

Testimony
J. Scott Roberts, Deputy Secretary for Mineral Resources Management
Department of Environmental Protection
before the
Senate Majority Policy Committee
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Chairman Pippy, Senator Yaw and members of the committee, thank you for the opportunity to appear before you today to discuss regulation of natural gas exploration, drilling in the Marcellus Shale formation and protection of the commonwealth's water resources.

Governor Rendell, Secretary Hanger and I understand how important harvesting Pennsylvania's energy resources is to its economy and the nation's interests and the development of these resources cannot come at the expense of our water, our land or our ecosystems. The exploration and development of natural gas resources is being done in accordance with the state's environmental laws and regulations.

The department will continue to work with the drilling industry, the state's conservation districts and others to develop the natural gas reserves in the Marcellus Shale formation in a responsible manner and further develop our traditional oil and gas reserves as well. The shale holds the promise of billions of dollars in new economic investments for commonwealth citizens and communities at a time of national economic turmoil.

Natural Gas as an Energy Source

While no energy source is perfect, all have their strengths and weaknesses, natural gas is one of the best fuel options we have available to us today. Natural gas has a much lower greenhouse gas emissions rate than many other sources of energy. Natural gas burns cleaner than coal or oil for both electricity generation and heating.

As an automotive fuel, the department has invested more than \$1.6 million through our Alternative Fuels Incentive Grants to convert transportation and municipal fleets from diesel and gasoline fuels to natural gas.

The department has helped the City of Philadelphia to purchase 15 natural gas powered trash trucks to replace standard diesel trucks. West Chester University currently operates 21 university vehicles on natural gas. These examples clearly demonstrate our commitment to developing new uses for natural gas.

Permitting and Production

Natural gas has its environmental benefits, but the business of natural gas extraction has also been very good for the commonwealth.

We have nearly 71,000 producing oil and gas wells in Pennsylvania. Last year we issued nearly 8,000 drilling permits and saw nearly 4,200 new wells drilled. The vast majority of this development has taken place in our traditional natural gas fields, as only 476 of the 8,000 permits and 196 of the 4,200 new wells were for Marcellus Shale exploration.

However, as the gas industry builds its transmission infrastructure and solves some other issues which I will discuss later, we expect the pace of Marcellus Shale exploration and permitting to increase dramatically.

From January 1 through March 27, the department has issued 1,662 drilling permits, 288 of which are specifically for exploration of the Marcellus Shale. During that period, there were 597 new wells drilled, 72 of which were in the Marcellus Shale.

Since 2005, when development of the Marcellus Shale first began, 864 drilling permits have been issued and 325 wells have been drilled into the formation. During that same period, 16,819 oil and natural gas wells have been drilled statewide.

Although the economic downturn has caused us to scale back our original permitting and well drilling projections for the year, we expect to remain on pace for continued record growth with 700 Marcellus Shale permits anticipated for the coming year and 1,200 new Marcellus Shale permits anticipated in 2010.

Economic Opportunities

The opportunities for economic growth presented by the Marcellus Shale formation are truly astounding. As I stated earlier, Governor Rendell supports the drilling industry and he very much wants the business of natural gas extraction to take place here in Pennsylvania.

The economic numbers are impressive. Penn State University estimates the economic value of the Marcellus Shale formation at \$1 trillion and that for every \$1 billion in royalty income paid to Pennsylvania residents, nearly 8,000 new jobs will be created each year over the next three years.

If we apply the mandated minimum royalty percentage of 12.5 percent to the estimated value of the natural gas the formation contains, Pennsylvania's landowners could receive as much as \$125 billion in royalty payments.

But royalty payments are just a small piece of the anticipated economic benefit from development of the Marcellus Shale formation – perhaps as little as 15 percent of the total economic impact on the commonwealth.

The steel and fabricating industries stand to gain billions of dollars of new business as development of the Marcellus Shale accelerates over the next 10 years.

Much of the natural gas infrastructure development will take place in the northeastern portion of the state where there has not been any gas drilling in the past and where there is little or no pipeline or processing infrastructure in place.

Existing natural gas infrastructure in western Pennsylvania will need to be upgraded or replaced to handle new volumes of gas produced from the Marcellus Shale formation.

Well drilling and the transmission of natural gas will create a need for literally thousands of miles of high-quality pipe.

Containers for chemicals and diesel fuel and other drilling supplies will be needed at drilling sites, as well as hundreds, if not thousands of 500 barrel steel water tanks. Specialty drilling materials such as drill bits, drilling rigs for local companies and specialty 'built for purpose' rigs all must be manufactured, creating opportunities for local fabricators and suppliers.

Regulatory Enhancements

The Governor has made it very clear, however, that this development cannot come at the expense of our environment. The department is responsible for protecting the drinking water supplies of our citizens, and we share a responsibility with neighboring states to protect the drinking water supplies for millions more people living along the Ohio, Susquehanna and Delaware Rivers and the Great Lakes.

As the agency responsible for regulating drilling in the commonwealth, we have needed to review our permitting process to accommodate growth of this new industry and consider the needs of industry.

