reenter the United States and build new chemical manufacturing facilities because they will have access to a super-competitive and plentiful feedstock, jump starting the job growth potential downstream of the wellhead

What does this mean for Ohio? Since 1860, Ohio has produced over 8.5 trillion cubic feet of natural gas and 1.14 billion barrels of crude oil. During recent history, the state's proven reserves have fluctuated annually at 40-50 million barrels of oil and 800 Bcf to1 trillion cubic feet of natural gas. Each year those reserves have produced approximately 5 million barrels of crude oil and 85 billion cubic feet of natural gas, operated by a small but vibrant production industry that has supported approximately 12,900 direct and allied jobs.

During 2009 through 2010, intense interest in the Utica Shale began to ramp up. This has led to a state-wide lease play and exploratory drilling. The State's Geologist recently provided a volumetric calculation to estimate the recoverable reserve potential of the Utica Shale/Point Pleasant interval.[1] He reported that should producers, using new technologies, extract 5 percent of the oil and gas in place, leaving 95 percent of the resource in the rock, the Utica would generate 15.7 trillion cubic feet of natural gas and 5.5 billion barrels of crude oil. That is an astonishing number and an enormous, perhaps "once in a lifetime", opportunity for Ohio.

On September 20, 2011 the Ohio Oil and Gas Energy Education Program released a study they had commissioned describing the economic impact of the existing Ohio exploration and production industry and the impact the resource shale play will have on Ohio.[2] The study was based on similar development in the neighboring Marcellus Shale play. In regard to Utica Shale development the study concluded the following:

- Ohio's natural gas and crude oil industry's will reinvest approximately $246 million on new exploration and development in 2011, and is estimated to ramp up to $14 billion by 2015. Over the next five years, oil and gas producers are projected to reinvest over $34 billion in exploration and development, midstream, royalty and lease expenditures.

- Ohio's natural gas and crude oil industry, via its expenditures, could generate approximately $12.3 billion to the gross state product and have a statewide output or sales of $23 billion.

- Ohio's natural gas and crude oil operators (producers) could distribute more than $1.6 billion in royalty payments to local landowners, schools, businesses and communities based on an estimate of 2,837 new Utica wells drilled and completed (in production)

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[1] *Shale Formations and Their Potential*; Larry Wickstrom, R. A. Riley, M. T. Baranoski, C.J. Perry, and M.S. Erenpreiss; Ohio Department of Natural Resources, Division of Geological Survey; October 2011, www.OhioGeology.com

[2] *Ohio's Natural Gas and Crude Oil Exploration and Production Industry and the Emerging Utica Gas Formation, Economic Impact Study*; Kleinhenz & Associates, Ohio Oil and Gas Energy Education Program; September 2011 www.oogeep.org

between 2011 and 2015. This could exceed the total amount of royalties paid for all geological formations between 2000 and 2010.

- Between 2011 and 2015, Ohio's natural gas and crude oil industry will help create and support more than **204,520 jobs** due to the leasing, royalties, exploration, drilling, production and pipeline construction activities for the Utica Shale within Ohio. Industry wages are projected to grow to more than $12 billion in annual salaries and personal income to Ohioans by 2015.

Coupled with the readily available and affordable energy resource, the expansion of job growth suggests that development of the Utica Shale may be the most significant positive economic event to take place in Ohio for decades.

Regulatory Policy: The principal regulatory authorities managing the environmental risks associated with oil and natural gas production are state agencies acting under state law or as the delegated regulator under federal law. To put the regulatory process in context, it is useful to understand some key elements of developing a well and generating production.

