

January 7, 2013

By Electronic Transmission

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Re: Comments on the Revised High-Volume Hydraulic Fracturing
Regulations (November 30, 2012)

Dear Commissioner Martens:

The City of New York (City or NYC) submits the following comments on the Revised High-Volume Hydraulic Fracturing (HVHF) Regulations (November 30, 2012). We appreciate the New York State Department of Environmental Conservation's (DEC) continued position that, under DEC's proposed regulations, HVHF will be prohibited in the City's Catskill and Delaware watersheds. However, we are very concerned that the proposed regulations do not include enhanced regulatory protections to further protect DEP's infrastructure from the potential impact of HVHF where such infrastructure is located beyond the boundaries of the Cat/Del watershed.¹

As you know, the New York City water supply provides high quality drinking water to nearly half the population of the State of New York – the over eight million residents of the City and the millions more commuters and tourists who visit every year, as well as the one million people in upstate counties who tap into our system. Currently, the City provides more than one billion gallons a day of high quality drinking water from surface water supplies, primarily from the Catskill and Delaware watersheds, which are of such high quality they are not required to be filtered. The Marcellus shale underlies the entire Catskill/Delaware watershed and significant portions of the tunnels that transport water from the reservoirs to the City. These tunnels run outside of the watershed boundaries, in whole or in part.

The City has been actively engaged in commenting on the environmental review of horizontal drilling and HVHF and has consistently expressed concerns on the potential impacts this industrial activity could have on the New York City water supply and infrastructure. In our most recent comments on the Revised Draft Supplemental Generic Environmental Impact Statement

¹ We note that the final Supplemental Generic Environmental Impact Statement (FGSEIS) for HVHF is not yet available for review. We expect that DEC will make any additional changes to the proposed regulations that are determined necessary based on the FGSEIS, including the recently added health review, and the proposed mitigation measures.

on the Oil, Gas and Solution Mining Regulatory Program (RDSGEIS),² incorporated herein by reference, the City commended DEC's proposed ban on HVHF in the watershed and within a surrounding 4,000 ft buffer, and focused on additional protections we believe are needed to provide adequate protection of the water supply infrastructure. Based on a review the City commissioned by independent experts of the risks of HVHF³ and the potential serious consequences to our infrastructure, the City proposed in its most recent comments a hybrid approach of an Infrastructure Exclusion Zone, where no HVHF would be allowed, and an Infrastructure Enhanced Protection Zone, where drilling would be allowed under certain conditions and with additional protections. Further, the City expressed concerns about low-volume hydraulic fracturing (LVHF) and horizontal drilling in the watershed. If LVHF were in fact to occur in the watershed, other than in an occasional and isolated manner, it could have significant adverse impacts that were not considered in the 1992 Generic Environmental Impact Statement (GEIS) for natural gas drilling.

The City is concerned that the infrastructure protections it has requested were not included, let alone addressed, in the revised draft regulations. While Part 750-3.3 contains a list of areas in which HVHF will be prohibited to address concerns identified in the environmental review about unfiltered water supply watersheds, public water supply intakes, and private drinking water wells, the draft regulations include nothing to protect the deep rock tunnels and provides inadequate protection for dams. These infrastructure protections need to be part of the regulations. Moreover, addressing infrastructure buffers by imposing conditions in individual permits does not provide an adequate substitute for buffers required by regulation. To ensure consistency and ease of administration and enforcement, an infrastructure setback should be included in the revised regulations, like the other setbacks in Part 750. Just as DEC has found it appropriate to include the geographical restrictions on HVHF in two unfiltered water supplies in the draft regulations given their unique nature, it should similarly include buffers with respect to the City's infrastructure given its unique importance. The infrastructure setback the City has requested should be a new mandatory requirement for all HVHF operations proposed within the proposed buffer areas, and should not be subject to Agency discretion on a case-by-case basis, whenever applicants seek to drill in those areas. As such, it should therefore be promulgated as a regulation pursuant to the State Administrative Procedure Act.

The City is also troubled by DEC's seemingly definitive statements in the Response to Comments minimizing the potential of induced seismicity.⁴ The scientific community clearly shares our view that this as an open issue, which requires and is subject to active research and scientific debate. Just in the past year, since the close of the comment period for the RDSGEIS in January 2012, there have been a number of reports,⁵ journal articles,⁶ and scientific

² City comment letter dated January 11, 2012.

³ Technical Memorandum: Geophysical Evaluation of Infrastructure Risks of Natural Gas Production on New York City Water Supply Infrastructure, prepared by Hager-Richter Geoscience, Inc., for Hazen & Sawyer, Leggette, Brashears and Graham Joint Venture, and DEP, December 2011.

⁴ For example: see responses to comments 4401,, 5871, and 5946.

