



January 11, 2013

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

Re: Revised Proposed Regulations for High-Volume Hydraulic Fracturing

Dear Sir or Madam:

Enclosed please find the collective comments of the Catskill Mountainkeeper, Delaware Riverkeeper Network, Earthjustice, Natural Resources Defense Council, Riverkeeper, Inc., and the Sierra Club on the Revised Proposed Regulations for High-Volume Hydraulic Fracturing ("HVHF") in New York State (Revised Proposed Express Terms 6 NYCRR Parts 52, 190, 550-556, 560 and 750).

At the outset, our groups wish to register our strong objection to the decision by the New York State Department of Environmental Conservation ("NYSDEC") to revise the proposed regulations *prior* to completing the on-going environmental review process pursuant to the State Environmental Quality Review Act ("SEQRA") and the health review process being undertaken by the Department of Health ("DOH"), and to require public comment on these revisions prior to the completion of SEQRA and DOH review. The fundamental purpose of SEQRA is to inform agency decision making. 6 NYCRR § 617.1(c). Issuing the Revised Proposed Regulations prior to completing the SEQRA process turns that sound, common sense purpose on its head.

Likewise, while we agree that a review of the potential health impacts of HVHF is necessary, NYSDEC's issuance of draft HVHF regulations before the completion of that review prevents that review from serving its purpose. And we remain extremely concerned that the health review process is operating under an inexcusable veil of secrecy. While the State deserves credit for its decision to conduct such an evaluation, it should not allow its efforts to be squandered. It is not too late for the Department to correct these shortcomings; the ongoing health review still represents an unprecedented opportunity for State decision-makers to more fully consider the potential health threats of proposed HVHF and to do so before irretrievable commitments to proceed are made.

We further wish to make clear that our comments on the Revised Proposed Regulations should not be read as indicating that our groups would support a decision to proceed with HVHF at this juncture. We reaffirm our position that no decision as to whether or how to proceed with HVHF can or should be made until those review documents are complete and until we and the public more generally have had the opportunity to analyze and comment on them.

Finally, we address the critical issue of agency staffing and resources. This is a matter that we and others have raised repeatedly, including in numerous comments on the Revised Draft Supplemental Generic Environmental Impact Statement and prior Proposed Regulations. To restate the obvious, the State cannot possibly ensure that the environment and health of its residents would be protected if any drilling operations were to proceed unless state and local officials have the resources to fully and effectively oversee and enforce any final HVHF regulatory program.

We recognize that NYSDEC cannot address its severe staffing and resource limitations through regulatory revisions, and that, ultimately, legislative action would be required. But, under these circumstances, NYSDEC can – and must - refrain from finalizing any proposed HCHF regulatory program and from processing and issuing drilling permits unless and until the resource questions have been fully considered and addressed.

In July 2011, NYSDEC appointed an Advisory Panel on HVHF with the express purpose of assisting in its review of necessary staffing and resource increases to effectively and safely administer an HVHF program. At various times, NYSDEC indicated that it would not finalize a regulatory program until that Panel's work was done. Now, NYSDEC should reaffirm that commitment, and further commit that it will not make any final determinations on HVHF until the Panel has been reconvened and its recommendations received, considered and, as appropriate, acted upon by the Legislature. The same commitment should be made with respect to financial assurances, bonding requirements and any other necessary statutory measures that NYSDEC has identified as outside the scope of its regulatory authority but necessary for the responsible implementation of any final HVHF program.

To his credit, Governor Cuomo has pledged: "New York State must ensure that, if and when the State's natural gas is obtained, it does not come at the expense of human health or have adverse environmental impacts." But, as we document in the attached comments, as of today, that remains a promise that yet to be fulfilled.

Sincerely,



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**Comments Submitted to the
New York State Department of Environmental Conservation**

**on Proposed Revisions to
6 New York Codes, Rules and Regulations
Parts 52, 190, 550-556, 560, and 750**

Prepared with technical, scientific and regulatory support from:
Harvey Consulting, LLC, and Tom Myers, Ph.D.

On behalf of:
Catskill Mountainkeeper;
Delaware Riverkeeper Network;
Earthjustice;
Natural Resources Defense Council;
Riverkeeper; and
Sierra Club

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Introduction and General Comments

The following comments were prepared with the technical, scientific, and regulatory support of Harvey Consulting, LLC and Tom Myers, Ph.D. and are submitted on behalf of Catskill Mountainkeeper, Delaware Riverkeeper Network, Earthjustice, the Natural Resources Defense Council, Riverkeeper, and the Sierra Club. These comments present recommendations for improving the Revised Proposed Express Terms of 6 NYCRR Parts 52, 190, 550-556, 560, and 750 (“Revised Proposed Regulations”), which were filed with the Secretary of State by the New York State Department of Environmental Conservation (“NYSDEC” or the “Department”) on November 29, 2012. These comments should be read in the context of the detailed technical recommendations that we submitted on January 12, 2012 (“2012 Recommendations”), regarding the Revised Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program, Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Reservoirs, issued September 7, 2011 (“RDSGEIS”), as well as on the then-proposed regulations, issued September 28, 2011. We hereby reaffirm the 2012 Recommendations in full and incorporate them by reference.¹

Appendix A to these comments is a separate technical memorandum concerning how flood flows and floodplains have changed since the 1970s, when the Federal Emergency Management Agency (“FEMA”) maps referenced in the RDSGEIS were produced. Appendix A also addresses the increases in frequency and intensity of recent and future storms (and, consequently, the increases in rainfall and flooding) that have occurred and are expected to continue as a result of climate change. Appendix A expands upon the comments and recommendations regarding flooding issues that were included in the 2012 Recommendations.²

The Revised Proposed Regulations do not provide for the responsible regulation of natural gas development using high-volume hydraulic fracturing (“HVHF”) in the Marcellus shale and other low-permeability formations in New York. We respectfully request that NYSDEC examine and prepare a comprehensive response to both these comments and our 2012 Recommendations—as well as complete its review of the environmental and health impacts associated with the permitting of HVHF gas development—before finalizing the Revised Proposed Regulations.

¹ The 2012 Recommendations included the reports of Harvey Consulting, LLC (“Harvey Report”), Tom Myers, Ph.D. (“Myers Report”), Glenn Miller, Ph.D. (“Miller Report”), Ralph Seiler, Ph.D. (“Seiler Report”), Susan Christopherson, Ph.D. (“Christopherson Report”), Meliora Design LLC (“Meliora Report”), The Louis Berger Group, Inc. (“LBG Report”), Kevin Heatley, M.EPC LEED AP (“Heatley Report”), Kim Knowlton, DrPH (“Knowlton Report”), Gina Solomon, M.D., M.P.H. (“Solomon Report”), and Briana Mordick (“Mordick Report”), which appeared, respectively, as Attachments 1 through 11 to the Joint Comments of Catskill Mountainkeeper, Delaware Riverkeeper Network, Earthjustice, NRDC, and Riverkeeper on the RDSGEIS, filed January 12, 2012 (“Joint Comments”).

² See Knowlton Report.

Overall Comments

1. NYSDEC May Not Apply the Revised Proposed Regulations to Low-Permeability Gas Reservoirs Other Than the Marcellus Shale without Examining the Different and Potentially Significant Impacts of Development in Those Formations.

Of continuing concern, NYSDEC has maintained the position that the new regulations it has proposed for 6 NYCRR Part 560 will apply to HVHF gas development in low-permeability gas reservoirs other than the Marcellus shale. As previously discussed in the 2012 Recommendations, the RDSGEIS does not analyze the impacts from HVHF gas development in formations other than the Marcellus shale – *e.g.*, the Utica shale. Because the impacts associated with the development of different low-permeability gas reservoirs are formation-specific, the analysis of Marcellus development impacts contained in the RDSGEIS cannot serve as the basis for permitting HVHF gas development in all other formations throughout the State.

NYSDEC has not provided any technical, scientific, or legal justification for applying the Part 560 Revised Proposed Regulations to any formation other than the Marcellus. NYSDEC, therefore, must either expressly limit the scope of the Revised Proposed Regulations to HVHF gas development operations in the Marcellus shale only or thoroughly analyze the potential impacts of developing other low-permeability formations and revise the RDSGEIS and the Revised Proposed Regulations accordingly.

2. NYSDEC Has Provided No Environmental Analysis to Justify Application of the 6 NYCRR Parts 550–556 Regulations to Wells Fractured with More Than 80,000 but Less Than 300,000 Gallons of Water.