We have been and will continue to work with the drilling industry to understand their processes and operational needs. Governor Rendell has directed the department to remove unnecessary roadblocks and streamline unwieldy processes so the commonwealth can benefit from the tremendous economic opportunities before us.

Here are some of the things we are doing to make our processes work better based on what we've learned from our dealings with industry:

First and foremost, we have addressed staffing needs. At a time when all state agencies are under a hiring freeze and great economic constraints, Governor Rendell has approved the hiring of 37 new inspection and permitting staff, and the creation of a new oil and gas office in DEP's Northcentral regional office in Williamsport.

We have structured ways to withdraw water from streams so there are consistent statewide rules for large water withdrawals regardless of where natural gas operators intend to drill.

We are responding to concerns that the addendum to the Marcellus Shale permit application was too cumbersome. We are working to split the water management plan apart from the well drilling permit so that the addendum will cover a geographic area such as a well field rather than each individual well. Drillers will be able to get the water management plan approved for a geographic area and can submit well permits at a later date when they are closer to begin drilling.

Drillers will need to update these plans when there are changes to water sources, but will only need to update the plan, not each individual permit.

It takes approximately 28 days to review and approve well permits, but I realize that Erosion and Sediment permits can take much longer – up to six months in some cases. This is a complaint not just from drillers but from nearly all industries doing business in the commonwealth. It is an issue Secretary Hanger has taken a personal interest in because he believes the current system is not working.

We have conducted training for permit review staff from the department and the county conservation districts and with the drilling industry, but this is not enough.

The department and County Conservation District staff spends an inordinate amount of time reviewing erosion and sediment plans and with the exception of drilling sites, little is being done to get people out in the field to actually inspect these sites to see that the work is being done as proposed.

Our goal is to offer drillers three different methods to acquire Erosion and Sediment and Stormwater Control permits. The long-term solution is the creation of a voluntary Permit-By-Rule process for low-impact earth disturbances that would require streamside improvements including riparian buffers and low-impact Best Management Practices. Plans must carry the seal of a licensed professional engineer who would be ultimately responsible for the accuracy and completeness of the plan. Not all sites would qualify for the Permit-By-Rule, but most drilling sites would be eligible.

However, this proposal must go through the regulatory process with comment and input from all stakeholders. Approval could take anywhere from 15 months to two years.

In the short-term, the department has instituted a couple of changes to the E&S and Stormwater permitting process that should help speed up the process of getting an erosion and sediment permits.

We have consolidated the permit review and inspection responsibilities for E&S permits within the regional oil and gas offices. This move has generated some attention in the media, both positive and negative, and there seems to be some confusion as to the responsibilities for reviewing erosion and sediment permits and inspecting drilling sites to ensure that construction activities are being done according to approved practices.

Simply put, review of E&S permits by the conservation districts has been replaced with review by DEP's regional staff, allowing drillers to work with the same staff throughout the permit review process. There will be no changes to the responsibilities for inspecting sites and monitoring drilling activities.

The regional offices already conduct required on-site inspections and this move will create a more efficient and effective process. The same strict environmental standards still apply and none of the state's regulations have been or will be compromised. Implementing uniform permitting procedures will ensure environmental compliance, and with the addition of new regional office staff, we anticipate even stronger oversight of the drilling industry.

We have also modified the existing Erosion and Sediment permit application to develop a standardized model Erosion and Sediment and Stormwater Control plan. An expedited review process has been incorporated as an alternative to the standard review process, and we have simplified post-construction demonstration for sites that will be reclaimed to natural, pre-existing conditions.

A third option which we recently instituted is to consolidate the erosion and sediment E&S permitting requirements for drilling sites into the well drilling permit application. These requirements will be designed expressly for well sites, eliminating unnecessary steps and creating a single permit application package.

It is our hope that this will solve industry's concerns about streamlining the permitting process so that they will be able to handle construction duties such as building the drilling pad and drilling the top hole during the time of year when the weather is most favorable for this type of earth disturbance.

Wastewater

However, all of these changes are not going to be of any advantage to the drilling industry if we do not solve the wastewater issues.

Nearly all natural gas wells in all geologic formations in Pennsylvania are hydraulically fractured. Modern hydraulic fracturing involves pumping a water/sand mixture under high pressure into the well to break apart the rock that holds the gas so the gas can flow freely to the well. The water is mixed with small amounts of chemicals to suspend the sand, reduce bacterial growth and protect the well casing from corrosion. As this water is returned to the surface, it is treated to remove chemicals and pollutants before it is returned to the surface waters.

Despite our best efforts to educate the public and the press, the rumors persist that the chemicals used in the process are a secret and that DEP has no knowledge of what chemicals are used in the fracturing process. The truth is that drillers are required to disclose the list of all chemicals used at well sites during the permit application period, and this information is made available to local emergency responders, and is also public record. DEP recently posted a list of chemicals used in the fracturing process on our website for all to see.

In addition to the chemicals in this flowback water, most wells will produce quantities of brine during the production of natural gas.

