

**Testimony of  
Secretary John Hanger  
Department of Environmental Protection  
before the House Republican Policy Committee  
Wednesday, April 7, 2010**

Chairman Saylor and members of the committee, thank you for the opportunity to appear before you to discuss the issues concerning the extraction of natural gas from the Marcellus Shale formation.

The Marcellus Shale gas reserve is enormous. It potentially holds enough gas to fully supply the nation for 10 or more years. The large size of the Marcellus gas reserve is a powerful reason why the gas industry has been heavily investing in Pennsylvania, but it is not the only reason.

The Marcellus gas has more advantages that make it particularly attractive when compared to other gas reserves. For example, the Marcellus is close to large populations that use substantial amounts of natural gas. Transportation costs are lower to move gas from Pennsylvania to Boston and the rich northeast markets than from Texas, Louisiana, Alaska or many major production regions. Pennsylvania's geography is a significant comparative advantage over the sunbelt and western regions.

Most of the Marcellus gas is also high quality and does not require processing to be pipeline quality. Wells here have been productive and in some cases have produced exceptionally large volumes of gas. These comparative advantages make Marcellus gas among the lowest cost to produce shale reserves in the country. All these advantages make the Marcellus reserves among the most attractive in the world, and billions of investment from around the world has already been made in Pennsylvania.

As a result of these many advantages, companies increased drilling here, even when companies were cutting drilling around the country, after the Lehman bankruptcy on September 15, 2008 caused global credit markets to freeze, aggregate demand for goods and service to collapse, and unemployment to skyrocket to the point that the United States lost more than 700,000 jobs in January 2009 alone. Range Resources reported data that Pennsylvania was the only state to see rising rig counts in fall 2008 and into spring 2009.

Producing the gas will create great new wealth and tens of thousands of jobs, profoundly changing Pennsylvania and its economy. The natural gas producing industry is a big business that includes many substantial companies that typically pay severance taxes in states like Texas, Alaska, and Louisiana.

Apart from the billions of dollars in revenues generated by gas production, another major reason that most states that have gas production impose a severance tax is the impact of drilling on local communities and the environment. Gas drilling and the distribution of gas are industrial activities that cannot be done without impacting the environment and local roads. Even with tight regulation and companies committed to minimizing impacts, trucks must be on roads, land must be disturbed, water must be withdrawn, compressors must run with air emissions, and water must

be ultimately treated or injected. Local and environmental impacts and costs can be reduced, but cannot be eliminated. A severance tax is one way to insure that the benefits of gas production outweigh its costs. Pennsylvania must join nearly every other state and enact a reasonable severance tax as part of its development of the Marcellus Shale gas reserve.

The Pennsylvania Department of Environmental Protection realizes that no energy source is perfect, each has its strengths and weaknesses, and extracting natural gas from beneath our landscape is no exception. Even with strong regulations, impacts will not be zero. Accidents can and will occur. But with strong regulations that the industry follows and real enforcement to insure compliance, environmental impacts can be reduced.

Governor Rendell has directed that the fees for permits to drill be increased and the revenues used to increase staff that oversees gas drilling. In 2009, DEP increased the well permit application fee and added 37 positions to the gas staff. In 2010 another 68 positions will be added. DEP has opened a new gas office in Williamsport and will open another in Scranton.

DEP has also proposed stricter standards, regulations and policies to avert and reduce the potential for both minor and major accidents at drilling sites and the communities surrounding these sites. Finalizing these new stronger rules is imperative.

Unfortunately, some of our communities and rural areas have already experienced issues relating to the exploration and drilling of Marcellus Shale wells, including spills, complications from erosion and sediment control violations, road damage and gas migration incidents.

For example:

- Last week, DEP responded to a fire at a well site in Hopewell Township, Washington County when a highly volatile material called 'condensate' caught fire, engulfing a pit containing 400,000 gallons of gas well wastewater, as well as a tank containing 'frac' material. Condensate is a mixture of hydrocarbons that condense out of natural gas. The fire also burned the plastic pit liner at and above the water line causing the heavy black smoke that could be seen for miles.

In addition to DEP, two local fire departments, the Washington County Hazardous Materials team and the Pennsylvania State Police responded to the emergency call. The fire departments and Hazmat team determined that both the pit and frac tank were on fire, not the well, which had originally been reported. The decision was made on site during inspection of the fire to allow it to burn, as well as vent the frac tank. A foam material was later applied to the frac tank to extinguish the remaining fire.

DEP directed the company to transfer the remaining contents of the pit to an adjacent lined pit. In addition, any soil contaminated by the fire and wastewater will be removed and properly disposed.

- Last year, the department investigated complaints of methane in the drinking wells of residents in Dimock, Susquehanna Township and along Hedgehog Lane in Bradford Township. Both of these incidents were a result of gas migration.