We reiterate our concern over the application of the 6 NYCRR Part 550–556 regulations to hydraulic fracturing operations using more than 80,000 but less than 300,000 gallons of water. The impacts of these operations were excluded from consideration under the RDSGEIS, and NYSDEC has not provided any justification for its implicit conclusion that such impacts were adequately evaluated in the 1992 Final Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program (“1992 GEIS”) or that they will be appropriately mitigated by the requirements included in the Part 550–556 regulations. As is discussed in our 2012 Recommendations, the 1992 GEIS addressed the hydraulic fracturing only of wells where 80,000 or fewer gallons of water were used and, therefore, cannot serve as the basis for the permitting of fracturing operations using more than 80,000 gallons of water.

NYSDEC has not provided any environmental analysis of the impacts associated with well fracturing that utilizes more than 80,000 but less than 300,000 gallons of water, let alone any consideration of the cumulative impacts of the permitting of such operations in conjunction with operations that use 300,000 or more gallons of water. NYSDEC cannot permit fracturing operations that use more than 80,000 but less than 300,000 gallons of water unless it first analyzes the impacts of such operations and revises the RDSGEIS and the applicable regulations accordingly.

3. NYSDEC Does Not Justify Its Refusal to Update the Part 550–556 Regulations Governing Non-HVHF Oil and Gas Wells.

NYSDEC has continued to rely on the 1992 GEIS as the basis for both the RDSGEIS and the Revised Proposed Regulations without addressing the fact that the technology available in 1992 and the practices required at that time are more than two decades old. Since 1992, numerous best technology and best management practice improvements have been made in the oil and gas industry. Nevertheless, NYSDEC

disputes the fact that its regulations are antiquated, *see* Response 3789, and proposes to retain, with little revision, existing regulations that are based on antiquated technology and practices for all oil and gas development in New York other than HVHF operations. New Yorkers, thus, are left with a technically and scientifically unsupported two-tiered system for oil and gas regulation in the State.

As currently drafted, the Revised Proposed Regulations would require industry to use standard best technology and operating practices only for HVHF wells. NYSDEC has not, but should, identify current best technology and operating practices and include those practices in regulation at Parts 550–556, so that they are applicable to all wells in New York State. Then, NYSDEC should capture in Part 560 only those unique best technology and operating practices required to develop the Marcellus shale using HVHF.

NYSDEC resists the extension of best practices to all wells by arguing throughout its Assessment of Public Comment that revising Parts 550–556 to include the best technology and operating practices now proposed only for HVHF would be unreasonable or impractical for the geothermal or shallow monitoring wells also governed by those Parts. If NYSDEC finds that widely acknowledged best practices for oil and gas wells are unreasonable or impractical for geothermal or shallow monitoring wells, it should move the regulations governing geothermal and shallow monitoring wells into a separate Part or allow for a waiver of the requirements for geothermal or shallow monitoring wells, where technically justified.

4. Generally Applicable Mitigation Measures Proposed in the RDSGEIS Should Be Codified in the Revised Proposed Regulations.

Many of the measures that NYSDEC has identified in the RDSGEIS as necessary to mitigate a variety of the major adverse environmental impacts of HVHF operations (and that our 2012 Recommendations suggested be codified in regulations) are absent from the Revised Proposed Regulations. For example, restrictions on air pollution emissions, limits on wellpad lighting use, minimization of noise levels, and best management practices for reducing impacts to ecosystems and wildlife that appear as proposed mitigation measures in the RDSGEIS still have no enforceable counterpart in the Revised Proposed Regulations. Despite its recognition of the need to protect against the air quality impacts associated with HVHF gas development, NYSDEC has not included in its proposed regulations the many specific measures—aside from some limited restrictions on well venting and flaring—that would control emissions of nitrogen oxides, sulfur oxides, sulfuric acid, particulates, benzene, formaldehyde, and other toxic pollutants.

In response to public comments calling for the codification of mitigation measures in regulations (including comments by the U.S. Environmental Protection Agency (“EPA”), *see* Comment 3831), NYSDEC contended that implementing RDSGEIS mitigation measures as permit conditions rather than as regulatory requirements will provide the Department with the flexibility necessary to best achieve its environmental protection objectives as technology advances. *See, e.g.*, Responses 3779, 3831. However, NYSDEC can maintain flexibility by adopting requirements that serve as a regulatory floor and reserving the discretion to add more stringent requirements as special permit conditions. Where site-specific differences come into play, the regulations can set forth the specific criteria that would be applied. Without minimum requirements codified in regulations, the public runs the risk that NYSDEC will eliminate mitigation measures or lower standards without any opportunity for public review.

The applicability and enforceability of important mitigation measures is made further uncertain by the inconsistencies between the Revised Proposed Regulations and the permit conditions identified in the RDSGEIS, the latter of which include a number of items that NYSDEC has not proposed to codify in its regulations. For example, the permit conditions call for limits on benzene emissions, for ongoing water well monitoring and testing, for a limit on the number of wells that may be drilled annually on a single

well pad, for radiation surveys, for the use of ultra-low sulfur fuel in equipment engines, for the implementation of visual impact and greenhouse gas emissions mitigation plans, for a Department-approved transportation plan, and for an invasive species management plan. None of these important mitigation measures are identified in the Revised Proposed Regulations. Moreover, a patchwork of requirements located in a variety of documents will be difficult for the public to understand, for NYSDEC staff to administer, and for industry to follow. Indeed, industry has made similar requests for consolidated regulation. See Comment 6094.

As our 2012 Recommendations explain, proposed mitigation measures that are intended as rules require formal promulgation as regulations pursuant to the State Administrative Procedure Act (“SAPA”). An attempt by NYSDEC to enforce the mitigation measures identified in the RDSGEIS as permit conditions applicable to all HVHF wells, without following formal rulemaking procedures, would run afoul of SAPA. If, however, NYSDEC does not intend such permit conditions to bind all applicants, then there is no guarantee that the SEQRA-required mitigation will ever be achieved. Therefore, NYSDEC must include all universally applicable mitigation measures in its regulations and reissue the Revised Proposed Regulations for public comment.

5. Many Specific Comments on the Proposed Regulations Remain Unaddressed.

Generally, we are disappointed with NYSDEC’s Revised Proposed Regulations and find the Department’s responses to public comments inadequate. NYSDEC did not address many of the issues identified in our 2012 Recommendations in either its Assessment of Public Comment or the Revised Proposed Regulations. In most instances where a response was provided, NYSDEC summarily rejected our recommendations, and those of other commenters, without providing a technical or scientific analysis or a justification for its decision, contrary to SAPA requirements.

Where commenters recommended the amendment of a specific regulation, but NYSDEC determined that the recommendation did not apply to the specified regulatory provision, the Department often dismissed the comment summarily, instead of considering how or where else the recommendation might apply. The rejection of well-supported recommendations on this basis elevates form over substance. In order to fulfill its obligation to respond to public comments, NYSDEC should revisit prior comments and clarify whether a recommendation has been rejected outright or has been accepted but incorporated into a regulatory provision other than the one identified by the commenter.

In addition, NYSDEC ignored most recommendations where the commenter suggested a revision but did not identify a specific subsection for amendment. With respect to our recommendations that did not specify the regulation to be amended, we reiterate those here and include suggestions of where they may best fit in the NYCRR.

6. Inconsistencies and Typographical Errors Should Be Eliminated.

Our examination of the Revised Proposed Regulations revealed a number of inconsistencies among the definitions and regulatory provisions included under various 6 NYCRR Parts. For example, in 6 NYCRR § 550.3(au), NYSDEC defines “potable fresh water” in virtually the same language as the definition of “fresh water supply” in 6 NYCRR § 750-3.2(b)(21). It is confusing and inconsistent to use two different terms that are defined by the same standard. Similarly, NYSDEC interchangeably uses the term “freshwater supply” and “fresh water supply” throughout 6 NYCRR § 750.3. If NYSDEC continues to use this term, it should retain one consistent spelling. There are also disparities between existing setback requirements in 6 NYCRR § 553.2 and proposed setbacks in 6 NYCRR § 560.4 and 6 NYCRR § 750-3.

NYSDEC should revise its existing regulatory provisions governing oil and gas development to provide for consistent setbacks for all drilling operations in the state.

