



January 11, 2013

Attn: Draft HVHF Regulations Comments  
New York State Department of Environmental Conservation  
625 Broadway  
Albany, NY 12233-6510

These comments are submitted on behalf of Delaware Riverkeeper Network (DRN) to New York State Department of Environmental Conservation (DEC) on the revised proposal to amend 6 NYCRR Parts 52, 190, 550-556 and Subpart 750-1, and to add Part 560 and Subpart 750-3, to address high-volume hydraulic fracturing (HVHF) for natural gas. DRN is also submitting joint comments with organizations through a joint submission. These comments are in addition to the joint comments and are made independently solely on behalf of DRN.

DRN incorporates herein comments and reports the organization submitted in January 2012 on Proposed Regulations for HVHF and on Sections 6.4, 7.4 and 6.1 and 7.1 of the Revised dSGEIS. Included with this submission is a copy of a report commissioned by DRN prepared for the Delaware River Basin Commission's (DRBC) draft natural gas development regulations (April 2011) by Paul Rubin, hydrogeologist. (**Attachment 1**) This report was also submitted with a comment letter in 2012 to DEC on the Proposed Regulations for HVHF and Sections 6.1 and 7.1 of the revised dSGEIS. The report contains technical information that, while specifically addressing DRBC proposed regulations, is relevant to DEC's proposed revisions. Also attached is a copy of DRN's comment dated January 9, 2012 on the Proposed Regulations for HVHF and Sections 6.4 and 7.4 of the revised dSGEIS submitted to DEC with two reports commissioned by DRN - Kevin Heatley, Restoration Ecologist and John Nystedt, Landscape Architect. (**Attachment 2**)

## **General Comments and Introduction**

DRN does not consider the proposed regulations, including these proposed revisions, to provide adequate protection from significant adverse environmental and public health impacts from gas drilling employing HVHF. DRN opposes the adoption of the proposed regulations and advocates that DEC withdraw these proposals. Few of the recommendations made by DRN, in the joint

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comments we filed with others and by other members of the public during the public comment period that expired in January 2012, have resulted in DEC changing its original proposals. This is a lost opportunity for DEC since there were informed comments submitted that could greatly improve these regulations. DRN asks that DEC reconsider the public comments that were made on the proposed regulations in the prior public comment period. It is not possible for DEC to propose effective regulations based on its responsibility to address environmental impacts when the underlying environmental analysis is not complete and what is complete is gravely flawed because of missing and inaccurate information and a lack of incorporation of sound public input.

Overall, DEC has not completed adequate analysis, scientific study, or inquiry into the potential impacts of HVHF on the State's environment, communities, and public health. DEC has not satisfied its own requirements that must be met before approval of regulations and has not even completed the SGEIS, an essential task that should be done before regulations are finalized. DEC has not completed a health review it is presently conducting regarding the human health impacts of HVHF, an essential piece of homework. DEC is not prepared to permit HVHF due to the lack of needed safeguards and, as is further discussed under Section Comments below, cannot move ahead with these proposed regulations and revisions without endangering the state's residents and environment. We request that these proposed revisions be rescinded and further essential analyses be completed.

### **Comments on Specific Sections of Proposed Revisions**

DRN proposed changes to these sections in joint and individual comments as did many other commenters and yet in many instances no changes were made by DEC based on that input and no justification provided. DEC's proposed revisions of these sections are not substantiated technically or scientifically and DEC does not explain why they have decided on the proposals or how environmental considerations have factored into the decisions that DEC has made.

#### 6 NYCRR Section 553.2 Surface Restrictions and Section 750-3.3(a)(2), (a)(4), (a)(6)

DRN does not agree with the conclusions in the revised dSGEIS, which provides a basis for DEC's decision to make no changes to Section 553.2, that: it is unlikely that fluids will migrate to the aquifer from a wellbore for hydraulic fracturing; that gas migration is solely a function of poor well construction; and that there is no significant adverse impact to water resources from migration of fracturing fluids, assuming that the targeted nature of hydraulic fracturing insures that fractures do not leave the fractured zone.