DEP has required immediate clean up and/or remediation at drill sites where these types of events occur, as well as imposing fines, revoking permits or ordering drilling operations to cease. The department monitors operations at the well site through routine inspections, and we will continue to aggressively review and address complaints.

Removing mineral resources, including mining and oil and gas, has taken place in Pennsylvania for more than three centuries. Pennsylvanians rightly want assurances that some of the mistakes of the past that included poor or non-existent regulation will not be repeated. Those mistakes have caused massive environmental damage that have left approximately 180,000 acres of mine lands currently waiting to be reclaimed and thousands of miles of streams to be restored at the expense of the commonwealth's taxpayers.

The cumulative environmental damage has already cost billions of taxpayers dollars to restore and billions more will be needed. The department knows of almost 9,000 wells that remain unplugged as a result of oil and gas drilling – with more being found every day. Plugging these 9,000 wells that pose a risk to our citizens will cost approximately \$99 million.

The department is ensuring that history will not repeat itself and that the lessons learned from the past are applied to the development and regulation of the Marcellus Shale natural gas play.

### **Proposed Regulations**

The department is working to improve our well construction standards to protect the public from gas migration events as mentioned above. Both DEP and the oil and gas industry recognize that gas migration is not acceptable. The department has developed draft regulations in conjunction with our Oil and Gas Technical Advisory Board that will strengthen well-casing and cementing requirements.

A properly cased and cemented well is critical to containing gas, oil and other fluids within the well bore. The draft regulations make important improvements through such measures as pressure testing casing used in Marcellus Shale and other high-pressure wells, and further defining specifications for oil field-grade cement to be used for well casing. The draft regulations will also require well operators to inspect all existing wells quarterly to ensure that each well is structurally sound, and report the results of these inspections to DEP. If the operator discovers a problem with the well, such as being over-pressured or if the casing has become corroded, they must notify DEP immediately and take steps to remedy the problem.

As mentioned, these draft regulations were developed with the valuable assistance of the Oil and Gas Technical Advisory Board. At the Board's March 25 meeting, the members voted unanimously to recommend that the department move forward with finalizing the regulations through the advanced notice of proposed rulemaking process. This process provided an additional opportunity for public comment to ensure that, when finalized, these technical regulations are accurate and effective. These proposed regulations will be considered by the Environmental Quality Board on May 19, followed by a public comment period this summer.

### **Wastewater Treatment and Disposal**

Extracting natural gas from the Marcellus Shale formation requires horizontal drilling and a process known as 'hydraulic fracturing' and uses greater amounts of water than traditional

natural gas exploration. Producing natural gas from shale requires pumping large amounts of water, sometimes in the magnitude of a few million gallons, along with sand and other chemical additives into the formation under tremendous pressure to fracture the shale around the well, allowing the natural gas to flow freely. When the pressure is released, some water will flow back to the surface and that water must be treated to remove chemicals and minerals. This fluid and production wastewater is classified as residual waste pursuant to the Pennsylvania's Solid Waste Management Act and the department's regulations.

And despite our best efforts to educate the public and the media, rumors persist that the chemicals used in the fracing process are a secret, and that DEP has no knowledge of what chemicals are used. To the contrary, the department obtained the Material Safety Data Sheets from the industry that disclose all the chemicals used by the various fracing companies. These MSDS sheets are also made available to local emergency responders and are public records. DEP has posted a list of the basic chemicals used in the fracturing process on its Web site and many of the companies operating in the Marcellus Shale have also posted similar company specific information on their Web sites.

Unfortunately, while DEP does know what chemicals are in the frac fluids, we do not know the exact proportions of the chemicals used, as the industry considers this information to be a trade secret. The industry itself is fueling public suspicion by not releasing full information about the mixtures used. I urge the industry to listen to those within it who advise that it should release this information. If not, this issue will likely be resolved by changing the law.

**The TDS Issue:**

The treatment and disposal of wastewater poses a challenge for the department and the oil and gas industry. From a water quality perspective, the pollutants that are expected to affect the use of and quality of surface waters are classified as Total Dissolved Solids (TDS). TDS is a measure of all elements dissolved in water and can include carbonates, chlorides, sulfates, nitrates, sodium, potassium, calcium and magnesium.

Sources of TDS can include sewage treatment plants, stormwater runoff, metal mining, mining, meat packing plants, vegetable processing plants, grain milling plants, bakeries, beverage processing facilities, agricultural chemical manufacturing, oil and gas drilling, petroleum refining, leather processing, primary metal industries, fabricated metal products, electric services, refuse systems, scrap and waste material industries and Abandoned Mine Drainage (AMD).