Except on federally owned resources, the regulatory responsibility rests with the state oil and natural gas agencies for permitting well construction and completion. These agencies set the standards that must be met in drilling a well such as location limits, construction standards (including steel casing and cementing requirements) and surface management requirements. Well construction requirements are particularly significant because they are the principal methods of protecting against ground water contamination. By creating a barrier between ground water and the wellbore, oil and other chemicals from the well cannot move into water formations – and water cannot move into the wellbore. This technological approach has been used effectively for 75 years and is continually improved. Well completion regulations determine the management of technologies to stimulate production from oil and natural gas containing formations. Hydraulic fracturing is a well stimulation technology. Consequently, since its invention in the late 1940s, its use has been regulated by state oil and natural gas agencies. Throughout the past six decades this regulatory structure has effectively protected against the environmental risks of fracturing without the involvement or intervention of the federal government. Proposals that the federal government needs to insert itself into well construction and completion regulation fail to show that any justification exists suggesting a failure of the current state based regulatory system or that the federal government has either the expertise or the capacity to regulate the 35,000 or more wells drilled annually in the United States.

In fact, where the federal government does have regulatory authority related to oil and natural gas production, it relies on the state regulators to conduct the daily regulation efforts. Federal environmental laws apply to oil and natural gas production activities when waste is generated. Most specifically with regard to the development of emerging shale gas and shale oil formations, the applicable federal laws address the disposal of produced water (including hydraulic fracturing flowback water) – the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA). The applicability of the law depends on the disposition of the produced water. Produced water injected underground is regulated under the SDWA; produced water discharged to the surface is regulated under the CWA. The SDWA and the CWA operate similarly. The federal government creates a national framework but the laws rely on state regulators to bear the larger permitting burden through the delegation of that role from the Environmental Protection Agency (EPA).

With respect to the SDWA, regulation of underground injection is defined by the Underground Injection Control (UIC). The UIC program creates a series of Classes for different types of injection wells; Class II applies to oil and natural gas production. In 1980, Congress modified the SDWA to allow for primacy under the law to be granted to states for Class II programs based on equivalent effectiveness rather than adoption of the specific EPA regulations. Most oil and natural gas producing states with active underground injection operations have primacy based on equivalency with the federal program. Class II wells can either be used for disposition of water or for reinjection into formations as a type of secondary recovery to increase production. There over 140,000 Class II UIC wells in the United States. Clearly, without the delegation of this program to the state regulatory bodies, the federal law would be virtually incapable of implementation.

The CWA operates somewhat differently. Every point source – discrete discharge outlets for waste water – must have a permit under the CWA. Permit writing is typically delegated to state regulators. Waste water discharge permits are generated based on federal Effluent Limitations Guidelines (ELG). ELGs are developed by EPA for industrial and other categories of sources that discharge waste water. ELGs are based on the Best Available Technology Economically Achievable (BATEA). ELGs are written using extensive analysis of the category and frequently contain subcategories that reflect distinctions within the category such as size or complexity of its components. If a category has an ELG, the state permit writer uses it to determine the amount of a contaminant that the operation can discharge on a daily basis. If there is no ELG, the permit writer uses Best Professional Judgment (BPJ) to determine what requirements would be equivalent to BATEA for that permit. This federal-state balance has been in place since the 1970s and works well. However, as in the case of the SDWA, it relies on the capabilities of the state regulators. Without delegation, EPA would be overwhelmed and incapable of managing the permit writing process.

Recently, EPA announced that it plans to develop new ELGs for produced water from Coal Bed Methane operations and shale gas production operations. To put this effort in perspective, oil and natural gas producers cannot directly discharge produced water under the CWA because the ELG for onshore oil and natural gas production is a zero discharge limitation. Historically, more than 90 percent of oil and natural gas produced water is managed by Class II UIC wells. As a result of the current ELG, producers in areas without UIC capability have to either send water to places where UIC is available or arrange for their water to be managed at a commercial waste treatment facility. Pennsylvania is an example. Its geology prevents widespread use of UIC and therefore producers either export water out of state – to Ohio in large measure – or send water to commercial operations. Recently, Pennsylvania prohibited shale gas produced water from being sent to commercial operations and shale gas producers are now exporting produced water or recycling it. However, because of the attention given to the Pennsylvania issues, EPA has responded by indicating its intent to develop a modification to the oil and natural gas production ELG. EPA also announced its intent to complete action on an ELG for Coal Bed Methane – an effort it has had underway for several years.