It appears that certain requirements governing technical aspects of HVHF gas development operations have been proposed for inclusion under both Part 560 and Part 750 – *e.g.*, setback requirements are proposed for 6 NYCRR § 560.4 and 6 NYCRR § 750-3. As is noted above, NYSDEC’s current proposal should be consolidated in order to facilitate a proper understanding of the regulatory regime by industry and the public. If all requirements governing oil and gas wells are located in one place, inconsistencies and contradictions in regulatory language will be more easily eliminated. At the very least, inconsistencies between the spelling of regulatory terms—*e.g.*, “fresh water” (6 NYCRR §§ 555.5(a)(3); 560.2(b)(14)) and “freshwater” (6 NYCRR §§ 560.6(b)(2), (c)(4))—should be corrected.

In addition, many of the definitions and a number of the substantive provisions in 6 NYCRR § 750 conflict with those in the 2011 draft of the State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from HVHF. Appendix B to these comments provides a list of conflicting definitions of terms found in § 750-3.2(b) and the SPDES General Permit. The SPDES General Permit should be revised to be consistent with applicable regulatory provisions and reissued for public comment.

7. Legislative Action Should be Sought Where Necessary to Provide Critical Mitigation Prior to Finalization of the Revised Proposed Regulations.

NYSDEC’s Assessment of Public Comment identifies a number of statutory amendments that are needed to provide the Department with the legal authority to regulate Marcellus shale HVHF gas development adequately and to improve its current regulation of other oil and gas wells. To ensure that NYSDEC does not codify a set of regulations that are based on known gaps in the law and its authority, the Department should seek the required statutory amendments and defer finalization of the Revised Proposed Regulations until the necessary amendments to State law are in effect.

For example, NYSDEC noted that current law precludes the Department from requiring financial assurances that would cover adequately all liabilities that could arise from oil and gas development and dictates the maximum amount of penalties that can be imposed for violation of the regulations. Both the current maximum financial assurance amounts and the maximum penalty amounts are too low. The financial assurance requirements do not guarantee the availability of the funds necessary to restore a water supply or other natural resource in the event of contamination. In addition, the current penalty structure for violations of the oil and gas regulations provides for civil penalties no greater than \$8,000 per violation, plus \$2,000 per day for continuing violations. Such minimal penalties will have little deterrent effect as they will simply represent the cost of doing business for most oil and gas companies. These significant issues must be addressed through appropriate legislation before NYSDEC commences the permitting of HVHF gas development operations.

Specific Comments

Specific comments on NYSDEC’s Proposed Revisions to 6 NYCRR Parts 52, 190, 550-556, 560, and 750 are provided below in numeric order.

6 NYCRR § 52 and 190 Use of State Lands

Revised Proposed Regulation: NYSDEC proposes new regulations at 6 NYCRR Parts 52 and 190 that prohibit surface disturbances associated with gas well drilling on State lands but allow for the drilling of gas wells under State lands, providing in substantially similar language as follows at 6 NYCRR § 52.3 and 6 NYCRR § 190.8(ag), respectively:

Notwithstanding any other provision of this title, surface disturbance associated with the drilling of a natural gas well subject to Part 560 of this Title on State lands is prohibited and no permit shall be issued authorizing such activity. This prohibition shall apply to any pre-existing leases and any new leases issued for oil and gas development on State lands. This prohibition shall not apply to subsurface access to subsurface resources located under State lands from adjacent private areas.

Notwithstanding any other provision of this title, surface disturbance associated with the drilling of a natural gas well subject to Part 560 of this Title on State owned lands is prohibited and no permit shall be issued authorizing such activity. This prohibition shall apply to any pre-existing and new leases issued for oil and gas development on State owned lands. This prohibition shall not apply to subsurface access to subsurface resources located under State owned lands from adjacent private areas.

“Surface disturbance” is defined as “any actions taken to alter the existing vegetation or soil of a site, such as clearing, grading, filling, and excavating.” Proposed 6 NYCRR § 52.2(a)(3); § 190.0(b)(14).

Prior Comment and Response: Our 2012 Recommendations requested that the Department prohibit *all* HVHF gas development of State-owned lands, including development activities on *and under* State-owned forests, reforestation areas, wildlife management areas, and public conservation easements as well as the siting of HVHF gas development ancillary facilities on State-owned lands.

NYSDEC bases its determination that “it is not necessary to prohibit subsurface access to mineral resources underneath State lands from adjacent private lands, nor would such access be inconsistent with the purposes for which these State lands were acquired” on the assumptions that the mitigation measures identified in Sections 7.4.1.1 and 7.4.1.2 of the RDSGEIS – which are not codified in regulation – will protect terrestrial habitats and wildlife sufficiently and that permeability characteristics of shale formations subject to HVHF will prevent vertical migration of fracturing fluid. [Response 5746].

Taking NYSDEC’s justifications in turn, mitigation measures that are not included as generally-applicable regulatory requirements cannot guarantee adequate protection of the unique environmental resources that are found on State-owned lands. As discussed previously in our 2012 Recommendations and in these comments, NYSDEC should include all applicable mitigation measures in its regulations. Absent a codification of the protections that the Department itself has identified as necessary, such measures should not be relied upon to allow for HVHF gas development on State-owned lands.

The claim that vertical migration will not occur given the permeability of the Marcellus is unsupported. As explained in our 2012 Recommendations, a hydraulic fracture treatment injected into the Marcellus Shale could exit the shale formation (as in the case of an out-of-zone fracture) and place hydraulic fracture fluid into intervening strata between protected water and the Marcellus. If there is an inadequate confining layer, natural fractures, or other pathways to vertical migration, ground water contamination can occur. Moreover, the RDSGEIS includes no evaluation whatsoever of the geological characteristics

of or the impacts associated with the development of shale formations other than the Marcellus. Low-permeability gas reservoirs present at depths shallower than the Marcellus and closer to water resources have not been studied at all. Thus, NYSDEC's conclusion that vertical migration is not a risk must be reconsidered.

NYSDEC's rejection of the recommendation that all surface disturbances associated with HVHF gas development, including well site activities and pipeline construction and maintenance, be prohibited is similarly unsupported. NYSDEC's Assessment of Public Comment states that "pipelines will be permitted on State-owned lands only if certain provisions of the ECL are met" [Response 5731], but does not identify those provisions or to explain how they will protect against adverse environmental impacts. As discussed in our 2012 Recommendations, pipelines fragment forests, disturb habitats, and adversely impact aquatic organisms, resulting in the disruption of vital ecological processes. [LBG Report at 33; Heatley Report at 6-7.] Activities that jeopardize the health of the State's ecosystems should not be allowed on State-owned lands.

Recommendations: NYSDEC should prohibit subsurface access to gas reservoirs located under State-owned lands and should prohibit the construction of gas pipelines on State-owned lands.

6 NYCRR § 550-556 and 560 Use of Term "Horizontal Well"

Revised Proposed Regulations: NYSDEC proposes regulations in 6 NYCRR §§ 552, 553, 554, 556, and 560 that use a number of inconsistent terms to describe wells that are directionally drilled. In some cases, the regulations apply to all directionally drilled wells, regardless of the degree to which the wellbore is turned; however, in some cases, the regulations specifically use the term "horizontal" which, using the standard dictionary definition of "horizontal", would eliminate directionally drilled wellbores that are not turned from vertical and drilled precisely 90° to true vertical through the hydrocarbon zone.

Most wells make a gradual transition from the vertical section of the wellbore to the section running through and parallel to the hydrocarbon zone, which may not be precisely 90° to true vertical. It is not accurate to assume that a directionally drilled well is "horizontal," since a significant portion of the wellbore (and potentially all of it) is vertical or deviated at an angle less than "horizontal."

The term "horizontal well" or "horizontal wellbore" could exclude all other directionally drilled wells that are not constructed at a right angle to the vertical plane, potentially exempting wells from meeting certain requirements if the wells are not drilled on a true horizontal plane.

In 6 NYCRR § 750-3.2(b), NYSDEC has defined horizontal drilling to include a well with a vertical component, and a wellbore that is parallel to the objective formation. However, even this definition excludes wells that are directionally drilled but do not remain completely parallel to the formation throughout the entire objective formation.

We are recommending that the regulations clearly apply to all directionally drilled wells, regardless of the degree to which the wellbore is turned.

