Wastewater a Key Issue in Fracking Debate

MARY ESCH - Associated Press - Associated Press

One of the most contentious issues in the debate over shale gas drilling in New York's share of the Marcellus Shale region — how to handle millions of gallons of contaminated wastewater — remains unsettled. As the state ponders final regulations, environmental advocates say the issue is a glaring gap in preparations.

"What's disconcerting is that while the state raises a number of possibilities, there isn't any real clear sense as to what the path forward is going to be," said Mark Brownstein, deputy director of the Environmental Defense Fund's national energy program. "On an issue as important as this, all of us who commented from the environmental community are looking for greater clarity."

There are three options for waste disposal in the state Department of Environmental Conservation's 1,500-page environmental review and proposed regulations for hydraulic fracturing, or fracking, of deep horizontal wells for natural gas in the Marcellus Shale:

— Truck the millions of gallons of wastewater produced per well to a treatment facility and either discharge the treated water into a river or reuse it for another drilling project;

— Ship it out of state for deep-well injection disposal; or

— Recycle it on-site for drilling multiple wells.

The water that flows from active gas wells is contaminated with traces of chemicals used in drilling and fracking, which breaks up the shale to release natural gas. Many of the chemicals are known or probable carcinogens. The flowback water also brings up such naturally occurring contaminants as barium, strontium and radium.

In Pennsylvania, researchers have found increased levels of bromide in rivers used for gas wastewater disposal. Bromide, when combined with chlorine in municipal drinking water supplies, produces trihalomethanes, which have been linked in some studies to increased human cancer rates after years of exposure.

Environmental Conservation Commissioner Joe Martens says permit applications must include details about how wastewater will be handled. It's up to the drillers to determine what method to use.

"All of those options have impacts; none of them is particularly benign," said Kate Sinding, a staffer of the Natural Resources Defense Council. "What's missing in the DEC review is, what's the impact of each available technology? They shouldn't be deciding on treatment options when issuing permits until they have the science on the impact of each option."

NRDC and other environmental groups support legislation that would close a loophole exempting oil and gas waste from the hazardous waste law that applies to other industries. The bill was passed Feb. 13 by the Assembly but a companion bill in the Senate remains in committee.

Under a voluntary moratorium last May, Pennsylvania moved to stop municipal wastewater treatment plants from taking Marcellus waste because excessive salt concentrations were found downstream in rivers. The wastewater has more than 30 times as much salt as seawater. Treatment to remove the salt is energy-intensive and should be considered as part of the environmental review, Sinding said.

On Friday, Pennsylvania officials released 2011 data showing that 97 percent of the shale wastewater generated after the moratorium, in the last half of the year, was either recycled, sent to deep-injection wells or to a treatment plant that doesn't discharge into waterways. The amount injected underground nearly tripled for the period, much of it going to Ohio.

Not evaluated are the impacts of deep-well injection, which involves slowly pumping the wastewater into an underground rock formation via wells regulated by the Environmental Protection Agency. Adverse impacts include potential earthquakes and the traffic of hundreds of tanker trucks transporting waste out-of-state — most likely to Ohio, which has 180 injection wells, while New York has none.

NRDC's scientific consultants consider deep-well injection the "least undesirable" option for wastewater disposal, Sinding said.

To accept the wastewater, treatment plants must pre-treat and analyze for chemical makeup and radioactivity. After it's treated, the effluent is usually discharged into rivers that also provide drinking water to communities downstream.

The treatment requirements would rule out any of the plants now in existence in New York unless they invest in new equipment.

Under permit from the DEC, brine from vertical wells in sandstone formations is commonly spread on unpaved roads in western New York for dust control and de-icing. But the agency says that won't be an option for Marcellus wells, at least until additional data on radioactive content is evaluated.

At least one upstate New York city is considering taking Marcellus Shale wastewater at its treatment plant to raise revenue. Earl Wells, spokesman for the Niagara Falls Water Board, said the city's specialized plant was designed to handle chemical waste and has the capacity to take gas well wastewater. Wells said the industrial wastewater plant in nearby North Tonawanda also has the capacity. Both would need additional equipment, he said.

Once treated, the wastewater would be discharged into the Niagara River upstream of Niagara Falls or reused in drilling. Environmental groups and residents of Niagara Falls have spoken out against the proposal, saying they don't want more tanker

trucks of hazardous wastewater rolling through the city.

The EPA announced in October that it will draft standards for wastewater that drillers would have to meet before sending it to treatment plants.

A number of private companies are lining up to provide treatment services, including Siemens, General Electric, Ecosphere Technologies and Aqua Pure. Consultants say cost, borne by the drilling companies, is a key consideration.

GreenHunter Water, one of the companies marketing wastewater handling and treatment to the oil and gas industry, estimates that the 2011 water disposal market in the Marcellus Shale region was $1.3 billion to $1.7 billion and will rise to $15 billion to $22 billion in 10 years. It figures the cost of water treatment at more than $300,000 per well.

Advanced Waste Services has installed a new system created by Siemens Water Technologies at the AWS plant in New Castle, Pa., which has the capacity to treat up to 200,000 gallons per day of gas well wastewater. It removes solids, metals and other pollutants and returns the treated water to a driller's pond or tanks for re-use in future wells.

The company also builds and operates treatment systems at drilling sites to clean wastewater for re-use and trucks away the resulting sludge to a hazardous waste landfill.

Aquatech, based in Canonsburg, Pa., is marketing a mobile wastewater treatment unit that distills water to remove impurities. The technology has long been used to desalinate seawater.

"The challenge is that you can filter out contaminants and then purify the water to the point that it can be discharged to a stream, but you're still left with a solid that needs disposal such as landfilling," said John Conrad, president of Conrad Geoscience in Poughkeepsie, an industry consultant.

Conrad, who worked for DuPont in the injection well business, anticipates New York and Pennsylvania will drill injection wells to handle some of the wastewater. Other geologists have said New York doesn't have the right geology for such wells. There are about 170,000 injection wells across the country.

Environmental Defense Fund's Brownstein said new technologies are being developed rapidly, so it's better that DEC not require any specific treatment method because a better solution may come along.

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