As explained by Mr. Rubin, aquifers need to be protected into the future and the long life of aquifers and their irreplaceable nature require that the measures used to isolate gas and pollutants from water must be long-lived as well. (**Attachment 1**) Cement and steel casing now available and employed will fail in 100 years or less. This means that wells will inevitably leak gas and contaminated fluids into aquifers within 100 years, adversely impacting the use of

groundwater by future generations, as illustrated in the Aquifer Protection Fact Sheet by Rubin, attached. (**Attachment 3**)

Even if cement were to successfully isolate contaminants from aquifers and surface waters and land, naturally occurring and seismically induced vertical fractures or other conduits such as water wells or abandoned gas wells, or HVHF-induced fractures that leave the target zone and enter other formations can be expected to allow contaminated fluids and gas to migrate to water supplies, to the land surface, and to other non-target receptors, as illustrated by Rubin's Seismic Fact Sheet, attached (**Attachment 4**) and as explained by Myers (Tom Myers, "Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers", Ground Water©2012,National GroundWater Association.doi: 10.1111/j.1745-6584.2012.00933.x). The proposed setbacks will not protect water sources from contamination from HVHF and no justification is provided by DEC for the inadequate setbacks that are proposed.

Change recommended: These sections should be revised agreeing with the recommendation of Paul Rubin as discussed below – a minimum 2100 foot setback from all receptors including public buildings, homes, schools, water bodies, water wells, surface water bodies, wetlands and other sensitive receptors. As discussed below, the 2100 foot minimum setback must be verified by testing to be performed as described and is to be measured from the gas well array, as defined in DRN Section 750-3.3(b) comments below.

#### Section 750-3.3(a)(1) Prohibited Activities and Discharges

As explained by Rubin and Myers, contaminants can migrate through fractures from both the vertical and horizontal well bore. DEC is exposing the water supply reservoirs that contain unfiltered water supplies to contamination from HVHF by allowing drilling and fracturing under DEC's proposed 4000' buffer and reservoirs/supplies. Drilling under all water bodies such as streams, rivers, lakes, and wetlands will also expose these surface waters to potential contamination from HVHF and should therefore not be allowed.

Along with all surface waters described above, DRN specifically points out that the Wild and Scenic Delaware River should be included in the waterways where HVHF is prohibited. The Delaware River is an important feature that requires specific mitigation to prevent degradation of its exceptional water quality and natural and recreational features. The Upper Delaware Scenic and Recreational River is located in New York. Under the Wild and Scenic Rivers Act, it is protected by an anti-degradation program adopted in 1990 by the DRBC in response to a Petition filed by Delaware Riverkeeper Network. New York supported the rulemaking that created the program. New York also supported the subsequent action by the DRBC to grant the Upper and Middle Delaware River Special Protection Waters status.

The Lower Delaware River was added to the SPW program in 2008, after it was designated Wild and Scenic by Congress, again with New York's support. New York, at the head of the Delaware, impacts the entire Delaware River with its activities in its portion of the Delaware River Basin; HVHF in the New York will directly impact the river downstream. SPW classification of the

Delaware River sets a high bar that protects the River's existing high water quality and must be recognized in these regulations by disallowing HVHF.

Change recommended: DEC should prohibit HVHF under and/or within the 4000' buffer and the unfiltered water supplies identified by DEC, all surface waters and all hydrologic features such as wetlands that are hydrologically connected to groundwater, including the Delaware River and its tributaries.

#### Section 750-3.3(a)(3) HVHF Operations Prohibited within 100-year Floodplains

DEC prohibits HVHF operations within 100-year floodplains, which is justified and is stricter than neighboring Pennsylvania but the provision is inadequate and should be expanded to provide needed protection from pollution and flood damages.