For example:

- 6 NYCRR § 552.1(a) requires an application to deepen or plug back a new "horizontal well," presumably exempting all other directionally drilled wells that are not turned 90° to true vertical. Instead, 6 NYCRR § 552.1(a) should require applications to deepen or plug back all directionally drilled wells,

- 6 NYCRR § 553.1(a)(1)-(2) and § 553.1(a)(9)-(12) require only a “horizontal well” to meet the proposed spacing requirements, presumably exempting all other directionally drilled wells that are not turned 90° to true vertical. Instead, 6 NYCRR § 553.1(a)(1)-(2) and § 553.1(a)(9)-(12) should require all directionally drilled wells to meet the proposed spacing requirements.
- 6 NYCRR § 553.1(a)(6)-(7) requires only a “horizontal wellbore” or “horizontal well” in a shale gas pool to meet the proposed spacing requirements, presumably exempting all other directionally drilled wells that are not turned 90° to true vertical. Instead, 6 NYCRR § 553.1(a)(6)-(7) should require all directionally drilled wells in a shale gas pool to meet the proposed spacing requirements.
- 6 NYCRR § 554.5(a) is more comprehensive by specifying that the exception applies to wells drilled directionally, including those drilled horizontally.
- 6 NYCRR § 554.5(d) clarifies that “controlled directional drilling” includes horizontal drilling.
- 6 NYCRR § 556.2(g)(4) exempts a new “horizontal well” within the producing horizon of a pool from submitting an application to deepen or plug back a well within the producing horizon of a pool, presumably requiring such an application from all other directionally drilled wells that are not turned 90° to true vertical.
- 6 NYCRR § 560.1(a) is more comprehensive by clarifying that the new HVHF regulations apply to all “vertical and directionally drilled wells, including horizontal wells.”
- 6 NYCRR § 560.6(c)(7) requires closed-loop tanks to be used only for “horizontal drilling” in the Marcellus Shale; presumably exempting all other directionally drilled wells that are not turned 90° to true vertical in the Marcellus, or any other directionally drilled well drilled in any other formation, including but not limited to all “other low-permeability shales.” Instead, 6 NYCRR § 560.6(c)(7) should require closed-loop tanks to be used for all wells drilled in the Marcellus.³
- 6 NYCRR § 560.7(g) requires a site-specific acid rock drainage mitigation plan only for “horizontal drilling” in the Marcellus Shale if the operator proposes to bury the cuttings onsite; presumably exempting all other directionally drilled wells that are not turned 90° to true vertical in the Marcellus, or any other directionally drilled well drilled in any other formation, including but not limited to all “other low-permeability shales.” We have requested that no cuttings be buried on site.

Recommendation: Revise the definitions of “horizontal drilling” and “horizontal well” as set forth below, and apply the revised definition throughout Parts 550, 560, and 750 to clarify that the regulations apply to all directionally drilled wells, including all wells drilled at an angle through or into the objective formation whether those wells are drilled parallel or nearly parallel through the objective formation:

‘Horizontal drilling’ shall mean the deviation of the borehole from vertical so that the borehole penetrates the objective formation in a manner parallel, or nearly parallel, to the objective formation.

³ See also our comments at “6 NYCRR § 560 Marcellus Shale Only.”

‘Horizontal well’ shall mean any well completed using “horizontal drilling,” as defined above.

6 NYCRR § 550.3(ai) and § 550.3(au) Surface Casing and Protected Water Definitions

Revised Proposed Regulation: NYSDEC proposes no changes to its surface casing definition at 6 NYCRR § 550.3(au) and did not define “protected water.”

NYSDEC’s current regulations define surface casing as:

6 NYCRR § 550.3(au): Surface casing shall mean casing extending from the surface through the potable fresh water zone.

NYSDEC’s current regulations define potable fresh water as:

6 NYCRR § 550.3(ai): Potable fresh water shall mean any water containing less than 250 parts per million of sodium chloride or 1,000 parts per million of total dissolved solids.

NYSDEC’s current regulations do not include a definition of “protected water.”

Well construction regulations at 6 NYCRR § 550–559 instruct operators to construct oil and gas wells in a manner that protects potable fresh water, *i.e.*, only water containing less than 250 ppm of sodium chloride or less than 1,000 ppm of TDS. 6 NYCRR § 550.3 (ai).

Prior Comment and Response: As we noted in our 2012 Recommendations, the NYCRR does not protect, under its definition of “potable fresh water,” water resources with less than 10,000 ppm TDS but greater than 1,000 ppm TDS, which could qualify as underground sources of drinking water (USDWs) under the Safe Drinking Water Act (SDWA). *See* 40 CFR §§ 144.3, 146.4.⁴ Regulations at 6 NYCRR § 554.1 require operators to prevent pollution to “surface or ground fresh water”; however, this term is not defined by the NYCRR, so it is unclear what additional fresh water beyond “potable fresh water” would be protected or how. We recommended revision of the surface casing definition to clarify that the setting depth should be at least 100 feet below the deepest “protected groundwater,” defined to encompass both potable fresh water and USDWs. *See* Harvey Report Recommendations Nos. 3, 4, 5, 9, and 11 and Myers Report at 4–6, for discussion of the hydrogeology of the shallow aquifers.

NYSDEC disagreed with our recommendation, stating:

The Department disagrees with the proposed change to the definition of surface casing. The existing definitions of surface casing and potable fresh water provide a clearer indication of where surface casing should extend. The use of “protected” groundwater, as suggested in the comment, would be vague. [Response 6275]

NYSDEC’s rejection of the term “protected groundwater” as vague ignores the substantial comments submitted to NYSDEC on the need to revise the regulations to protect all USDWs, as required by federal

⁴ The regulations promulgated under the SDWA define a USDW as an aquifer or part of an aquifer, which is not exempted (per 40 CFR § 146.4), and: (1) which supplies a public water system; or (2) which contains a sufficient quantity of groundwater to supply a public water system and either supplies drinking water for human consumption or contains fewer than 10,000 milligrams/liter of Total Dissolved Solids (TDS) [10,000 ppm TDS]. 40 CFR §§ 144.3, 146.4.

law, not just the limited subset of USDWs currently included in NYSDEC's potable fresh water definition at 6 NYCRR § 550.3(ai). Indeed, these detailed comments were submitted in response to the vagaries inherent in the current regulation's failure to define the term "surface or ground fresh water."

NYSDEC did not respond to the particular recommendation that protected groundwater depth be verified prior to setting casing or that the casing be set at least 100' below the deepest protected groundwater. NYSDEC's rejection of a specific, quantifiable setting depth (100') is unsupported, especially when NYSDEC currently requires a 100' setting depth in its Existing Fresh Water Aquifer Supplementary Permit Conditions Required for Wells Drilled in Primary and Principal Aquifers.⁵

The proposed surface casing definition now offers no minimum setting depth measurement at all.

Harvey pointed out that the NYCRR does not provide the operator with instructions on how to determine protected groundwater depth. The RDSGEIS explains that the depth of potable freshwater in NYSDEC is typically 850' deep, but this depth will vary across the state. Using the 850' benchmark may not sufficiently protect all groundwater covered under the SDWA. The NYCRR should be revised to provide instructions to the operator on how to estimate protected water depth in drilling applications and well construction designs. The NYCRR should require that depth be confirmed before setting surface casing.

Recommendations:

1. 6 NYCRR § 550.3(au) should be revised to read: "Surface casing' shall mean casing installed and cemented from the surface, through protected groundwater, to a point at least 100' below the deepest protected groundwater."
2. A new definition for the term "protected groundwater" should be added to 6 NYCRR § 550.3, to ensure that New York's long-term water needs are met. The new definition should provide: "Protected groundwater' shall mean potable fresh water and all underground sources of drinking water, as defined in 40 CFR §§ 144.3, 146.4, including all primary and principal aquifers."
3. The NYCRR should require that the protected groundwater depth be estimated in the drilling application to aid in well construction design. Specifically, Parts 554.4 and 560.6(c) should be amended to require that: (1) protected groundwater depth be verified with a resistivity or electric conductivity log or other sampling method during drilling, and (2) if the protected groundwater depth is deeper than estimated, an additional string of intermediate casing should be required. NYS could include a provision in the regulations allowing for a waiver of the verification requirement if there is statistically significant data in the area from prior drilling that accurately identifies the protected groundwater depth.

6 NYCRR § 550.3(bg) and § 550.3(s) Workover and Hydraulic Fracturing Definitions

Revised Proposed Regulations: NYSDEC added a new definition for "workover" at 6 NYCRR § 550.3(bg) and a new definition for "hydraulic fracturing" at 6 NYCRR § 550.3(s).