Crafting these oil and natural gas production related ELGs presents a significant challenge because of the differences between most industrial categories and oil and natural gas production. For a typical industry, the facility acquires water from a source, uses it in the facility, treats it to remove contaminants and discharges it. Consequently, in designing an ELG, the issues are essentially related to removing what is added by the facility. Oil and natural gas production faces a different challenge – each well can have a different composition of produced water depending on the composition in the producing formation. Consequently, spending significant efforts to develop an ELG – even one with extensive subcategories – based on current production could be meaningless with regard to the next well or the next formation.

For this industry, it would be far more cost effective to extensively use the BPJ process to allow for the permit writer to consider the unique circumstances of different formations or within a formation.

Validation of State-Based Regulation:

The operation of oil and natural gas wells has been regulated since the 1920s with an increasing emphasis on environmental controls since the 1960s. This regulation has been and continues to be done effectively by the states – a reality that has been recognized by the Congress and by the EPA. Because of the diversity of conditions associated with oil and natural gas production, the regulatory process must be flexible and reflect the unique conditions in a state or areas within a state. It requires the technical expertise that has been developed in each state and which does not exist within the EPA. For this reason federal law has generally deferred to the states for the regulation of this industry.

GWPC: The Ground Water Protection Council (GWPC) is an organization of state ground water regulatory agencies which come together to mutually work toward the protection of the nation's ground water supplies. The purpose of the GWPC is to promote and ensure the use of best management practices and fair but effective laws regarding comprehensive ground water protection.

During August 2011, the GWPC issued a report that investigated the regulatory history of Texas and Ohio as it relates to oil and gas production and protection of groundwater resources.[3] The report conclusively demonstrates that the state regulatory agencies within these states, both significant oil and gas producing states, have prioritized regulatory reforms and strategically applied resources to improve standards that reduce risk associated with state-specific compliance issues. Over time, both Ohio and Texas have strategically enhanced regulatory standards for state-specific oil and gas E&P activities that have been found to cause groundwater contamination incidents. In other words, the states have made consistent ongoing improvements to protect the environment and the public interest that is tailored to each individual state's characteristics and needs.

STRONGER: Through 1980 amendments to the Resource Conservation and Recovery Act (RCRA), Congress temporarily exempted from the hazardous waste regulations under RCRA Subtitle C, drilling fluids, produced water and wastes associated with oil and gas exploration and production pending further study and a regulatory determination. EPA completed its study and published the results in December 1987 in a Report to Congress entitled *Management of Wastes from the Exploration, Development, and Production of Crude Oil, Natural Gas, and Geothermal Energy*. Among other findings, EPA found that existing state and federal regulations were generally adequate to manage oil and gas wastes, but that certain regulatory gaps did exist, and enforcement of existing regulations in some states was inadequate.

In July 1988, EPA issued its regulatory determination (53 FR 25446) stating that federal regulation of oil and gas wastes as hazardous wastes was not warranted. At that time, EPA said it would implement a three-pronged strategy to address the diverse environmental and programmatic issues posed by these wastes. This strategy involved: (1) improving federal programs under existing authorities in Subtitle D of RCRA, the Clean Water Act, and Safe Drinking Water Act; (2) working with states to encourage changes in their regulations and enforcement to improve

[3] *"State Oil and Gas Agency Groundwater Investigations and Their Role in Advancing Regulatory Reforms, A Two-State Review: Ohio and Texas", Scott Kell, Groundwater Protection Council, August 2011,* www.gwpc.org

some programs; and (3) working with Congress to develop any additional statutory authorities that may be required. The State Review Process was established to address the second prong of EPA's strategy, to work with the states to improve their regulatory programs.

This state review process has undergone a number of changes since its inception. The guidelines have periodically been updated and expanded in scope. Management of the process has shifted to a non-profit corporation named State Review of Oil and Natural Gas Environmental Regulations (STRONGER). The STRONGER Board of Directors is comprised of stakeholders representing state regulatory agencies, industry and public interest/environmental groups. Board Chairmanship rotates among the stakeholder groups.