Additional requirements should be added here. First, there are many floodplains that are not delineated due to the lack of Federal Emergency Management Agency mapping. Some maps are outdated (major floods have occurred and/or stream locations have shifted). Floodplain maps should be completely up to date before permits are issued adjacent to floodplains. In addition, many headwater and first order streams are not routinely mapped because they do not tip the required threshold for FEMA mapping or state stream permitting. In this event, the floodplain must be mapped at the expense of the applicant by a professional objective party based on riparian soils and available flood and stream data prior to approval of a permit.

Second, the 500-year floodplain should be used to delineate the off-limits area rather than the 100-year floodplain. The 500-year floodplain will provide important protection from flooding and reduce the pathways of direct pollution from HVHF by reflecting more accurately areas that can be expected to flood in the coming years as flood flows and frequency continue to increase and streams and rivers continue to meander. As verified by USGS, flood frequencies have increased in the Delaware River Basin, as evidenced in their analysis of recent major flood events in the basin. The report also shows that the 500-year flood flow was substantially larger than the 100 year flood flow at four stream gauges on the Delaware River during these storms. (Schopp, R.D., and Firda, G.D., "Flood magnitude and frequency of the Delaware River in New Jersey, New York, and Pennsylvania", US Geological Survey Open-File Report 2008-1203).

Third, a buffer should be added that delineates an off-limits area adjacent to the 100-year floodplain based on riparian soils. Identification of riparian soils should be accomplished by site specific soil testing and the employment of available Soil Survey information. The buffer should encompass the entire area that contains riparian soils and should measure a minimum of 500 feet added to the outside limits of the 100-year floodplain for optimum protection from erosion and stream destabilization which can contribute to increased flood damages and increased pathways of pollution from activities adjacent to the floodplain. (Fischer & Fischenich, Design Recommendations for Riparian Corridors and Vegetated Buffer Strips, emrrp, April 2000). The buffer must not be disturbed, compacted or built upon.

Fourth, the 500-year floodplain and buffer should be kept in native vegetation and not disturbed to protect water quality, reduce runoff, and prevent land cover and hydrological changes that can result in downstream flooding. The Delaware River Basin Commission's Flood Advisory Committee published a report that states why this is important. (DRBC, "Recommendations of the Floodplain Regulations Evaluation Subcommittee (FRES) of the DRBC Flood Advisory Committee (FAC)", 5.19.09), as quoted below:

Floodplains vegetated with trees and shrubs can be four times as effective at retarding flood flows as grassy areas. Naturally vegetated floodplains are generally layered with leaf and organic matter that result in organic soils with high porosity and a greater capacity for holding water. More than just being an area that can help address flooding issues in a community, the floodplain, in this natural state, is a riparian ecosystem that needs the overbank flows that the natural watershed's hydrology provides in order to remain healthy and in balance.

The floodplain and buffer should be kept in natural condition to support and protect water quality and flow regime in the adjacent waterway. The Commission's floodplain evaluation subcommittee report to the Commission's Flood Advisory Committee states that:

A naturally functioning floodplain is a hydrologically important and dynamic component of a watershed. In addition to being environmentally sensitive and ecologically diverse, floodplains provide flood storage and conveyance, protection of water quality and recharge of groundwater.

A regulatory floodplain may, or may not, encompass the natural floodplain, the area needed a watercourse to maintain its natural biologic, geomorphic and hydrologic functions. Instead, regulatory floodplains are adopted standards designed to guide floodplain development and lessen the effects of floods on the built environment.

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It is important to acknowledge that floods do not stop at regulatory floodplains, nor does the regulatory floodplain define the limit of potential flood damage or losses.

Background: Existing flood hazard area maps greatly underestimate the limit of floodways along the main stem Delaware River and other waterways within the Delaware River Basin. The flood hazard area, or floodplain, is the area along a waterway that is expected to be or has been inundated by floodwaters. The floodway, which is the inner portion of the flood hazard area nearest the stream or river, is the most dangerous area that carries deeper flows and higher velocities during a flood. New construction of structures is generally prohibited in floodways because it is unsafe and obstructs the passage of floodwaters, although removal of vegetation and construction of parking or other nonstructural activities while having an impact are often allowed. The flood fringe, or areas immediately adjacent to floodways where development is commonly allowed are often subject to flood depths and velocities similar to those of the floodway.