6 NYCRR § 550.3 (bg): 'Workover' shall mean any downhole operation in an existing well performed after initial completion that is designed to sustain, restore or increase

⁵2011 NYSDEC RDSGEIS, Appendix 9.

efficiency, make the well safer, or correct a known or potential environmental hazard [emphasis added].

6 NYCRR § 550.3(s): ‘Hydraulic Fracturing’ or ‘Fracturing’ shall mean a stimulation technique involving the pumping of hydraulic fracturing fluid, possibly with a proppant, into a formation to create fractures to increase formation permeability and productivity, but shall not include other operations during a workover [emphasis added].

Recommendations: The new definitions for workover and hydraulic fracturing are useful additions, but two revisions are required. The first reflects the fact that industry typically uses the term “workover” to refer to operations that require re-entry into the well to stimulate or repair the well. These operations could include a re-fracture treatment or another type of well stimulation, which should be expressly referenced in the regulation. The second clarifies that provisions applicable to fracturing also apply to re-fracturing. The terms “re-fracture” and “re-fracturing” appear later in the regulations (e.g., 6 NYCRR § 556.2(g)(6)), but are not defined. We recommend that:

1. 6 NYCRR § 550.3(bg) should be amended to add the italicized language: “‘Workover’ shall mean any downhole operation in an existing well performed after initial completion, *including re-fracturing*, that is designed to sustain, restore or increase efficiency, make the well safer, or correct a known or potential environmental hazard.”
2. 6 NYCRR § 550.3(s) should be amended to add the italicized language: ‘Hydraulic Fracturing’ or ‘Fracturing’ shall mean a stimulation technique involving the pumping of hydraulic fracturing fluid, possibly with a proppant, into a formation to create fractures to increase formation permeability and productivity, *and shall include re-fracturing*, but shall not include other operations during a workover.”
3. 6 NYCRR § 550.3 should be amended to add a definition for “re-fracturing” as follows: “‘Re-fracturing’ shall mean any hydraulic fracturing stimulation that is conducted on a well after the first hydraulic fracture stimulation has been performed.”

6 NYCRR § 551.1(a)

Revised Proposed Regulation: NYSDEC does not propose to include a requirement in 6 NYCRR § 551.1(a) that out-of-state environmental compliance records be disclosed as a condition of permitting.

Prior Comment and Response: Comments 3109 and 7798 recommended that 6 NYCRR § 551.1(a) be amended to require that out-of-state environmental compliance records be disclosed as a condition of permitting and that operators with poor records be denied permits. NYSDEC’s only response is to refer to the Department’s Record of Compliance Policy. DEC does not explain how the Policy can be implemented without disclosure of the information identified in the comments.

Recommendation: NYSDEC should require disclosure of all permit applicants’ compliance records, including at a minimum all prior administrative or judicial enforcement actions or criminal proceedings against the applicant in New York or any other state and all denials of permits in any state.

6 NYCRR § 551.5 and § 551.6 Amount of Financial Security

Revised Proposed Regulation: There is no proposed revision to the amount of financial security for wells up to 6,000’ deep. 6 NYCRR § 551.5. For wells between 2,500’ and 6,000’ in depth, NYSDEC

requires only \$5,000 financial security per well, with the overall total per operator not to exceed \$150,000.

For wells drilled more than 6,000' deep, NYSDEC is proposing a regulatory revision that requires the operator to provide financial security in an amount based on the anticipated cost for plugging and abandoning the well (6 NYCRR § 551.6). The amount of that financial security is capped at the anticipated cost of plugging and abandoning that well to an unknown amount "specified by the department."

Prior Comment and Response: NYSDEC concludes that increasing financial security amounts for wells 6,000' deep or shallower would require legislative action, because the amounts for such wells are set in statute at ECL § 23-0305(8)(k)(1). [Response 3112]

For wells more than 6,000' deep, we recommended that each operator provide a bond of at least \$100,000 per well. Additionally, we recommended that NYSDEC require Commercial General Liability Insurance, including Excess Insurance, Environmental Pollution Liability Coverage, and a Well Control Policy, of at least \$5,000,000. We recommended that if NYSDEC deviates from these financial assurance requirements, it should be justified with a rigorous economic assessment that is provided to the public for review and comment.

Our 2012 Recommendations were based on information from NYSDEC's own consultant and from practices in other states. In 2003, ICF completed a report for the New York State Energy Research and Development Authority (NYSERDA) on NYS oil and gas wells. ICF's report advised NYS that well plugging and abandonment can range from \$5,000 per well to more than \$50,000 per well depending on the well depth, well condition, site access, and site condition. ICF's 2003 report recommended that NYS consider increased financial security requirements. NYSDEC's current requirement of only \$5,000 financial security per well is clearly insufficient, as ICF determined in 2003 that the cost could be as much as \$50,000 per well. Today's cost would likely be higher than the decade-old ICF estimate, which did not contemplate the longer, more complex wells envisioned for development of the Marcellus Shale.

In Ohio, an operator is required to obtain liability insurance coverage of at least \$1,000,000 and up to \$3,000,000 for wells in urban areas. The Ohio Code at Title 15, Chapter 1509 requires:

1509.07 Liability insurance coverage. An owner of any well, except an exempt Mississippian well or an exempt domestic well, shall obtain liability insurance coverage from a company authorized to do business in this state in an amount of not less than one million dollars bodily injury coverage and property damage coverage to pay damages for injury to persons or damage to property caused by the drilling, operation, or plugging of all the owner's wells in this state. However, if any well is located within an urbanized area, the owner shall obtain liability insurance coverage in an amount of not less than three million dollars for bodily injury coverage and property damage coverage to pay damages for injury to persons or damage to property caused by the drilling, operation, or plugging of all of the owner's wells in this state. The owner shall maintain the coverage until all the owner's wells are plugged and abandoned or are transferred to an owner who has obtained insurance as required under this section and who is not under a notice of material and substantial violation or under a suspension order. The owner shall provide proof of liability insurance coverage to the chief of the division of oil and gas resources management upon request. Upon failure of the owner to provide that proof when requested, the chief may order the suspension of any outstanding

permits and operations of the owner until the owner provides proof of the required insurance coverage [emphasis added].

Except as otherwise provided in this section, an owner of any well, before being issued a permit under section 1509.06 of the Revised Code or before operating or producing from a well, shall execute and file with the division of oil and gas resources management a surety bond conditioned on compliance with the restoration requirements of section 1509.072, the plugging requirements of section 1509.12, the permit provisions of section 1509.13 of the Revised Code, and all rules and orders of the chief relating thereto, in an amount set by rule of the chief.

Fort Worth, Texas requires an operator drilling 1-5 wells to provide a blanket bond or letter of credit of at least \$150,000, with incremental increases of \$50,000 for each additional well. Therefore, under Fort Worth, Texas requirements, an operator drilling 100 wells would be required to hold a bond of \$4,900,000, as compared to \$150,000 in NYS.

In addition to the bond amount, Fort Worth, Texas also requires the operator to carry multiple insurance policies:

- 1. Standard Commercial General Liability Policy of at least \$1,000,000 per occurrence. The Standard Commercial General Liability insurance must include: "premises, operations, blowout or explosion, products, completed operations, sudden and accidental pollution, blanket contractual liability, underground resources and equipment hazard damage, broad form property damage, independent contractors' protective liability and personal injury."*
- 2. Excess or Umbrella Liability of \$5,000,000;*
- 3. Environmental Pollution Liability Coverage of at least \$5,000,000 "applicable to bodily injury, property damage, including the loss of use of damaged property or of property that has not been physically injured or destroyed; cleanup costs; and defense, including costs and expenses incurred in the investigation, defense or settlement of claims...coverage shall apply to sudden and accidental, as well as gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste material or other irritants, contaminants or pollutants."*
- 4. Control of Well Policy of at least \$5,000,000 per occurrence/combined single limit with a \$500,000 sub-limit endorsement for damage to property for which the Operator has care, custody and control; and*
- 5. Other insurance required by Texas (e.g. Workers Compensation Insurance, Auto Insurance, and other corporate insurance required to do business in the state of Texas).*

Even though NYSDEC's own consultant recommended higher financial security amounts than proposed by the agency, as we noted in our 2012 Recommendations, NYSDEC neither evaluated the financial security amounts required by other hydrocarbon producing states as benchmarks for improving NYSDEC's requirements nor provided an economic assessment to justify alternative financial security amounts.