Twenty-one state programs, representing over 90% of domestic onshore oil production, have been reviewed and critiqued by stakeholder review teams. Written reports of review team findings and recommendations were developed, published and distributed. Ten reviewed programs have had at least one follow-up review to determine the status of implementation of review team recommendations and to review the programs against updated sections of the guidelines. Follow-up review teams documented that 76% of the recommendations from earlier reviews had been satisfied. This high implementation rate reflects state commitment to the improvement of oil and gas environmental regulatory programs. It further documents the success of the multi-stakeholder process for guidelines development and state reviews. During the summer of 2009, all states that have been reviewed were surveyed to determine the status of implementation of recommendations contained in the report of their most recent review. All states responding indicated that they had taken steps to improve their programs based on review team recommendations. Of the 593 recommendations to the 16 states that responded, 194 (33%) were described as fully implemented, 161 (27%) as partially implemented, 157 (26%) as outstanding and 82 (14%) as unknown. This indicates that at least 60% of the recommendations have resulted in some improvements to state programs. When coupled with findings of follow-up review teams, the number of review team recommendations resulting in state program improvements increases to 74%.

In 2009 STRONGER formed a Hydraulic Fracturing Workgroup charged with examining the issues and developing draft guidelines for state regulatory programs. Final hydraulic fracturing guidelines were completed and made available in early 2010. Focused reviews of state hydraulic fracturing requirements were initiated. Hydraulic fracturing specific reviews have been completed in Pennsylvania, Ohio, Oklahoma, Louisiana, and Colorado. Arkansas has just been reviewed this month.

Ohio State Review: During 2010 the Ohio General Assembly enacted Substitute Senate Bill 165, comprehensive legislation updating Ohio's oil and gas law. The legislation significantly bolstered statute regarding issues with well construction, hydraulic fracturing, disclosure of frac constituents and enforcement authority, while adding significant new funding resources.

Following implementation of the new law, STRONGER conducted a hydraulic fracturing-specific state review of the Ohio oil and gas regulatory program. The review team was chaired by a representative of the environmental community. The review concluded that the Ohio program was overall well managed, professional and meeting its program objectives. The review singled out the program's operations in the areas of comprehensive program assessment, planning, and use of stakeholder input that led to legislation that improved the program; reporting of comprehensive information regarding hydraulic fracturing operations with the well completion report; review of potential pathways of contamination; strong enforcement tools; increased staff levels; and use of the web site to disseminate information.

State Review Conclusion: The important characteristic of the State Review Process is that it brings three primary stakeholder groups together to actually work to improve regulatory policy in order to protect human health, safety and the environment as it takes place at the state level. The Ohio hydraulic fracturing-specific state review validates that the Ohio oil and gas regulatory program and the statutes that authorize it are working well to protect the public interest.

The Secretary of Energy (USDOE), Advisory Board (SEAB), Shale Gas Production Subcommittee is charged with identifying measures that can be taken to reduce the environmental impact and to help assure the safety of shale gas production.[4] Both interim reports have specifically recognized the value of the State Review process and what that means to state-based regulation. The SEAB report said, "STRONGER is a not-for-profit organization whose purpose is to accomplish genuine peer review of state regulatory activities. The peer reviews (conducted by a panel of state regulators, industry representatives, and environmental organization representatives with respect to the processes and policies of the state under review) are published publicly, and provide a means to share information about environmental protection strategies, techniques, regulations, and measures for program improvement. Too few states participate in STRONGER's voluntary review of state regulatory programs. The reviews allow for learning to be shared by states and the expansion of the STRONGER process should be encouraged." The SEAB Subcommittee went on to recommend enhanced public funding for both GWPC and STRONGER.

Similarly, on September 15, 2011 the National Petroleum Council issued a report on shale development that, in part, also focused on the benefits of STRONGER.[5] The report said, "STRONGER should be bolstered and increase the scope of its activities. All states with natural gas and oil production should actively participate in STRONGER and use its recommendations to continuously improve regulation. It should be adequately funded, including from the federal government."

The State Review Process demonstrates that the states are the best and most efficient point to regulate the industry's waste streams. The process provides for a system of constant improvement and an opportunity to share and promote new or unique regulatory concepts among the states, while maintaining the flexibility needed to meet individual states' needs.