⁵ For example: National Research Council, Induced Seismicity Potential in Energy Technologies, June 2012, <http://i2.cdn.turner.com/cnn/2012/images/06/15/induced.seismicity.prepublication.pdf>; British Columbia Oil & Gas Commission, Investigation of Observed Seismicity in the Horn River Basin, August 2012, <http://www.bcogc.ca/document.aspx?documentID=1270&type=.pdf>;

conferences⁷ on these very topics. One recent report from British Columbia⁸ clearly links induced seismicity to fault movement resulting from HVHF at nearby gas wells. While we recognize that there remains significant scientific uncertainty on this issue, it is important to acknowledge that uncertainty, to continue to gather information as the scientific community's knowledge base grows over time, and to make prudent decisions taking that uncertainty into account. This approach is particularly appropriate where, as is the case in New York State and in the maps published in the RDGEIS, all known faults or potential faults and fractures are not mapped at a scale that will provide the industry the information necessary to avoid drilling in those areas.⁹

We urge DEC to address this concern by incorporating enhanced seismic monitoring into the regulatory framework. The City recommends that DEC adopt a traffic light system¹⁰ establishing a set of operational protocols based on real-time seismic monitoring. Under its current regulatory authority, DEC has the discretion to require that drilling activities be modified, suspended, or terminated based on real-time seismic data collected through such a monitoring system, and regulation of drilling activities based on this real-time data can be incorporated as an enforceable permit term.¹¹ This type of traffic light system, using a microseismic network, is planned for Blackpool, UK, where one of the confirmed cases of hydrofracking-induced seismicity occurred, and is recommended in the British Columbia report.

Ohio Division of Natural Resources, Preliminary Report on the Northstar 1 Class II Injection Well and the Seismic Events in the Youngstown, Ohio, Area, March 2012, <http://ohiodnr.com/downloads/northstar/UICReport.pdf>.

⁶ For example:

- M. D. Zoback, Managing the seismic risk posed by wastewater disposal, Earth Magazine, April 2012, <http://www.earthmagazine.org/article/managing-seismic-risk-posed-wastewater-disposal>;
- Frohlich, C. et al., Location and Felt Reports for the 25 April 2010 m_bLg 3.9 Earthquake near Alice, Texas: Was it Induced by Petroleum Production?, Bulletin of the Seismological Society of America, vol. 102, no. 2, April 2012, <http://www.bssaonline.org/content/102/2/457.abstract>;
- Ellsworth, W. L., et al., Are Seismicity Rate Changes in the Midcontinent Natural or Manmade?, presented at the Annual Meeting of the Seismological Society of America, April 2012, http://www2.seismosoc.org/FMPro?-db=Abstract_Submission_12.fp7&-lay=MtgList&-max=all&-format=/meetings/2012/abstracts/2012.html&-view.

⁷ For example, multiple papers and sessions at:

- Annual Meeting of the Seismological Society of America, April 2012;
- Society of Exploration Geophysicists/Society of Petroleum Engineers Joint Workshop on Injection Induced Seismicity, September 2012;
- American Geophysical Union Annual Meeting, December 2012.

⁸ British Columbia Oil & Gas Commission, Investigation of Observed Seismicity in the Horn River Basin, August 2012; <http://www.bcogc.ca/document.aspx?documentID=1270&type=.pdf>

⁹ Revised Draft SGEIS 2011, Page 4-25, Figure 4.13.

¹⁰ Generally in a traffic light system, there are three operational states:

- Green Light = "Go." Drilling can proceed normally.
- Yellow Light = "Caution." Seismicity detected above a threshold level; earthquake data are analyzed and compared to drilling locations; drilling activities such as injection rates and volumes are modified.
- Red Light = "Stop." Seismic event above critical threshold; all drilling activity is suspended while an investigation is conducted.

The trigger points between green and yellow and, perhaps most importantly yellow to red, are site-specific and depend on background seismicity levels and identified risks.

¹¹ 6 NYCRR § 621.13.

In brief, such a system would rely on a dense seismic array,¹² which would need to be installed in the area of concern. If earthquakes are triggered with a magnitude above a pre-determined level, regulators, and in this case water supply operators, would be notified immediately; scientists would be able to quickly and more accurately determine the epicenter, and well activities could be shut down if required. The earthquake epicenter and source characteristics combined with the locations and recent history of nearby wells could determine which well and which fault are the likely cause. Application of a traffic light regulatory approach would not only protect the water supply infrastructure but would also provide valuable technical and scientific information to inform future well siting and design of hydraulic fracture events. This could be done as a multi-agency cooperative project that builds capacity over time and is modified iteratively over time, based on the information gathered (i.e., levels of induced seismicity).

In closing, we again thank DEC for the critical protection that a ban on HVHF in the watershed provides to the nine million consumers of the NYC water supply. We look forward to discussing these important remaining issues in the future as partners in our efforts to protect this invaluable resource.

Very truly yours,



Carter H. Strickland, Jr.

- c: Nirav R. Shah, Commissioner, New York State Department of Health
- Judith Enck, Regional Administrator, U.S. Environmental Protection Agency, Region 2
- Marc Gerstman, Executive Deputy Commissioner, DEC
- Steve Russo, General Counsel, DEC
- Eugene Leff, Deputy Commissioner, DEC
- James Tierney, Assistant Commissioner, DEC
- Philip Bein, Watershed Inspector General, New York State Attorney General's Office

¹² Such a seismic monitoring system is not currently in place. In its response to comment 5871, DEC notes: Seismic monitoring systems are already in place for New York and are described in Section 4.5.5. There are forty seismograph locations located in NY and six surrounding states (CT, DE, MD, NJ, PA, and VT). In NY, there are sites in Albany, NYC, Cobleskill, Lake Ozonia, Binghamton, and two secondary schools, three colleges, and 15 universities across the states.

These sites are too few and too far apart to provide meaningful data to support a traffic light system.