Instead, NYSDEC pointed to limitations at ECL § 23-0305(8)(e) that limit financial security amounts and limit financial security to plugging and abandonment costs only. [Responses 3112, 3114, and 3118]. Although current law constrains the amount and type of financial security that NYSDEC may require for wells 6,000' deep or shallower, the law does not limit the type or amount of financial security that the agency can require for wells more than 6,000' deep. ECL § 23-0305(8)(k)(3) allows NYSDEC to promulgate regulations requiring "additional financial security" for wells deeper than 6,000'.

Recommendations: NYSDEC should not finalize the regulations prior to proposing and obtaining a legislative amendment that would authorize it to require adequate financial assurance from operators for all liabilities potentially arising from oil and gas development and for all wells regardless of depth. The proposed legislation should not limit NYSDEC's financial assurance requirements to the cost for plugging and abandoning a well. Instead, the legislation should authorize a combination of bonding and insurance that guarantees payment of the full costs and risks of long-term monitoring; publicly incurred response and cleanup operations; site remediation and well abandonment; and adequate compensation to the public for adverse impacts (e.g., water well contamination). Financial assurance amounts set pursuant to the legislative amendments should apply to each well, with no aggregate cap for multiple wells, and the amounts should be indexed to inflation to reflect changes in actual costs.

If NYSDEC proceeds with this rulemaking without first securing the recommended legislative amendment, it should exercise its authority to require "additional financial security" for wells more than 6,000' deep. That security should include a combination of bonding and insurance that guarantees payment of the full costs and risks of long-term monitoring; publicly incurred response and cleanup operations; site remediation and well abandonment; and adequate compensation to the public for adverse impacts (e.g., water well contamination). Financial assurance amounts should apply to each well, with no aggregate cap for multiple wells, and the amounts should be indexed to inflation to reflect changes in actual costs. If NYSDEC retains the discretion to cap required financial security, the agency should identify and justify the criteria it uses to fix the caps. Amounts should equal or exceed the amounts suggested in the 2012 Recommendations as set forth above unless NYSDEC provides an economic assessment to justify lower financial security amounts.

6 NYCRR § 552.1(a) Applications and Fees

Revised Proposed Regulation: NYSDEC proposed the following language to revise 6 NYCRR § 552.1(a):

(a) It shall be unlawful for any owner or operator to commence operations to construct the well pad or access road; drill, deepen, plug back or convert a well for oil and gas exploration, production, input, or storage purposes to any depth; or drill, deepen, plug back or convert a well for disposal, geothermal, or stratigraphic purposes to any depth greater than a true vertical depth of 500 feet until [he] the owner or operator has filed an application with the department and has received a permit as specified below. Except for the drilling of a new horizontal well exclusively within the producing horizon of a pool, this application shall not be required for deepening or plug back operations to be conducted exclusively within the producing horizon of a pool [emphasis added].

NYSDEC's proposed change would not require a permit for a disposal well drilled from the surface to 500.'

Prior Comment and Response: NYSDEC states that ECL § 23-0305(14) limits NYSDEC's jurisdiction under the Oil, Gas and Solution Mining Law to brine disposal wells drilled deeper than five hundred feet;

concluding that any regulation of disposal wells less than 500' was out of scope. [Responses 6580 and 7800].

Recommendation: NYSDEC should clarify in regulation that disposal wells drilled in NYS are, regardless of depth, prohibited from injecting waste into any USDW and must be drilled to comply with the federal UIC program.

6 NYCRR § 552.1(b) Surveyor and Engineering Requirements

Revised Proposed Regulation: NYSDEC revised 6 NYCRR § 552.1(b) to require NYS licensed land surveyors and NYS licensed professional engineers to certify plats.

Prior Comment and Response: Comment 3872 requested licensed land surveyors and licensed professional engineers to certify plats. NYSDEC agreed. [Response 3872].

Recommendation: We support this change.

6 NYCRR § 552.1(b), § 560.3(b), § 560.6(a)-(b) Location Accuracy

Revised Proposed Regulation: NYSDEC's proposed regulations use "decimal latitude and decimal longitude" throughout, including in 6 NYCRR §§ 552.1(b), 560.3(b), 560.6(a) and (b). The regulation should specify precision on the decimal. For example, 40.5 degrees is much less precise than 40.51832 degrees.

Recommendation: Require decimal latitude and decimal longitude to be reported to a 6 decimal accuracy.

6 NYCRR § 552.1(b) Water Well Location on Plat

Revised Proposed Regulation: NYSDEC did not add a requirement at 6 NYCRR § 552.1(b) to include the location and distance of private water wells within 2,000' of the proposed well.

Prior Comment and Response: Commenter 7799 requested that the plat include the location and distance of private water wells within 2,000' of the proposed well, for wells that are hydraulically fractured in NYSDEC, not just HVHF wells.

NYSDEC explained that water well location on the plat is required for HVHF as part of the EAF Addendum, but refused the request to include this requirement in NYCRR without justification. [Responses 7799 and 7805].

Recommendation: Add a requirement to include the location and distance of all items requiring setbacks from the proposed well on the well plat for all hydrocarbon wells in NYS that undergo hydraulic fracturing stimulation treatment, not just HVHF wells.

6 NYCRR § 552.1(b) Abandoned Well Location on Plat

Revised Proposed Regulation: NYSDEC did not include a requirement at 6 NYCRR § 552.1(b) to identify abandoned wells on the plat.

Prior Comment and Response: Comment 7805 recommended NYSDEC include a requirement at 6 NYCRR § 552.1(b) to identify any abandoned wells within 2,500' of the furthest fracture zone extent and to verify that the abandoned well has been effectively plugged prior to conducting hydraulic fracturing operations.

NYSDEC explained that abandoned well identification is required for HVHF wells on the well plat submitted for an Application for a Permit to Drill, but did not respond to the Commenter's recommendation that this standard be met for all wells that are hydraulically fractured in NYSDEC, not just HVHF wells. [Response 7805].

Recommendation: Include a requirement to identify any abandoned wells within 2,500' of the furthest fracture zone extent and to verify that the abandoned well has been effectively plugged prior to conducting hydraulic fracturing operations for all hydrocarbon wells in NYS that undergo hydraulic fracturing stimulation treatment, not just HVHF wells.

6 NYCRR § 552.2(b) Plat

Revised Proposed Regulations: 6 NYCRR § 552.2(b): This section specifies the requirements for a "neat, legible plat."

Recommendation: 6 NYCRR § 552.2(b) should require that the applicant include on the plat all of the items from which setbacks are required under § 553.2 and § 560.4, such that the plat can be used to verify that setbacks will be achieved. Alternatively, NYSDEC could require that the applicant submit an additional map demonstrating that setbacks will be achieved.

All information required to be disclosed to the Department under 6 NYCRR § 552.2(b) should be made publicly available on NYSDEC's website.

6 NYCRR § 552.1(c) Pre-Fracture Notice and Disclosure of Chemicals

Revised Proposed Regulation: NYSDEC did not include a requirement for pre-fracture notice and disclosure of chemicals at 6 NYCRR § 552.1(c).

Prior Comment and Response: Comment 7796 recommended pre-fracture notice and disclosure of chemicals to both the Department and the landowner, consistent with Wyoming's and Colorado's regulations. NYSDEC explained that pre-fracture notice and disclosure is required for HVHF wells under Part 560, but did not respond to the Commenter's recommendation which was to require this standard to be met for all wells that are hydraulically fractured in NYSDEC, not just HVHF wells. [Response 7796].

Recommendation: Include a requirement for pre-fracture notice and disclosure of chemicals for all wells that undergo hydraulic fracturing stimulation treatment, not just HVHF wells.

6 NYCRR § 552.1(c) Approval to Re-Fracture a Well

Revised Proposed Regulation: NYSDEC did not include a requirement at 6 NYCRR § 552.1(c) for an operator to submit a Sundry Well Notice and Report Form for re-fracture treatment of an existing well.

Prior Comment and Response: Comment 7801 recommended that NYSDEC require an operator to submit an application prior to re-fracturing a well. [Comment 7801].

