RIVERKEEPER.
NY's clean water advocate

April 15, 2011

Paula Schmitt, Commission Secretary
Delaware River Basin Commission
P.O. Box 7360
25 State Police Drive
West Trenton, NJ 08628-0360

Re: Delaware River Basin Commission Draft Natural Gas Extraction Regulations

Dear Ms. Schmitt:

Riverkeeper is a member-supported watchdog organization dedicated to defending the Hudson River and its tributaries and protecting the drinking water supply of nine million New York City and Hudson Valley residents. For decades Riverkeeper has worked with the New York State Department of Environmental Conservation ("NYSDEC" or "DEC"), the New York City Department of Environmental Protection ("DEP") and other local, state and federal regulatory agencies on a variety of enforcement and permitting issues that pertain to the protection of unfiltered drinking water supplies. Riverkeeper submits these comments with respect to the Commission's Draft Natural Gas Development Regulations (the "Draft Rules"), which would be promulgated as a new Article 7 of Part III – Basin Regulations, issued for public comment on December 9, 2010.

The more we learn about the risks of horizontal drilling and high-volume hydraulic fracturing, the more skeptical we are that the DRBC has adequately considered the potential adverse environmental impacts of this activity. Furthermore, we are concerned that DRBC's proposed regulations rely too heavily on and in many cases, defer to "host state" regulations. Not only are New York's regulations related to gas drilling outdated and fail to adequately address modern-day industrial gas development dependent on the use of significant amounts of water and chemicals, New York and specifically NYSDEC lack sufficient resources to fully administer even their existing regulatory system governing the permitting, monitoring, inspection, and enforcement related to gas drilling in the Delaware River Basin.

Finally, the proposed draft regulations fail to adequately analyze and address cumulative impacts to surface and groundwater resources that will result from the processes used in horizontal drilling and high-volume hydraulic fracturing operations within the Delaware River Basin. This is a critical deficiency because it ignores the cumulative environmental, social and economic impacts of natural gas development using horizontal drilling techniques throughout the life cycle of the process. Riverkeeper agrees with the determination which NYC DEP has made that, based on the best available science and current technology, hydrofracking cannot safely be conducted in the New York City Watershed and we would urge the Commission to be guided by that determination in deciding how to proceed with its own rule-making.

These comments conclude that because of the significance and irreplaceable nature of the resource at stake, the Delaware and New York City watersheds, and the 15 million people who rely on those watersheds for clean drinking water, we urge the DRBC take the time to develop a complete understanding of the impacts of natural gas drilling and to make certain that its proposed regulations are able to and do address all of those impacts *before* proceeding forward with adoption of those regulations. We respectfully request that the Commission withdraw its draft regulations, proceed with its own comprehensive environmental and cumulative impacts analyses, and wait for the completion of and the results from the U.S. Environmental Protection Agency's ("EPA") study of hydraulic fracturing's impacts on water quality, as well as NYSDEC's Supplemental Generic Environmental Impact Statement ("SGEIS") process and the rule-making which is likely to follow.

Background

The New York City Watershed and the NYSDEC Environmental Review Process

The headwaters of the Delaware River originate in the Catskill region of the Delaware Watershed, which supplies drinking water to over half of New York State's population. On average, this 1,010-square-mile watershed delivers 600 million gallons per day of unfiltered drinking water from four reservoirs to more than nine million consumers in New York City and Westchester, Putnam, Orange and Ulster Counties. Marcellus shale reserves underlie the Delaware portion of the New York City Watershed, only 30% of which is protected from shale gas development through fee ownerships, easements or other means.

In 1992, NYSDEC prepared a GEIS for its oil, gas, and solution mining regulatory program, which studied the environmental impacts of low-volume hydraulic fracturing for natural gas. With the implementation of new technologies that permitted high-volume hydraulic fracturing with horizontal drilling, New York State Governor Paterson in 2008 directed the NYSDEC to prepare a supplemental GEIS (SGEIS) to update the 1992 review and to "ensure that any new technologies deployed in New York State are first thoroughly analyzed and regulated to ensure that all environmental and public health impacts are mitigated or avoided..."[1]

NYSDEC released the draft SGEIS for public review and comment in 2009. In December 2010, Governor Paterson vetoed legislation that would have imposed a moratorium on both horizontal and vertical hydraulic fracturing and instead issued Executive Order No. 41, which imposed a moratorium only on horizontal hydraulic fracturing until the order expires on July 1, 2011. NYSDEC plans to complete and release the final SGEIS in summer 2011.

