

**Pennsylvania House of Representatives
HOUSE REPUBLICAN POLICY COMMITTEE**

**Public Hearing
Water Safety Issues and Marcellus Shale Drilling
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**Testimony Of
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Chairman Reed, members of the Committee, the Susquehanna River Basin Commission appreciates the opportunity to provide comments on the implications of natural gas development on water resources management important issue.

For those that may not be familiar with the Susquehanna River Basin Commission, we were created in 1971 as a federal-interstate compact commission by the passage of concurrent legislation in the General Assemblies of the three basin states, Pennsylvania, New York and Maryland, and by the United States Congress, all of which were signed into law by the respective governors and the President to create the Susquehanna River Basin Compact.

Under the terms of the Compact, the Commission is vested with very broad authority in the areas of water resources planning, management, conservation, development, utilization and allocation. Because that authority emanates from the Compact, all actions of the Commission constitute a joint exercise of the sovereign powers of our member states over the water resources of the basin. Our four commissioners are appointed, one each by the governors of our member states, and one by the President (ex officio), and they represent their respective jurisdictions as they take actions that affect the basin as a whole.

In that sense the Commission is somewhat unique; we carry out these authorities not within any one political jurisdiction, but rather within the jurisdictional area of the Susquehanna River Basin. Our jurisdictional boundaries are thus watershed-based, rather than political. While the basin is

shared by the three states, most of the basin, nearly 75 percent, is located in the Commonwealth of Pennsylvania. Approximately half of the entire land area of the Commonwealth lies within the basin.

We appreciate the Chairman's invitation to speak here today on water use associated with development of the Marcellus Shale play. Let me start by offering a few comments on both the Commission's role in this activity and the steps we have taken to minimize environmental impacts related to water use by the natural gas development industry.

First, our business is water resources management, not mineral resources management. We don't regulate drilling or the production or transmission of natural gas. Nor do we regulate the treatment, disposal and re-use of flowback and production fluids, including brines. These aspects of natural gas development are all managed comprehensively by our member states.

What we do regulate is the withdrawal and consumptive use of water associated with natural gas development activity. Our management objective is to have this industry avail itself of the water resources of the basin in the development of this important mineral resource, but to do it in way that minimizes impact to the basin's water resources. In the exercise of our regulatory authority we coordinate very closely with the Pennsylvania Department of Environmental Protection to minimize duplication of effort and maximize management efficiency.

In the past, we have seen mineral exploitation occur at the expense of society; where the environmental risk was not mitigated, but instead transferred to the public. We don't want to repeat that history and perpetuate that legacy – and we don't need to. We need to be smart and use the lessons we have learned.

One of the things we realized almost immediately when the Marcellus industry came to town was that our traditional regulatory scheme was not a good fit for this type of activity. Rather than a typical industrial facility located at a specific site withdrawing water at a specific quantity on a regular basis, we quickly realized that this industry in a sense was much more decentralized—it needed to take varying amounts of water from many different sources to support drilling operations at multiple locations, and at different times over a different duration.

In short, what we realized is that we needed to modify our approach, not to our substantive water resource protections standards, but to how we administratively manage the impacts of this type of water use. Within the first six months, we undertook rulemaking changes resulting in several modifications to our program, and continued to refine them with two additional rulemaking actions in 2009 and 2010. We also anticipate additional refinement of the rules in 2011.

Given our concern for the potential for environmental impact, we effectively eliminated our standard regulatory thresholds applicable to all other types of water use (i.e., 100,000 gallons per day for withdrawals and 20,000 gallons per day for consumptive use) with our 2008 rulemaking changes. If you drill into the Marcellus or Utica shale formations, you need a consumptive use approval from us, and all sources of water used for the operation require advanced Commission approval, regardless of the quantity. For this industry it starts with gallon one. I will explain an expansion of this rule later in my testimony.

