

Water Quality and the Marcellus Shale

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Welcome back to Water Bytes. I'm Taj Magruder and today we will be examining the issue of water quality in relation to one of Pennsylvania's hottest topics, the Marcellus Shale.

As Pennsylvania's senior U.S. Senator, Robert P. Casey, Jr., has said, "We are now experiencing a natural gas rush in Pennsylvania" (Casey, 2010). This so-called "natural gas rush" is the result of the development of the Marcellus Shale. Spanning approximately 54,000 square miles, the Marcellus Shale is a natural subterranean rock formation that extends through Maryland, New York, Ohio, Pennsylvania, and West Virginia. 350 million-years-old, the Marcellus Shale is nothing new but extraction of its natural gas has only recently become commercially viable through the process of hydraulic fracturing (George, 2010). The numbers speak for themselves. In 2007, there were 27 natural gas drilling wells in Pennsylvania. That number jumped to 161 in 2008, and then to 785 in 2009. Last year, there were no less than 1,213 wells in Pennsylvania (Popichak, 2011).

However, due to the poor regulation and management of natural gas extraction, serious concerns have arisen about its effect on surrounding water supplies. As previously mentioned, extraction is largely accomplished through hydraulic fracturing. The process of fracturing begins by drilling a deep natural gas well. "Once a well is drilled, millions of gallons of water, sand, and proprietary chemicals are injected, under high pressure, into a well. The pressure fractures the shale and props open fissures that enable natural gas to flow more freely out of the well" (*Gasland*).

The natural gas industry is not required to provide complete disclosure of the chemical composition of fracturing materials, and the fracturing process itself is exempted from regulation under the Safe Drinking Water Act. Among the highly dangerous chemicals used in fracturing are methyl alcohol, hydrochloric acid, boric acid, monoethanolamine, potassium hydroxide, propargyl alcohol, acetic anhydride, and benzene (George, 2010). Therefore, sources of drinking water are open to serious contamination. This is particularly troubling for Pennsylvania, "which has the second highest number of private wells for drinking water in the United States" (Casey, 2010). Indeed, numerous cases of contamination possibly related to fracturing have already been reported. In 2009, three different spills took place over two weeks at Stevens Creek in Susquehanna County,

dumping approximately 8,000 gallons of fracturing chemicals and resulting in polluted wetlands and a massive fish kill (George, 2010). In response, 13 families from Susquehanna County filed a lawsuit against the drilling company, saying the cement casing in the drilling well was defective (Foster, 2010).

In 2009, a discharge of fracturing chemicals led to the complete annihilation of 161 aquatic species at Dunkard Creek in Greene County, including fish, mussels, salamanders, crayfish, and insects (George, 2010). That same year, Pennsylvania's Department of Environmental Protection issued a report that documented at least two dozen cases of gas and fracturing chemicals leaking from old wells into local water supplies, forcing the evacuation of entire homes ("Deteriorating," 2011). The HBO documentary *Gasland* examined the effects of fracturing in 24 states, including Pennsylvania, and revealed chronic health problems in residents who lived near drilling sites; the tap water from one man's kitchen faucet was even found to be flammable (*Gasland*).

Pennsylvania does have some regulations for natural gas drilling. For example, the state requires that wells be at least 200 feet away from water supplies (Foster, 2010). However, Pennsylvania's regulations are highly outdated, with most dating back to 1984 (Popichak, 2011). In March 2011, because of the growth of natural gas drilling in Pennsylvania, the federal Environmental Protection Agency demanded the state perform testing for radioactive pollutants and other contaminants at water facilities (Urbina, 2011). Federal regulators also raised concerns about sludge from waste treatment plants receiving drilling wastewater.

For instance, a plant in Johnstown accepts 50,00 to 100,000 gallons of drilling wastewater per day with levels of radioactivity over 2,000 times higher than the drinking water standard (Urbina, 2011). This wastewater is then being discharged into rivers and streams by sewage treatment plants. In response to the EPA's orders, state environmental regulators have required 14 public water authorities to do new testing. They also contacted 25 wastewater plants, requesting that those with older permits voluntarily begin testing for radium, uranium and other pollutants.

These measures represent a modest step in the right direction, but Pennsylvania must do much more to ensure the water quality for its residents.

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