EPA Study

In 2010, the U.S. Environmental Protection Agency (EPA) Office of Research and Development submitted a draft scope of study on hydraulic fracturing for public review and comment. The scope proposed the research of potential risks to drinking water posed by all aspects of hydraulic fracturing throughout the entire natural gas production cycle. It is precisely this scope of analysis – the full lifecycle analysis – that has been overlooked in the recent rush to exploit this

[1] NYSDEC, Marcellus Shale, available at http://www.dec.ny.gov/energy/46288.html.

technology. In February 2011, EPA submitted the draft plan of the study for further review and comment. Following completion of the final study plan, EPA's Science Advisory Board intends to initiate the study in 2011 and expects to have initial study results available by late 2012 with a final report completed in 2014. This comprehensive study will provide a sound scientific basis for future rulemaking to protect water supplies during hydraulic fracturing operations.

A Comprehensive Environmental and Cumulative Impacts Analyses by DRBC is an Essential Prerequisite to Developing Adequate Drilling Regulations

It is imperative that the Commission comprehensively evaluate the full range of potential environmental impacts from gas exploration and production technologies, including hydraulic fracturing, and identify measures to prevent impacts before they occur – something that has not undertaken to date. Unfortunately, in the absence of proper federal regulatory guidance, most states have allowed extensive industrial gas production operations to proceed without attempting to study and/or mitigate environmental impacts in advance.

The approach taken by most states thus far flies in the face of the Precautionary Principle, a fundamental and globally recognized scientific and legal policy that underlies nearly all of our nation's environmental laws. The Precautionary Principle dictates that where there is scientific uncertainty concerning a proposed action, the proponent of such action bears the burden of proving that the activity will not be harmful. In such instances, the role of decision makers is to err on the side of protecting public health and the environment and to respond aggressively to low probability, high-impact events. Taking lead out of gasoline is the classic domestic example of regulating in the face of danger.[2] At a minimum, the Precautionary Principle is about prudent decision making. Therefore, studying potential impacts to drinking water before employing specific technologies on a grand scale is the proper course of action.

We understand that the Commission itself sought federal funding for a cumulative impact study, based on its recognition that natural gas development in the Delaware Basin had the potential to result in significant cumulative impacts. As a result of the failure to conduct such a study in advance of its issuance of draft natural gas regulations in December 2010, the Commission prepared draft rules in the absence of critical information necessary to insure that those regulations are sufficiently comprehensive and protective. Moreover, that failure violates the requirements of the National Environmental Policy Act ("NEPA") that an environmental impact statement be prepared for all "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4322(2)(C). Consequently, preparation of a full environmental impact statement is essential in order to both comply with the legal requirements of NEPA and to ensure effective regulations adequate to the task of meeting the DRBC's mandates and controlling a risky industrial activity that has already caused documented environmental impacts in Pennsylvania and other states.

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[2] Ethyl Corp. v. EPA, 541 F.2d 1, (D.C. Cir. 1976) (court acknowledged the high degree of scientific uncertainty, but upheld EPA's decision to regulate lead in gasoline). "Man's ability to alter his environment has developed far more rapidly than his ability to foresee with certainty the effects of his alterations." *Id.* at 6.

Such an impact study should address the following specific impacts that contribute to water quality degradation on a cumulative basis which are of particular concern to the New York City Water Supply, many of which have been studied and documented by the New York City Department of Environmental Protection (NYCDEP) in its *Rapid Assessment Report*, discussed and cited below.