We also created a new Approval by Rule (ABR) process that enables us to issue consumptive use approvals on a drilling pad basis, rather than an individual well basis, and which imposes monitoring, metering, reporting and mitigation requirements for that specific location. It gives us an efficient administrative mechanism for tracking water sources and water use on the pad site, regardless of the number of wells permitted to be developed at that location by our member states.

On the issue of water quality, we require projects to certify compliance with all applicable state and federal laws for the treatment and disposal of flowback or produced fluids, including brines. We see this as perhaps the most significant issue related to natural gas development activity, more so than water quantity.

Although we have made specific rule changes related to this industry, I should point out that we have not modified any of our current standards or requirements associated with the review and approval of water withdrawals. The natural gas industry continues to be subject to the same standards that all withdrawals across the basin are subject to, and we believe are appropriate to protect our water resources as we simultaneously allow for their utilization to support this important industry.

With regard to the evaluation of withdrawals, we look to whether a proposed taking should be subject to a protective passby flow condition, which restricts the ability to take water during certain prescribed flow events, such as during low flow periods (essentially cutting off the withdrawal when flow conditions reach a certain threshold). This protocol enables us to evaluate the impact of the withdrawal and involves looking both upstream and downstream to assess cumulative impact, taking into account all other withdrawals and discharges and their impact on instream needs and the resource itself, particularly during low flow periods.

To date, the Commission has issued 155 surface water withdrawal approvals to the natural gas industry, with most of them involving a passby condition to protect stream flow. We have an additional 60 applications for surface water withdrawals currently in-house undergoing review. On top of that, we have 10 applications pending seeking to use out-of-basin sources.

The industry is now starting to turn to groundwater as a potential source of water and we have recently begun the review and approval of applications for this type of use. To date, we have issued 2 approvals. We anticipate more applications in some of the glaciated regions of our basin, given that base flows in those regions are not well equipped to sustain depletion during low flow conditions. I should point out that the Commission has a very good aquifer testing protocol that is applicable to all groundwater withdrawals, and which can likewise result in passby conditions to protect the resource.

We have also approved the use of 29 public water supply systems as a source for water, 24 of which are located in the Pennsylvania portion of the basin. The industry has turned to these systems to supply approximately 34% of the water used for natural gas development. For the industry, it's a matter of economics – where can it find water closest to the drilling pad site to minimize transportation costs.

Thus far, the Commission has issued a total of 1,479 ABR pad site approvals. The pace of submittal of applications for ABRs rose sharply in 2010, but thus far in 2011 that pace has leveled off somewhat.

One of the conditions contained in all ABRs is the required filing of post-hydrofracture reports with the Commission. Among other things, these reports identify the sources and quantities of water used in the hydrofracture stimulation process, the quantity of flowback (return flow), and the fate of

that flowback. These data have made it possible to develop a water use profile of this industry. That profile is dynamic and subject to change over time, but currently (July 1, 2008 through February 14, 2011) provides us with the following information:

- Water obtained from surface water withdrawals totals 949.8 million gallons (M/gal).
- Water obtained from public water supply systems totals 542.6 M/gal.
- The total water obtained from both sources totals 1592.4 M/gal.
- Of that total, 66% is from surface water sources and 34% is from public water supply systems.
- The average total volume used in each operation is 4.2 M/gal, of which 3.7 M/gal is fresh water and 0.4 M/gal is recycled flowback.
- The industry uses approximately 1 million gallons of water use for each 1000 linear feet of horizontal lateral.
- The average recovery of fluids injected is 8%.
- Of the amount recovered (127.4 M/gal), approximately 2/3's was reused and 1/3 disposed of for treatment.
- The disposal quantity (42.1 M/gal) represents less than 3% of the total amount used for hydrofracture operations.

This represents our current information on the water use profile for this industry to date and we would be happy to supply the Committee with additional information on a periodic basis. Reports are being submitted on an ongoing basis, resulting in ongoing modification of these profile values.

People are very interested to know what this water use profile data actually represents in terms of the overall impact on the water resources of the basin. A lot of concern is raised about whether we can accommodate another straw

in the water, especially by an industry that seems to have a tremendous thirst.

