DELAWARE RIVERKEEPER®

Edward Hanlon, Designated Federal Officer
SAB Staff Office
Ronald Reagan Building
1300 Pennsylvania Avenue, NW
Suite 31150
Washington, DC 20004

February 25, 2011

Re: Hydraulic Fracturing Study Plan Review Panel

Dear Mr. Hanlon,

I represent the Delaware Riverkeeper Network and the Delaware Riverkeeper, Maya van Rossum. DRN has taken a lead role in protecting the waters of the Delaware River, which supplies drinking water for more than 15 million people. We have taken a keen interest in the issue of hydraulic fracturing for natural gas in shale formations such as the Marcellus Shale because of the potential for severe, if not catastrophic, harm to the Basin's irreplaceable drinking water resources.

Although the EPA Hydraulic Fracturing Study Plan is a good start, its scope has been unduly narrowed to focus only on the deliberate and intentional use of water in the hydraulic fracturing process itself. This study design excludes consideration of impacts to drinking water from critical steps in the natural gas extraction process such as surface level construction, vertical well installation, road and pipeline installation and use, and more. It is simply not the case that the only impacts to drinking water resources will occur from the deliberate use of water in the hydraulic fracturing process itself. The EPA study should not limit consideration only to the intentional use of water in the hydraulic fracturing process alone, but encompass the larger water quality impacts caused by the shale gas well installation and extraction process as a whole.

We intend to submit additional comments on the Environmental Protection Agency's Hydraulic Fracturing Study Plan via fax and email on Monday, February 28, 2011, in time for the Scientific Advisory Board's consideration at the meeting scheduled for March 7-8, 2011. As an initial submission, however, I enclose for the SAB's consideration a number of expert reports that were prepared for the Delaware Riverkeeper Network and the Delaware River Basin

Delaware Riverkeeper Network
300 Pond Street, Second Floor
Bristol, PA 19007
tel: (215) 369-1188
fax: (215) 369-1181
drkn@delawareriverkeeper.org
www.delawareriverkeeper.org

Commission for a hearing on the impacts to water quality from vertical wells drilled for shale gas exploration in the Delaware River Basin.[1]

Among other issues, these reports specifically address adverse impacts to water quality that are likely to occur specifically because of well pad construction and vertical well installation. Adverse impacts to drinking water quality may occur at many points in the gas development and exploitation process and are not limited to impacts from horizontal drilling and/or hydraulic fracturing.

Actual and potential water quality impacts from vertical well construction and installation identified in these expert reports include:

- Impacts to water quality from sedimentation and erosion as well as stormwater runoff resulting from land disturbance from pad site, entrance road, and pipeline facility construction as well as widening or paving of existing roads and increased road traffic (Adams, O'Dell, Sildorff)

- Chemical and biological contamination to ground water resulting from the chemical products used in both drilling muds and air drilling as well as naturally occurring chemical, biological, and/or radioactive substances mobilized by drilling. Contamination of water may occur either below ground (e.g., through casing or grouting failure or annular channels) or above ground (e.g., from drill cutting pits and waste disposal) (Bishop, Demicco, Harvey, Rubin, O'Dell, Sildorff)

- The water quality impacts of a well blowout, not only from the produced fluids and naturally occurring fluids ejected during the blowout but also from the chemical suppressants and water withdrawals used to cap wells and contain blowouts (Harvey)

- Adverse water quality impacts resulting from stray gas migration when vertical wells are not properly cased and cemented, thus allowing natural gas in subsurface formations to migrate from the wellbore through bedrock and soil, contaminating aquifers and drinking water wells (Harvey, Rubin)

- Adverse water quality impacts resulting from the penetration by vertical wells of bedrock joints that may result in hydrological connections between saline and freshwater horizons by opening inter-formational pathways. (Rubin)

- Clearing and fragmentation of forested areas and degradation of riparian zones related to well pad construction result in adverse impacts to drinking water. Intact forest ecosystems and riparian buffers are critically important to protecting stream water quality from non-point source pollution and nutrient loading, particularly in the headwaters of the Delaware River Basin (Owens, Jackson & Sweeney)

Because surface level construction, site use, and vertical well installation are prerequisites to any horizontal drilling and hydraulic fracturing processes, EPA should address the impacts of these activities in its study design to fulfill Congress' mandate and ensure a complete picture of the impacts to drinking water.