The Flood Hazard Area, as defined by FEMA, is composed of a floodway and a flood fringe. The flood fringe is the portion of the floodplain that lies outside the floodway. Floodwaters generally move more slowly in the flood fringe as compared with the floodway, and the flood fringe serves to temporarily store large volumes of floodwater during a flood. The space that floodwaters occupy on a given site during a flood is referred to as the "flood storage volume" of that site.

When structures or fills are placed in a flood fringe, it occupies a space that would otherwise be filled with floodwaters during a flood, thus reducing the flood storage volume on the site. If a significant volume of floodwater is prevented from occupying a given area, excess floodwater will instead occupy neighboring and downstream properties, thus worsening flood conditions on those

sites. Unless properly managed, development within floodplains can exacerbate the intensity and frequency of flooding by increasing stormwater runoff, reducing flood storage, and obstructing the flow of floodwaters. Structures constructed in the flood fringe are subject to flood damage and threaten the health, safety and welfare of both the people who occupy them and emergency responders who respond in times of flood emergency.

Historically, the earliest settlements along the eastern seaboard were established along navigable waters. As a result, many of the Delaware River basin's older communities lie partially or completely within floodplains. As development has continued within the basin over the years, increased impervious cover in the form of roads, buildings and parking lots combined with the destruction of forest and wetlands for development and agriculture has increased peak rates and the volume of runoff flowing to the streams and rivers within the basin.

Development within the floodplain obstructs flood flows and compromises the flood storage and peak attenuation contributions of a natural floodplain. In addition, it knowingly places structures, infrastructure and people in the very locations that are known and expected to be subject to flooding and flood damages. As a result, flooding that naturally occurs along waterways has become progressively more threatening and damaging to people, buildings and infrastructure as a combination of increased runoff, decreased vegetation and storage absorption capacity and additional development in floodplains occurs. It is expected that these negative trends will continue so long as buildings and structures continue to be placed in the floodplains of the streams and rivers of the Delaware River basin.

Recommendation: Protect the flood fringe in a naturally vegetated state and limit development including, but not limited to, structures, infrastructure, impervious surfaces, fill, grading and removal of vegetation.

For these four reasons DEC should expand the flood impacted area where HVHF is prohibited.

Change recommended: DEC should prohibit HVHF in 500-year delineated floodplains and within buffers that measure at least 500 feet from the 100-year floodplain or more based on site specific soils analysis that identify riparian soils. Floodplain mapping must be up to date based on the most recent return interval analyses. For areas that are not subject to FEMA or State floodplain mapping requirements, the 500-year floodplain must be mapped based on site specific riparian soil identification and local stream flow data analyzed at the expense of the applicant. The floodplain and buffer off-limits area should be left undisturbed, compacted and in natural vegetation.

### Section 750-3.3(b) Setback Measurement

All measurements in Section 750-3.3(a) should be measured from the terminus of the horizontal well bore (which in multiple wells on a pad will form a "well array") so that any fractures that leave the intended zone or that communicate with other fractures can be kept at a distance from the nearest environmental feature (water well, water body, wetland, occupied dwelling, etc.). DRN emphasizes that the recommended 2100 foot setback from the well array in Rubin's report is a minimum setback and that site specific analysis of local geology should be required to map fractures, faults, and the dip and strike of the local geology; the data gathered should be used to establish final setbacks. Also, as discussed in Paul Rubin's report an aquifer pump test should be performed to map the aquifer and reveal the likelihood of connection between the proposed gas

well and adjacent water wells and the setback distance for the specific well should be set based on this data and analysis. Because contaminants can leak into other formations, to aquifers, the land surface, and surface waters through fractures and other pathways, an expanded separation is warranted. The schematic by Rubin attached displays the setback measurement. (**Attachment 5**)

Change recommended: DEC should change this section to require the measurement of all setbacks to be from the well array, which includes the terminus of the horizontal well bore and the areas that are hydraulically fractured as illustrated in Attachment 5.