Water Withdrawals

According to NYCDEP, "Water withdrawals for fracturing could impact DEP by directly reducing inflows to NYC reservoirs, and/or by requiring additional reservoir releases to meet downstream flow targets. The Delaware River Basin Commission has the authority to permit water withdrawals from the Delaware River watershed, which also has an established basin-level planning framework. The Catskill watershed lacks such protection and is more vulnerable to excessive withdrawals . . . [because] DEC currently only regulates water withdrawals and diversions related to community water supply use. As such, water withdrawals associated with gas well drilling and hydraulic fracturing are not regulated by the state." [3]

"Certain aquifers in the region are heavily utilized for drinking water, have limited recharge, and are somewhat stressed due to demands."[4] Subjecting "particularly susceptible" aquifers to contamination increases concentrations of pollutants in groundwater, which compounds adverse impacts when aquifers are already stressed. The DRBC regulations must ensure that the cumulative impacts of water withdrawals for fracturing operations do not impact reservoir inflows and releases in the New York City Watershed, for the benefit of both New York State consumers and the downstream communities that rely on those releases.

Groundwater Contamination

NYCDEP reported that "[n]early every activity associated with natural gas development in the Marcellus Shale has the potential to impact NYC source water quality to some degree..."[5] "The [water quality] protection afforded by hydraulic separation between the deeper and shallower bedrock formations may be compromised in areas where natural or induced fracturing occurs."[6] "Fractures created during stimulation could potentially propagate beyond the target formation or enhance the permeability of an existing feature (such as a fault), resulting in communication between the target formation and other formations and subsequent contamination of groundwater and surface water."[7] Additionally, "it is anticipated that influences from deep groundwater on the surface water and shallow groundwater could result in detectable changes in water quality."[8] For these reasons, degradation of drinking water quality is foreseeable if activities directly and indirectly associated with gas drilling are permitted in the Delaware River Basin.

Another threat to groundwater results from the fact that "[t]he Marcellus Shale is a radioactive formation, and during drilling and stimulation operations naturally occurring radioactive material

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[3] NYCDEP, RAPID IMPACT ASSESSMENT REPORT (hereinafter "DEP REPORT") (2009), at ES-5, 37.
[4] *See id.* at 62
[5] *See id.* at 87.
[6] *See id.* at 15.
[7] *See id.* at 35.
[8] *See id.* at 23.

(NORM) may be brought to the surface."[9] "The depths of gas wells in the Marcellus Shale are expected to require drilling through the fresh water aquifer, and may result in contact with saline aquifers or formations that contain hydrocarbons, heavy metals, radionuclides or other potential contaminants."[10] This threat is in addition to the potential negative impacts associated with chemical constituents of the fracking fluids that are forced into the ground as a part of the horizontal hydrofracking process. "Many of the constituents that have been identified are recognized as hazardous to water quality and health (e.g., benzene, xylene, ethylene glycol, diesel fuel)."[11] Because spills and leaks are foreseeable and anticipated, chemical compounds that fall under these parameters have no place in New York City's unfiltered drinking water supply for nine million consumers or any other surface or groundwater drinking water supplies. The DRBC regulations must consider the cumulative impacts of foreseeable spills and groundwater contamination such as those that have occurred in high-volume hydraulic fracturing operations in Pennsylvania and elsewhere.

Surface Water Contamination

The addition of impervious surfaces to watershed lands adversely impacts water quality, aquatic ecosystems, stormwater control, streambank stabilization, soils, vegetation, and human health. "The most dramatic rates of decline in physical habitat and ecological function with the [New York City] watershed occur at the lowest levels of imperviousness up to approximately 10% [impervious cover]... The steepest rates of decline in biological and physical indicators occur in the 0-5% impervious range, as a watershed undergoes initial urbanization."[12]

NYCDEP reported that "[t]he rate and density of natural gas well construction is a critical factor in evaluating potential impacts to the NYC water supply. Based on available data from the Barnett and Fayetteville shale plays… a similar pace of development in the NYC watershed would translate to well completion rates on the order of 50 to 500 wells per year."[13] The DRBC must consider the cumulative impacts of multiple well pads at high density and under build-out conditions.