---

[1] Five of the reports (Anderson & Kreeger, O'Dell, Sildorff, Jackson & Sweeney, Volz) were produced at the request of the Delaware River Basin Commission, which has no affiliation with the Delaware Riverkeeper Network. These reports are publicly available documents.

More generally, these expert reports highlight some of the shortcomings of the current scope of the proposed EPA study and illustrate how the study, as proposed, will not fulfill Congress' mandate to study the cumulative effects of shale gas extraction on drinking water quality. Many additional elements of the shale gas extraction process need to be studied for their potential impacts to drinking water quality. For example:

- It is inappropriate to exclude consideration of air quality impacts resulting from natural gas production wells from the EPA study, because air quality impacts can cause water quality impacts, as air pollutants precipitate and deposit both on ground surfaces and water surfaces (Harvey).

- Seismic activity in areas of vertical well installation and hydraulic fracturing has significant implications for impacts to drinking water quality. Seismically active regions such as the Marcellus Shale have a high likelihood over time of significant ground motion that may instantly shear multiple well casings, opening connections between formerly separated freshwater and saline horizons and permitting natural gas migration as well as contamination from produced waters. (Rubin)

- Multiple pathways of water quality degradation from surface and subsurface activities relating to well pad construction and shale gas extraction may result in impacts to aquatic biota such as freshwater mussels. In the Delaware River, large assemblages of these filter feeders play a critical role in maintaining the drinking water quality of the River. Yet these species are highly susceptible to the impacts that natural gas well construction and hydraulic fracturing may inflict, such as increased sedimentation, increases in suspended sediments, water quality degradation from brines and other contaminants, inadequate flows and dewatering, invasive species, and forest fragmentation. (Anderson & Kreeger, Sildorff)

- It is also incumbent on the EPA not merely to identify possible contaminants (whether natural or manmade) that may affect drinking water quality but also to examine the potential health impacts of drinking water contamination on human populations. I draw your attention to the Teitelbaum paper and its appendices on this issue.

- EPA should examine the interactions between naturally occurring and manmade chemicals introduced through the drilling and fracturing processes. Biochemist Ron Bishop, whose report is attached, has, identified 4 Nitroquinoline 1-oxide (4NQO), a powerful carcinogen, in the wastewater produced by natural gas drilling. He has informed DRN that this chemical compound is not a drilling or hydraulic fracturing additive and it is also not found naturally in the geologic formations that produce flowback water during the stimulation process. Apparently, it is formed through interaction of the chemicals that are present in these fluids.

- The presence of this extremely powerful carcinogenic compound is a serious health concern and immediately requires further investigation since it is being found in currently produced gas drilling wastewater in New York State and perhaps in Pennsylvania as well. 4NQO is used in cancer research to induce cancerous tumors in animals for study. It is one of the most potent of all cancer causing chemical compounds. (See, e.g., http://bit.ly/gdzwlP).

Thank you for the opportunity to comment on EPA's draft study. For your convenience, I enclose a binder with one paper copy of each of these expert reports (without appendices) as well as twenty-four duplicate copies of all reports plus appendices on CD for the use of the members of the SAB.

Very truly yours,

Jane P. Davenport

Digitally signed by Jane P. Davenport
DN: cn=Jane P. Davenport, o=Delaware Riverkeeper Network, ou=Senior Attorney, email=jane@delawareriverkeeper.org, c=US
Date: 2011.02.28 17:29:26 -05'00'

Jane P. Davenport
Senior Attorney, Delaware Riverkeeper Network
jane@delawareriverkeeper.org