NYSDEC explained that a Sundry Well Notice and Report Form for re-fracture treatment of an existing well is required for HVHF wells under Part 560, but did not respond to the Commenter's recommendation that this standard be met for all wells that are hydraulically fractured in NYSDEC, not just HVHF wells. [Response 7801].

Recommendation: Include a requirement for a Sundry Well Notice and Report Form for re-fracture treatment of an existing well for all wells that undergo hydraulic fracturing stimulation treatment, not just HVHF wells.

6 NYCRR § 552.2(c) Permit Term

Revised Proposed Regulation: 6 NYCRR § 552.2(c) proposes the following language extending the permit term from 180 days to two years.

"If the operations for which the permit is granted have not commenced and been pursued in a diligent manner within [180 days] two calendar years from the date of issuance of the permit, said permit shall expire."

Recommendation: NYSDEC should either reduce the permit term to 180 days or require that the operator resurvey and update its plat within 30 days prior to commencement of the second year, to verify continued compliance with all required surface setbacks.

6 NYCRR § 552.2(e) Verbal Issuance of a Permit

Revised Proposed Regulation: NYSDEC proposes no changes to 6 NYCRR § 552.2(e), which allows verbal approval to commence operations prior to issuing a permit, as follows:

Under unusual or emergency circumstances, or for other good cause, the department may permit the commencement of operations by verbal authority of the director prior to the issuance of a formal permit.

Prior Comment and Response: NYSDEC disagreed with several Commenters who recommended that the verbal approval authority be removed unless the rationale for and circumstances under which verbal authority are allowed are clearly laid out [Responses 3876 and 7803].

NYSDEC responded that verbal approvals are permitted under the existing regulations, but provides no justification for retention of verbal approval. NYSDEC reminds the commenters that the applicant would still be required to meet the regulations and an application would need to be on file.

NYSDEC does not explain how issuing a verbal approval ahead of a complete and thorough permit review and environmental assessment is equivalent to issuing a formal written permit approval.

NYSDEC has not provided any rationale for retaining the existing regulatory language, nor has it explained what type of unusual or emergency circumstances may occur that would prevent the agency from issuing a letter clearly stating what operations are or are not approved. The only indication of possible situations where a verbal approval might be granted is explained in Response 7803, where NYSDEC states it might issue a verbal approval for an emergency remedial operation or drilling a relief well. In both these cases an operator would need its engineering team to develop a remediation plan or

relief well plan, which can take one to several days. There is sufficient time for NYSDEC to work with the operator's engineering team to understand the proposed plan and issue an expedited written approval.

Recommendation: No operations should commence without a formal written permit approval. Even in the case of unusual or emergency circumstances, there is sufficient time for NYSDEC to issue a brief letter clearly stating what operations are or are not approved and justifying the unusual or emergency circumstances that prompted the expedited approval. If NYSDEC continues to allow operations prior to issuance of a permit, the agency should clearly delineate in the regulation the type of unusual or emergency circumstances that would warrant and justify a verbal approval and are so urgent that no written documentation can be accomplished.

6 NYCRR § 553.1(c) Three-Year Drilling Limit

Revised Proposed Regulation: NYSDEC revised 6 NYCRR §§ 553.1(a)(6) and 553.1(c) to remove the requirement to drill infill wells within a three-year period.

Prior Comment and Response: Industry Comment 6308 requested relief from the proposed requirements at 6 NYCRR § 553.1(a)(6) and 6 NYCRR § 553.1(c) to drill all infill wells from a common well pad within three years of the date that the first well in the unit commences drilling. Industry wrote:

The Part 553.1(a)(6) requirement that all horizontal wells be drilled from the common well pad within three years of the date the first well in the unit commences drilling may be unrealistic. The same is true for the 553.1(c) requirement that infill wells deemed necessary must be drilled within three years from the date the first well in the unit commences drilling. Industry recommends that Part 553.1(c) be more flexible to accommodate potential legislative changes and, therefore, should be amended to read as follows: In a spacing unit established pursuant to paragraph (6) of subdivision (e) of this section, infill wells shall be deemed necessary to satisfy the policy objectives of Part 550 of this Title [emphasis added].

NYSDEC accepted this comment by changing 6 NYCRR § 553.1(c) to eliminate the following bold text:

The department may issue permits to drill infill wells on a reasonably uniform pattern within the spacing unit after an integration order has been issued, if required, and only if it determines that drilling infill wells is necessary to satisfy the policy objectives of Part 550 of this Title. . . . In a spacing unit established pursuant to paragraph (6) of subdivision (a) of this section, infill wells shall be deemed necessary, and the number of infill wells required to satisfy the policy objectives of Part 550 of this Title must be drilled within three years of the date the first well in the unit commences drilling [emphasis added].

The effect of this revision is to eliminate completely not only the three-year deadline for drilling infill wells but also the need for any determination that the Part 550 policy objectives have been met.

Recommendation: The 2011 language of 6 NYCRR § 553.1(a)(6) and 6 NYCRR § 553.1(c), requiring that all infill wells be drilled from the common well pad within three years of the date the first well in the unit commences drilling, was derived directly from express language in ECL §§ 23-0501(1)(b)(1)(vi) and 23-0503(4). NYSDEC does not have the authority to adopt regulations that eliminate a statutory

requirement. The 2011 language of 6 NYCRR § 553.1(a)(6) and 6 NYCRR § 553.1(c) should be restored.

6 NYCRR § 553.2 Surface Restrictions

Revised Proposed Regulation: NYSDEC did not propose any improvements to existing surface restrictions at 6 NYCRR § 553.2. Existing regulations require wells to be set back at least:

- 100' from any inhabited private dwelling house without written consent of the owner;
- 150' from any public building or area which may be used as a place of resort, assembly, education, entertainment, lodging, trade, manufacture, repair, storage, traffic or occupancy by the public;
- 75' feet to the traveled part of any State, county, township, or municipal road or any public street, road or highway; and
- 50' feet from any public stream, river or other body of water.

Prior Comment and Response: NYSDEC responded that it increased the well set back to 500' for HVHF wells located near inhabited private dwellings and places of assembly, which is an improvement over the existing setback requirements of 100 and 150' respectively; however, NYSDEC did not apply the 500' standard to all wells. Nor did NYSDEC provide any scientific or technical analysis to justify its 500' distance, or to justify its decision not to increase any other surface setback distances, despite extensive comment received on this topic from a number of commenters.

NYSDEC did not adequately address Comment 4231 that recommended that NYSDEC increase well setbacks for all wells, not just HVHF wells, to:

- 500' from homes and public buildings;
- 1,000' from homes whose owners did not sign a lease;
- 1,000' from schools;
- 2,000' from any water body; and
- 5,000' from residential and municipal water well sources.

NYSDEC did not adequately address Comment 7806 that recommended NYSDEC increase well setbacks for all wells, not just HVHF wells, to:

- 3,000' from any stream, river, other body of water or private water well; and
- Adopt California's ¼ mile setback from public buildings to account for air quality impacts.

NYSDEC did not acknowledge or respond to our 2012 Recommendations on surface setbacks at all. Specifically, the Harvey Report Recommendations Nos. 61-72 proposed that NYSDEC complete the following scientific and technical assessment and establish improved surface setbacks for all wells in NYS, not just HVHF wells.

- **Recommendation No. 1:** The SGEIS should provide scientific and technical justification for each setback distance proposed to demonstrate how that distance is protective of the nearby sensitive receptor. A hazard identification analysis should be completed to assess the safe distance from human and sensitive environmental receptors to proposed shale gas drilling and

HVHF operations. The analysis should assess blowout radius, spill trajectory, explosion hazards, other industrial hazards, fire code compliance, human health, agricultural health, and quality-of-life factors. Improved setbacks as a result of this analysis should be included in the SGEIS as a mitigation measure and codified in the NYCRR.