#### Section 560.7 Sections (a), (b), (c), (d), (e), (i), (j), and (k) Waste Management and Reclamation

Full and effective reclamation of the well site is critical to safeguard the environment and public health. DRN supports the removal of waste fluids and solids, including drill cuttings and pit liners, from the well site according to an approved plan by licensed professionals. DRN opposes the burial of any of this waste material on site to reduce the potential pathways for pollution. It is particularly important that no potential pollutants be allowed to be buried or permanently stored on site because of the exemption of the industry from federal CERCLA requirements, the “Superfund Law”. DRN is concerned that these sites could become points of pollution in the future and the burial or storage of these potential pollution sources will not be subject to federal cleanup requirements, leaving taxpayers to cover these costs or leaving the pollutants in the environment due to lack of a means or funding to clean them up.

We support testing of waste, soils, and equipment for radiological properties but other toxic constituents should also be tested for. To develop a comprehensive standard list of parameters, DEC must conduct further data gathering and employ the data it has already obtained and cataloged in the Revised dSGEIS Tables. The full list of parameters tested for and the results of testing should be made available publicly on DEC’s website as soon as they are complete and available.

DRN does not support the use of open pits for any waste, including drill cuttings and muds. DEC should not allow any open pits that will be used to store any waste produced by HVHF.

Changes recommended: This Section needs to be rewritten utilizing more information from the dSGEIS process, including the health analysis that is underway by the New York Department of Health and DEC. Waste management requirements when a site is being closed should be reworked based on robust data that is integrated into the planning for the reclamation of each well site. The handling, testing and final disposition of wastes when a site is closed should be prescribed based on a goal of avoiding pollution and eliminating the potential for permanent or long lived contamination of the site, water supplies resources, and the local, regional, and downstream environment. DEC should standardize the test parameters that are required for a site and should post publicly on its website all test results. DEC should prohibit the use of open pits for any waste produced by HVHF. DEC should consider if the federal CERCLA exemption can be overridden by the State to provide a mechanism and funds for clean up by responsible parties.

## Section 560.7 Section (h) and (l) Reclaimed Areas

The reclamation of a well site requires restoration of the natural conditions of the site; anything less is a degradation of the environment and is wholly unjustified due to readily available and achievable mitigation measures. DEC should require reclamation of the natural condition of the site and the re-establishing of natural vegetation, not the minimal and ineffective DEC proposal that “Reclaimed areas must be seeded and mulched after topsoil replacement”.

Additionally, the allowance for these requirements to be waived with the landowner’s consent is unacceptable. Such a waiver will allow for degraded conditions to remain or get worse, the disruption of local and regional habitats, the introduction of invasive plant and animal species, and the loss of the important multiple benefits of natural vegetation and forests, all of which have public and environmental impacts far beyond one parcel of land. Further, lack of adequate restoration/reclamation of a well site can have far-reaching off site impacts if the land is not adequately de-compacted and all impervious surfaces (including compacted soils) renovated to a pervious natural condition. Negative off site impacts can include: reduction of infiltration to groundwater leading to reduced aquifer replenishment and reduced base flow of streams and wetlands; increased erosion and sedimentation to adjacent waterways; changed drainage patterns and stream morphology and water quality; and increased flooding locally and downstream.

One of the fundamental problems with DEC’s poor approach to reclamation is the apparent acceptance that negative impacts are unavoidable, as if it is “the cost of doing business”. Contributing to DEC’s wrong conclusion is the fact that the dSGEIS does not accurately assess the potential impacts and doesn’t present an effective mitigation option to avoid degradation. This is an example of the mistake DEC is making by not completing and improving the SGEIS for HVHF before regulations are proposed or finalized. As stated in DRN’s introductory comments, it is not possible for DEC to propose valid regulations based on its responsibility to address environmental impacts when the underlying environmental analysis is not complete and what is complete is gravely flawed—this Section is clear evidence of the failure of this process.