Let me give you the bottom line first. Yes, we can accommodate this use, but it needs to be managed to avoid impacts. The real issues really don't relate to quantity in the larger scheme, but rather to the timing and location of withdrawals, and the ultimate fate (disposal/treatment) of flowback and production fluids. With those aspects properly managed, we can accommodate this level of water use.

From the standpoint of quantity, our current estimate is that use will gradually climb to 28 mgd as the industry goes to full production mode. If it reaches that point, this industry would then be using 10 billion gallons per year. To put that into perspective, 10 billion gallons is what is withdrawn every 3 days in our basin to produce electricity. This is not to suggest that water use for natural gas development is inconsequential, but rather to suggest that relative to all other uses in the basin, it will not have a significant cumulative impact if managed properly.

I should also point out that our current estimates were focused on potential use of water related to development of the Marcellus shale play, and to a lesser extent the Utica. As new shale formations begin to be developed, these estimated numbers will change.

Along those lines, and just this week, the Commission's Executive Director is issuing a Notice of Determination extending jurisdiction under our natural gas well development rules to cover the Antes, Burket, Geneseo, Mandata, Middlesex, Needmore and Rhinestreet shale formations.

Through our coordination with DEP, we have learned that well permits to allow exploratory work in at least some of these formations have been issued for our basin and we want to ensure a consistent regulatory approach to this activity as well. To the extent the exploratory drilling proves successful, development of these formations will impact our estimates of water use by this industry and its cumulative impact.

I also wanted to note for the record that the Commission has deployed a remote water quality monitoring network that continuously measures and reports certain water quality conditions in smaller watersheds located in

northern tier Pennsylvania and southern tier New York watersheds where Marcellus activity is underway.

This real-time monitoring system was designed to allow access to the data collected to other resource agencies and the general public through our website. As of the end of 2010, we had 37 stations on line and reporting, and hope to have a total of 50 stations on line and reporting as of July 1 of this year.

The stations continuously monitor and record the following five parameters: temperature, pH, conductance, dissolved oxygen, and turbidity. In addition, water depths will be recorded to establish a relationship with stream flows. The data will be transmitted to our web site at predetermined intervals, measured in minutes. In addition to the raw data, the web site interface available to the public provides user-friendly access to other critical information and tools, such as tables, graphs, maps and statistics. This system is intended to provide transparency for tracking water quality conditions at stations across the basin.

In addition to the remote sensing, Commission staff are also collecting streamflow measurements, and macroinvertebrate and habitat data. Samples are also collected about 6 times per year at all monitoring station locations and undergo lab analysis for acidity/alkalinity, chlorides, barium, total dissolved solids, sulfate and total organic carbon. Quarterly sampling is analyzed for calcium, magnesium, sodium, potassium, nitrate, carbonate alkalinity, bicarbonate alkalinity, carbon dioxide, bromide, strontium, lithium, and gross alpha and beta (radioactivity).

We believe the data being generated by this network will serve all of us moving forward. The stations cover areas where drilling for natural gas is the most intense (or projected to be) and where smaller streams have not historically been monitored. The data help all agency officials track existing water quality conditions and any changes in them on an ongoing, real-time basis.

Speaking of transparency and the desire of the public to have access to applications and approvals related to this industry, the Commission has a Water Resources Portal on our website that provides access to all SRBC-approved projects and pending water withdrawal and consumptive use applications (www.srbc.net/wrp/Default.aspx). The user-friendly web site

allows viewers to locate information using an interactive map or through other search functions, including typing in the names of project sponsors. Viewers also can sign up to receive project updates through an RSS Feed, similar to the Pennsylvania Department of Environmental Protection's eFacts service.

In conclusion, let me just offer that the Commission stands ready to continue to coordinate with and provide value-added service to the Commonwealth as it moves forward with this next generation of natural gas well development.

Thank you.

I would be happy to respond to any questions or comments from the Committee.