In addition, "[p]ipeline and facility construction requires surface disturbance which could result in erosion and stream impacts. Pipeline failures could result in gas leaks causing explosions or fires. Pipeline maintenance may include herbicide treatment at the surface to prevent vegetation growth along the pipeline right-of-way. Improper herbicide use could result in surface water or groundwater contamination. Gas treatment at compressor stations and/or refineries may require chemicals and create liquid wastes that if handled improperly could lead to surface water or groundwater contamination."[14]

Finally, erosion and sedimentation present serious water quality concerns not only during the gas well construction phase, but also arise from the increased stormwater flow associated with the

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[9] *See id.* at 32.
[10] *See id.* at 33.
[11] *See id.* at ES-5, 36.
[12] HORSELY & WITTEN, INC., AN EVALUATION OF IMPERVIOUS SURFACE COVER THRESHOLDS IN THE NEW YORK CITY WATER SUPPLY SYSTEM EAST OF HUDSON (2002), 2.

[13] DEP REPORT, at 69.
[14] *See id.* at 44.

addition of impervious surfaces for well pads, access roads and appurtenances. These impacts must be analyzed on a cumulative basis to address the proposed disturbance and increased imperviousness associated with the removal of forests and other vegetation and the construction of access roads and well pads under build-out conditions.

Water Supply Infrastructure

"Numerous activities during all phases of natural gas development have the potential to contaminate groundwater or surface water supplies. Fracturing operations in proximity to DEP infrastructure could compromise water quality and potentially damage infrastructure."[15] "Changes in subsurface geologic characteristics may also impact the structural integrity of water supply infrastructure (e.g., dams, tunnels, and aqueducts) and could potentially allow contamination of tunnels or aqueducts."[16] NYCDEP's review also "revealed that substantial portions of DEP's West of Hudson aqueducts and tunnels, as well two reservoirs, are constructed within 500 to 1,500 feet vertical distance of the Marcellus Shale Formation. In two locations near the edge of the Marcellus Formation, portions of the Catskill Aqueduct and the Rondout-West Branch Tunnel of the Delaware Aqueduct are in direct contact with the Marcellus Formation."[17] The setback distances from well pads proposed in the draft DRBC regulations must be increased to protect New York City's water supply infrastructure. Moreover, any setback regulations must specify how the setback will be measured when horizontal drilling is involved. All setbacks must be measured from the end of the nearest horizontal drill leg to the resource in question, rather than from the edge of the well pad.

In addition, "[i]nduced seismicity is known to be associated with injection wells, and has reportedly been linked with hydrofracturing operations. Given the widespread use of injection wells for disposal of wastes in other regions, the possibility of causing or accelerating changes in subsurface faults and fractures, and the creation of new or enhanced flow paths, is considered a potential risk to water supply infrastructure."[18] Compounding these threats to water supply infrastructure is the fact that "[u]nderlying the Marcellus Shale are several other bedrock formations that have been identified as gas plays that may be potential targets of future extraction in the Region."[19]

Wastewater Disposal

"Treatment and disposal of fracturing wastewater is complicated by the presence of constituents that are not amenable to conventional treatment (e.g. high salinity, chemical residues, radionuclides.) In New York, the wastes can only be accepted at conventional treatment plants with approved pretreatment programs. There are currently no specialized treatment plants in the region designed to treat these wastes."[20] "Limited disposal options and/or high costs may lead to illicit disposal of wastes... Improper waste management can lead to water quality problems at local or regional scales... Incidents of both localized and widespread contamination have been documented in other states... Overall, waste management failures were responsible for the

[15] *See id.* at ES-6.
[16] *See id.* at 35.
[17] *See id.* at ES-4.
[18] *See id.* at 36.
[19] *See id.* at 13.
[20] *See id.* at ES-5.

majority of documented water contamination incidents related to natural gas development."[21] As there are no facilities in New York that can currently treat these wastes, the DRBC's analysis of cumulative impacts associated with high-volume hydraulic fracturing will not be complete unless and until it includes analysis of, among the other items highlighted herein, the construction, operation, and maintenance of additional treatment facilities that may be necessary if any treatment of drilling wastewater is expected within the region.