Respectfully submitted,

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[4] *Secretary of Energy Advisory Board, Shale Gas Production Subcommittee, 90-Day Report*; SEAB, August 18, 2011, http://www.shalegas.energy.gov/

[5] *Prudent Development: Realizing the Potential of Abundant North American Natural Gas and Oil Resources,* National Petroleum Council, September 15, 2011, http://www.npc.org/

Tom Stewart serves as the executive vice president of the Ohio Oil and Gas Association (OOGA), having been elected to that position in September 1991. At OOGA, Stewart is director of staff; editor of the Association's publications; an industry spokesman to media outlets and other forums; and, on behalf of OOGA members' interests, serves as public policy advocate in Columbus and Washington D.C.

Stewart serves as the Ohio associate representative to the Interstate Oil and Natural Gas Compact Commission (IOGCC), having been appointed to that position by Governor George Voinovich in 1997. IOGCC (http://www.iogcc.state.ok.us/) is an organization of governors of the oil and natural gas producing states established to promote the conservation and efficient recovery of domestic oil and natural gas resources while protecting health, safety and the environment.

Stewart is an active participant with the Independent Petroleum Association of America (IPAA)(www.ipaa.org) and serves on the IPAA Environment and Safety Committee, the Communications Steering Committee, the Gas Pipeline Safety Sub-Committee and is an original member of the management team organizing the national BRIEF Project. http://www.energyindepth.org/

In December 2001, Stewart was elected to the Board of the State Review of Oil and Natural Gas Environmental Regulations, Inc. (STRONGER) as one of three representatives for the U.S. oil and gas exploration and production industry. During 2003, Stewart served as chairman of the STRONGER Board. He currently serves as treasurer of the organization. STRONGER is a non-profit organization created to administer and advance the state review process of the States' oil and gas exploration and production waste management regulatory programs. STRONGER is a stakeholder-driven process with equal representation from government, industry and the environmental community. STRONGER's objective is to foster constant improvements in state oil and gas regulatory programs in order to protect human health, safety and the environment. http://www.strongerinc.org/

From August 2002 to November 2005, Stewart served as the secretary treasurer of the Liaison Committee of Cooperating Oil and Gas Associations. The Liaison is a national network organization of state and regional trade associations that represent the independent oil and gas exploration and production industry in the United States. Stewart was responsible for coordinating the organization's efforts.

Prior to joining OOGA, Mr. Stewart has fifteen years of formal experience in the oil and gas industry as an oil and gas producer and provider of contract drilling services. He is the third generation of his family to engage in exploration, development and production of crude oil and natural gas.

The Ohio Oil & Gas Association is a statewide trade association with over 1,750 members who are actively involved in the exploration, development and production of crude oil and natural gas within the State of Ohio. Since 1947, the Association's mission is to protect, promote, foster and advance the common interests of those engaged in all aspects of the Ohio crude oil and natural gas exploration and production industry.

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

Truth in Testimony Disclosure

Pursuant to clause 2(g)(5) of House Rule XI, in the case of a witness appearing in a nongovernmental capacity, a written statement of proposed testimony shall include: (1) a curriculum vitae; and (2) a disclosure of the amount and source (by agency and program) of each Federal grant (or subgrant thereof) or contract (or subcontract thereof) received during the current fiscal year or either of the two previous fiscal years by the witness or by an entity represented by the witness. Such statements, with appropriate redaction to protect the privacy of the witness, shall be made publicly available in electronic form not later than one day after the witness appears.

(1) Name:

Thomas E. Stewart

(2) Other than yourself, name of entity you are representing:

The Ohio Oil & Gas Association

(3) Are you testifying on behalf of an entity other than a Government (federal, state, local) entity?

YES **If yes, please provide the information requested below and attach your curriculum vitae.**

YES

NO

(4) Please list the amount and source (by agency and program) of each Federal grant (or subgrant thereof) or contract (or subcontract thereof) received during the current fiscal year or either of the two previous fiscal years by you or by the entity you are representing:

Thomas E. Stewart and The Ohio Oil & Gas Association has not received any Federal grants or contracts during the current fiscal year or either of the two previous fiscal years.

Signature

Nov. 16, 2011

Date

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