Although there are many pollutants of concern in these wastewaters, the pollutants that are expected to affect the quality of surface waters are Total Dissolved Solids (TDS) and chlorides. Many of the areas where the drilling for natural gas is proposed have a history of mining activity and are affected by Abandoned Mine Drainage (AMD). Brine and fracturing wastewater have high concentrations of dissolved solids, and considering the already elevated levels of dissolved solids in the AMD-affected surface waters, the need to stringently control dissolved solids likely will prevent other pollutants from presenting water quality problems.

Based on water quality analyses performed for the major watersheds of the commonwealth to date, the rivers and streams of Pennsylvania have a very limited ability to assimilate additional TDS. In fact, water quality issues emerged in the Monongahela River basin even before any significant new dischargers were approved. It is clear from these analyses that the department is constrained in approving any substantial increases of TDS and chloride discharges from the pending proposals and applications for new treatment facilities that propose to discharge this wastewater, and still protect water quality.

It is vital that flow-back and production wastewater is handled properly and that new treatment methods are instituted so that public municipal drinking water supplies and other industrial uses are not disadvantaged by increased total dissolved solids and chlorides in our surface waters. We are encouraging the on-site reuse and recycling of wastewater, which will cut down on water withdrawals and dramatically reduce the amount of water being taken to our treatment facilities. But even with reuse and recycling, we must still find a solution for the flow-back and production fluids that must be treated.

To that end, we have an open dialog with the members of the Marcellus Shale Committee. The committee has given us their ideas and is independently looking at various technologies including underground injection. All of us need to understand the costs of these technologies and potential solutions. Our goal is to allow the industry to begin deploying advanced treatment technologies for flow-back and production fluids within two years. In the meantime, we are allowing flow-back and production fluids to continue going to wastewater and brine treatment facilities.

We have developed a strategy for managing the discharges of this wastewater in this interim, two-year period. That strategy will be presented at a public meeting April 15 in Harrisburg. A notice announcing this meeting will appear in the April 11 edition of the Pennsylvania Bulletin. We encourage interested parties to attend.

We also are working to sort through the issues surrounding the easy, rational and timely process for permitting impoundments to hold wastewater.

At DEP we have faced criticism from both sides on this issue – from those who say we have too heavy a regulatory hand, and those who charge that we don't do enough to protect their interests. The facts are that the department has been working with the drilling industry to provide tangible results that meet the goals of welcoming the exploration of Natural Gas, particularly exploration and development of the Marcellus Shale.

Dimock Township Gas Migration

Many of you are aware of a recent incident in Dimock Township, Susquehanna County where drinking water wells at private homes were impacted by natural gas drilling activities by Cabot Oil and Gas Company.

DEP began investigating this situation in January when a resident reported an explosion in an outside water well pit. Samples of private wells were taken from approximately 24 homes to

check for dissolved methane. Nine wells were found to be impacted, with methane levels in four of those wells at levels that could pose a threat of explosion in enclosed areas of the home.

The department cited the company for allowing natural gas to enter fresh groundwater in the Carter Road area, and other operational and record-keeping violations. The notice of violation requested Cabot to continue to provide alternative water supplies to four homes with saturated levels of dissolved methane in their wells and that the company installs methane gas detectors in a total of nine homes.

Cabot also is implementing a new protocol for casing and cementing any new gas wells to address the unique geology of the area. The new procedure creates another barrier to prevent gas migration. For pre-existing wells, Cabot will install an additional cement sealer to prevent gas from migrating. DEP staff are inspecting existing wells in the area and monitoring new drilling. The department also continues to schedule home visits with residents to take water samples and to inspect property for the presence of fugitive gas.

Some residents have expressed concern that dissolved methane may not be the only contaminant in the groundwater feeding their wells. The DEP laboratory has analyzed numerous water samples for total dissolved solids, chlorides, specific conductivity, pH, alkalinity, hardness, sodium, calcium, barium, manganese, potassium and aluminum. None of these contaminants were found in levels that would indicate that liquids used to fracture natural gas wells have migrated to groundwater. Additional sampling for these elements will be conducted as the investigation continues and as the department receives new complaints.

On a related note, the department conducted a workshop with local and regional Emergency Response staff and representatives from gas and drilling companies in December in response to concerns voiced by Senator Baker about emergency response capabilities at all government levels. Approximately 50 emergency responders and aides to local legislators attended the workshop, which included presentations by Oil & Gas Management staff, OSHA and industry representatives.

The department is also conducting a series of industry-sponsored training sessions across the state for drilling companies to review recent changes to our permitting process. These sessions will begin next week and will compliment existing industry-wide training on proper well and drilling site construction conducted by DEP staff.

Conclusion

The department will continue to work with other state agencies, as well as the commonwealth's environmental organizations and the oil and gas industry, to ensure that all drilling activities that take place on Pennsylvania's soil are done responsibly and abide by the commonwealth's environmental rules that protect and safeguard the state's natural resources. With this increased interest and activity in gas drilling throughout the state, Pennsylvania will experience a boost to its local economies, more gas that is cleaner than many alternatives will be produced and our water resources will be protected.

Chairman Pippy, Senator Yaw and members of the committee, I thank you for your attention, and look forward to your thoughts and questions.

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