Other Concerns

Prior Disclosure of the Chemical Components of Fracking Fluids

The draft rules should require disclosure of fracking fluid components prior to their use, rather than after drilling operations have been conducted as they currently provide. In addition, DRBC should provide for public disclosure of all chemicals used and should place restrictions on the use of known toxic substances. Several gas companies have recently supported Texas legislation that would require the disclosure of fracking fluid components.

Lack of Capacity to Regulate Drilling Activities

The DRBC does not have the staff to regulate drilling activities, nor is it realistic for the Commission to rely on over-burdened state agencies like New York to enforce its regulations. A recent study revealed that New York has in fact cut the staffing of its oil and gas division in recent years. Its field inspection staff of 16 represents a 20% reduction, while its overall enforcement-related staff, including management and office positions, has been reduced by 10%.[22] Moreover, since New York has not adopted any regulations or procedures to specifically govern high volume, horizontal hydraulic fracturing, the reliance of DRBC's draft regulations on host state rules and regulations on issues such as setbacks and other matters will mean that DRBC's management of drilling activities will be based on outdated, generic mining rules and regulations which were put in place in New York before the State had even commenced its supplemental environmental review. The DRBC cannot defer to New York State on critical aspects of the gas drilling operation including well casing, setbacks, safety and the use and location of wastewater impoundments until New York has completed its own environmental review process and subsequent rule-making with respect to these issues.

Inadequate Provisions for Ensuring Compliance

The DRBC should not rely on the industry to self-report violations with an industry that has shown itself to have significant difficulties with self-policing. In addition, the DRBC regulations need to require that adequate financial assurance is posted by drillers so that taxpayers will not have to pay the cost of cleaning up environmental accidents. The $125,000 per well that the regulations currently require is inadequate to cover likely costs.

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[21] *See id.* at ES-5, ES-6.

[22] *State Oil and Gas Regulators are Spread Too Thin to do their Jobs*, Abrahm Lustgarten, ProPublica, December 30, 2011.

Spill Control Plans

Given the many uncertainties and risks around natural gas drilling, both geologic and human, the Commission should require that a comprehensive spill control plan be submitted and approved as a condition of project approval. This is essential to address the potential for spills and releases that may result from human accident or unusual and unexpected subsurface conditions. The spill control plan should be required to be reviewed and updated annually. The DRBC should also give serious consideration to secondary containment requirements particularly large, centralized wastewater storage facilities.

Permit Duration

In light of the pace of natural gas development that has been seen in other states and the rapidly changing information that is available regarding risks and impacts, a permit term of 10 years is too long to allow the DRBC to act within a reasonable period of time on new information without having to initiate formal proceedings to revoke or modify a permit. In light of that concern, it is recommended that permit terms be no longer than 3 years.

Conclusions

DRBC regulations must be based on detailed, cumulative analyses of: (1) potential economic costs that may result from all aspects of hydraulic fracturing operations statewide; (2) economic benefits created and maintained by intact forest ecosystems, clean streams and rivers, recreational fisheries, and open space in regions currently slated for hydraulic fracturing; and (3) costs associated with potential environmental damage that result from all aspects horizontal drilling and high-volume hydraulic fracturing, including but not limited to roads, drinking water, environmental cleanup and/or remediation.

Therefore, Riverkeeper urges the DRBC to suspend its current rule-making to afford itself the time to proceed with its own comprehensive environmental and cumulative impacts analyses and assemble the scientific data necessary to support a comprehensive and effective rule-making. In addition, we respectfully request that the Commission withdraw its draft regulations until it has the opportunity to consider the results of the EPA's study of hydraulic fracturing's impacts on water quality, as well as NYSDEC's SGEIS process and the rule-making so that the Commission has the opportunity to analyze the regulatory package to be developed by New York on which the DRBC regulations intend to rely. Hydrofracking for natural gas is acceptable only if safeguards governing the entire extraction process and subsequent handling of the waste stream are in place. Without thorough and reliable information on adverse impacts associated with the entire life cycle of hydraulic fracturing operations, the promulgation of final regulations in advance of this important study would be premature and unsupported by sound science.

Thank you for the opportunity to comment on the Commission's draft natural gas extraction regulations and the significant challenges they present.

Sincerely,

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Watershed Program Director

William Wegner
Staff Scientist