The Heatley report (**Attachment 2**) explains the value of ecosystems in assuring water quality and quantity and how important the health of those ecosystems are in providing those benefits. The proposed permit conditions and mitigation in Section 7.4 and Appendix 10 of the SGEIS is presumably relied upon in DEC’s proposed regulation in this rulemaking. The approach should be based on ecological planning units not the cookie-cutter approach DEC uses in its proposed plan in the Revised dSGEIS.

The Nystedt report (**Attachment 2**) explains that due to DEC’s lack of guidance regarding proper site planning and design before construction, lack of sufficient guidance on plantings during the construction phase, and lack of guidance on the details of the ultimate landscape restoration plan, DEC fails to provide effective regulation of well site reclamation. Key missing pieces include: lack of protection of existing native vegetation; how to handle the site before and during construction to minimize negative impacts that can be long lived and thwart successful reclamation and



restoration; soils management that conserves and supports soil functions; and how to plant and manage a re-vegetated site to avoid degradation and provide restored ecosystem values.

As detailed in the Heatley and Nystedt reports, DEC should regulate reclamation with a goal of restoring healthy ecosystems based on ecological assessment and planning and long term management and monitoring of well sites; DEC's approach does not do this. Under what is proposed, New York's forests will rapidly degrade and the functions of these ecosystems, as well as the wildlife that depends on them, will suffer permanent decline. This mistake will cost New York and its residents, as well as all those communities downstream who rely on the water resources of the state's watersheds, such as the Delaware River Basin and the Susquehanna River Basin, millions in increased water treatment costs and lost natural resource values. These costs – increased drinking water treatment, increased flood and storm flows, billions in lost natural values, jobs, and economic activity, and the increased cost of invasive species management and ecosystem restoration -- correctly identified, should be part of the socioeconomic analysis performed by DEC for the dSGEIS but that process is not complete and does not propose to do that at present. If these costs are not prevented through ecologically based planning and maintenance, the public and private landowners will have to pay for these costs far into the future. This is not acceptable.

Changes recommended: These two Sections should be rescinded and an ecologically based planning approach to the reclamation and restoration of well sites should be developed based on the dSGEIS process.

## **Conclusion**

DEC should not proceed with the proposed revisions and should put the rulemaking process on hold until all needed studies are completed and a reasoned conclusion can be made. DRN commented in January 2012 that DEC's decision not to recommend the "no action" alternative in Sect. 9.1 of the Revised dSGEIS was not a reliable conclusion and that based on what DEC was proposing, the "no action" alternative should be the one chosen by DEC. DRN's opinion has not changed regarding these proposed revised regulations. These proposed revisions do not satisfy DEC's responsibility to "conserve, improve, and protect its natural resources and environment" or the law's requirement that DEC prevent environmental damage and enhance resources.

DRN is a nonprofit membership organization dedicated to the protection and restoration of the Delaware River Watershed representing communities - human and nonhuman - throughout its ~13,000 square miles with many members in New York State. DRN champions the rights of our communities to a Delaware River and tributary streams that are free-flowing, clean and healthy. Based on these comments and the attached expert reports, DRN respectfully requests that DEC not proceed with these proposed revisions.

Thank you for the opportunity to submit this comment.

Sincerely,



Maya K. van Rossum  
the Delaware Riverkeeper

Tracy Carluccio  
Deputy Director

**Attachments:**

**Attachment 1** Rubin Report to DRBC on Proposed Natural Gas Regulations 4.9.11

**Attachment 2** DRN Revised dSGEIS Comments, SPDES GP for Stormwater Discharges for High-Volume Hydraulic Fracturing, and Proposed Regulations for HVHF to NYDEC 1.9.12

**Attachment 3** Rubin Aquifer Protection Fact Sheet

**Attachment 4** Rubin Seismic Fact Sheet

**Attachment 5** Rubin Well Array Setback