In fact, many of the areas where the drilling for natural gas is proposed have a history of mining activity and are affected by AMD. That history has left the commonwealth with a difficult pollution legacy. Brine and fracturing wastewater have especially high concentrations of dissolved solids. Considering the already elevated levels of dissolved solids in the AMD-affected surface waters, stringent control of dissolved solids will be necessary to protect the quality of these receiving streams and assure they meet their designated uses.

The problem of TDS is a very real threat to Pennsylvania's waterways. In 2008 and 2009, TDS levels exceeded drinking water standards along the Monongahela River which is a major source

of drinking water. In addition, Pennsylvania's water treatment plants are not equipped to remove TDS from drinking water and these pollutants are delivered through our pipes and out of the taps to our residents. This serves as a reminder and a warning that rivers and waterways can only dilute so much pollution before water quality reaches unacceptable levels.

In early September 2009, excessive levels of TDS primarily from mining discharges were a primary factor in the environmental disaster in Dunkard Creek that wiped out 26 miles of the stream in Greene County. High TDS concentrations led to the death of at least 16 species of freshwater mussels and 18 species of fish. These concentrations, coupled with other factors such as temperature and nutrient concentrations, lead to colonization and growth of golden algae and an inhospitable environment for aquatic life. These algae released toxins to the water column that literally wiped out aquatic life, including endangered mussels. Dunkard Creek is an example of what can happen if TDS is not controlled, and the loss of this important public resource was an environmental and economic tragedy.

Recognizing the importance of addressing the TDS issue, the department took action and issued the Permitting Strategy for High TDS Wastewater Discharges on April 11, 2009. This strategy presents an approach that allows the department, until the proposed regulation is finalized and approved, to effectively deal with the increasing demand for assimilative capacity in the surface waters to accept increasing new loads of TDS from current and new facilities. As a major part of this strategy, the department proposed revisions to its 25 Pa Code Chapter 95 Wastewater Treatment Requirements to eventually codify key treatment discharge limitations.

To date, the department has held four public meetings regarding the proposed regulation revisions and has received a significant amount of comments encouraging the department to continue with the adoption of the current regulation revision proposal or to revise the regulation proposal to adopt more stringent criteria. In addition, the department has heard presentations from a variety of environmental and stakeholder groups that could be impacted by the change of the regulation, including the oil and gas industry.

Prior to these draft changes to the Chapter 95 regulations, the Water Resources Advisory Committee (WRAC) noted concerns over the technologies available for treatment of high TDS wastewater as well as the costs associated with that treatment. As such, WRAC requested that DEP work with a subcommittee to specifically discuss these concerns and the department has been meeting regularly with the subcommittee since August 2009.

This subcommittee has further examined the technologies available and the cost associated with the treatment of TDS and has determined that technologies exist to remove the pollutants so that the resulting effluent can be discharged to streams; however, the capacity to treat the expected levels of wastewater is not yet available. Numerous permit applications for these types of facilities have been submitted to the department and are currently being reviewed.

Other disposal methods for wastewater are available, such as underground injection. Underground injection is not currently available in Pennsylvania at the capacity necessary to handle the amount of wastewater that is generated; so much of this type of disposal is taking place in other states. In addition, the cost associated with the transportation of the wastewater

also limits the use of underground injection. Pennsylvania's climate does not lend itself readily to the use of large evaporation basins that are frequently used in more arid sections of the country. The most likely treatment technology is evaporation or distillation, because drilling water has exceptionally high levels of TDS.

The department is encouraging the reuse and recycling of wastewater, which will cut down on water withdrawals and dramatically reduce the amount of water being taken to treatment facilities. The department has heard reports that up to 50 percent of operators are reusing at least a portion of the wastewater, with some operators reporting nearly 100 percent reuse. The reuse of wastewater will reduce the overall disposal volumes for high TDS wastewater throughout the state.

Preliminary reports from Marcellus Shale wells suggest that less than 40 percent of the water used for fracturing the well is flowing back to the surface as flow-back water, which greatly reduces the water treatment obligations for these wells. Regardless, even with reuse and recycling, we must still find a solution for the flow-back and production fluids that cannot be reused. As the drilling activities continue to increase in Pennsylvania, the department fully anticipates the need for increased treatment capacity, even at the reduced flow-back estimates. The regulations and protections I've described above are important to the protection of our natural resources. However, they mean very little if the department does not have the staff necessary to inspect well sites and oversee the environmentally protective development of this resource. Insuring adequate staff to oversee this industry remains vital.

In closing, DEP is working each day to ensure that natural gas is produced responsibly and our water is protected. Enacting a reasonable severance tax, strengthening our water and drilling regulations and insuring sufficient staff to provide oversight are vital to maximizing the benefits and minimizing the costs of developing the Marcellus reserve. We will continue to work with the legislature, other agencies, environmental organizations and the oil and gas industry to develop these resources responsibly.

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

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