- **Recommendation No. 2:** The SGEIS and NYCRR should allow local zoning authorities to establish more protective setbacks than statewide regulations to address unique and site-specific local concerns and community characteristics. The ability to improve local setbacks should be included in the SGEIS as a mitigation measure and codified in the NYCRR.
- **Recommendation No. 3:** The process for revising the 500' setback from primary and principal aquifers and the 2,000' setback from a public water supply in two and three years, respectfully, is unclear. NYSDEC should clarify the review process, including an explanation of its plans for public review and comment. NYSDEC should revise its regulations at 6 NYCRR § 617.4(b) to provide that the siting of any oil or gas well within 500' of a primary aquifer or within 2,000' of a public water supply is a Type I action.
- **Recommendation No. 4:** The SGEIS should examine whether waivers to the 500' private water well setback comport with federal law and the requirement to protect Underground Sources of Drinking Water (USDWs). The SGEIS should provide technical justification for any reduction in this setback, and should not allow a private well owner to reduce the setback such that it poses a risk to its water supply, as well as other user in the area. Private land owners should not be allowed to waive setbacks from private water wells and adversely affect the water quality of neighboring wells.
- **Recommendation No. 5:** The conflicting language between the 150' setback requirement and 2,000' setback requirement for lakes, rivers, and streams needs to be resolved in both the SGEIS and the NYCRR. As drafted, neither the RDSGEIS nor the NYCRR are clear which lakes, rivers, and streams would be protected by the 150' setback, and which would be protected by a 2,000' setback. NYSDEC should indicate whether it intends to apply the 150' setback only to surface water resources that are not actual or potential public drinking water supplies. NYSDEC should also explain whether the 150' set back is sufficient to protect those water resources, or whether this setback should be increased. Improved setbacks as a result of this analysis should be included in the SGEIS as a mitigation measure and codified in the NYCRR.
- **Recommendation No. 6:** The 4,000' setback from NYC and Syracuse watersheds should be added to the proposed regulatory revisions for operations associated with HVHF at 6 NYCRR § 560.4. The SGEIS and NYCRR should also clarify if activities associated with HVHF drilling and completions will be prohibited underneath the watershed as well as on the surface.
- **Recommendation No. 7:** The setback increases proposed in the RDSGEIS should apply to all oil and gas drilling in NYS and should be codified at 6 NYCRR § 553.2.
- **Recommendation No. 8:** Improved setbacks should be included in the SGEIS as a mitigation measure and codified in the NYCRR. Specifically, the SGEIS and NYCRR should be revised at 6 NYCRR § 553.2 to include the following minimum setbacks: homes, public buildings, and schools (1,320'; ¼ mile); private and public wells, primary aquifers, and other sensitive water resources (4,000'); and other water resources (660'; 1/8 mile). Additionally, NYSDEC should clarify the authority of local zoning authorities to establish minimum setbacks that are more

protective than NYS' minimum standards in order for localities to address unique and site-specific local concerns and community characteristics.

- **Recommendation No. 9:** The NYCRR should be revised at 6 NYCRR § 552.3 to allow the well location to be adjusted by 75' without a permit amendment only if all the statewide and local setback requirements are still preserved.
- **Recommendation No. 10:** The NYCRR should be revised at 6 NYCRR § 553.2 to include a wetland setback of at least 100' as described in the RDSGEIS.
- **Recommendation No. 11:** The NYCRR should be revised at 6 NYCRR § 750-3.3, 6 NYCRR § 750-3.2, 6 NYCRR § 553.2, and 6 NYCRR § 560.4 to provide consistent setback requirements that are protective of water sources, including rivers, streams, lakes, and private water supplies.
- **Recommendation No. 12:** NYCRR and the SGEIS should clarify that setbacks are measured from the edge of the well pad. Wells should be centered on the well pad and should be set back at least 100' from the pad edge, to maximize well setbacks from sensitive receptors.

The Myers Report, an annexed portion of our comments, also recommended that:

- NYSDEC examine existing setbacks to verify if they have been successful or whether increased setbacks are warranted;
- Wells be set back at least 500' from wells and springs;
- Wells be set back at least 4,000' from primary aquifers and public water supplies; and
- Well not be placed within the 500-year flood plain.

While NYSDEC stresses the importance of establishing setbacks, it does not provide any scientific or technical assessment to demonstrate that its proposed setbacks meet its own stated criteria. Instead, NYSDEC's reasoning behind its proposed setback distances is often uncertain or unspecified.

For example, NYSDEC states that it requires setbacks "to conservatively provide a margin of safety should the operational mitigation measures fail or not be implemented in a particular instance" and that "setbacks serve as a means of helping to prevent a spill from reaching and contaminating critical water resources. Depending on the scope of the setback (**the larger the distance the greater the protection**), a spill can potentially be contained, or sufficiently delayed before reaching the water source to reduce the potential impact." [Response 6136; emphasis added]. If these are NYSDEC's primary goals, then sites that are on a flowpath either downstream or downgradient from a gas well should be farther from the gas well than a site cross-gradient or upgradient from the gas well.

In general, NYSDEC does not respond to Commenters' concerns about setbacks with logic and reasoning – it just disagrees. For example, in response to Comment 3826 about the need for increased setback distances, NYSDEC writes: "*The Department does not agree that the commenter's proposed prohibitions are necessary. Exiting Parts 550 – 559 regulations, the proposed Part 560 regulations and the prohibitions/restrictions found in the rdSGEIS provide adequate protections for the public drinking water supplies, and the environment. The presence of FIDs or faults does not mean these features are open and able to transmit fluids at depth.*" [Response 3826]. Here, NYSDEC simply asserts a disagreement and states that regulations are adequate without providing any reasoning. As for faults, some may not transmit fluids, but many do, and NYSDEC has chosen to ignore that possibility.

Recommendation: Include a requirement to increase all well surface setbacks in NYS on the basis of a scientific and technical analysis to justify all proposed surface setback distances. Respond to Comments 4231 and 7806 as wells as our 2012 Recommendations, including the Harvey Report Recommendations Nos. 61- 72 and the Myers Report recommendations on setbacks.

6 NYCRR § 553.3(f) Input from Affected Persons

Revised Proposed Regulation: In 6 NYCRR § 553.3, NYSDEC included a new requirement to seek input from all affected persons on spacing units, stating:

The Department may, upon its own initiative or at the request of the owner or operator, upon good cause shown, modify an order establishing a spacing unit or a spacing unit which conforms to statewide spacing without conducting a hearing if a finding has been made that no facts are in dispute after all affected persons have been provided a reasonable opportunity to comment. For spacing units established pursuant to paragraph (6) of subdivision (a) of section 553.1 of this Part, failure to drill infill wells pursuant to subdivision (c) of section 553.1 of this Part shall constitute good cause for the department to initiate a modification of the spacing unit.

Prior Comment and Response: Comment 7807 requested that NYSDEC define the term “affected persons” to include, at minimum, landowners and local governments and to define what constitutes a “reasonable opportunity to comment.” NYSDEC rejected the recommendation to include a local government in the definition of “affected persons” but did not define what an “affected person” is. [Response 7807]. NYSDEC stated that it responded to a comment seeking a definition of “reasonable opportunity to comment” in Response 4326; however, this response does not appear to exist.

Recommendation: NYSDEC should clearly define the term “affected persons” and “reasonable opportunity to comment” in 6 NYCRR § 553, and should include local governments in the definition of “affected persons.”

6 NYCRR § 553.4(a) Public Comment on Variance Applications

Revised Proposed Regulation: NYSDEC has proposed a revision to language in 6 NYCRR § 553.4(a) which currently provides for a mandatory public hearing when an applicant seeks an exception from a well spacing requirement. Under the proposed change, the application would instead trigger a public comment period of 15 days after NYSDEC’s publication in the Environmental Notice Bulletin (“ENB”) of a notice of intent to issue a variance to the well spacing provisions of 6 NYCRR § 553. The proposed regulations do not specify what information is required in such notice.

Prior Comment and Response: Comment 10942 states that the elimination of mandatory hearings for each variance application “severely limit[s] the role of public participation.” In Response 10942, NYSDEC states that the requirement in 6 NYCRR § 553.4 to hold a public comment period prior to scheduling a hearing makes the variance review process consistent with the public notice and hearing requirements found in other parts of ECL Article 23, such as § 23-0503(3) and § 23-0503(6). However, ECL § 23-0503(3) provides for a 30-day public comment period in contrast to the 15-day comment period proposed herein. As a result, 6 NYCRR § 553.4 is not consistent with Article 23 with regard to the required public comment timeframe.

Moreover, the public notice provision in § 553.4(a) does not specify what information must be included in the ENB notice and does not state that publication of the permit and variance application is required. NYSDEC should adopt the Uniform Procedures Act (UPA) regulatory requirements for the content of the ENB notice. As required by 6 NYCRR § 621.7(b)(6), this subsection should provide that the ENB notice contain:

(1) The applicant's name; (2) A brief description of the proposed project and its location; (3) A list of all department permits for the project for which application has been made, and identification numbers for those applications; (4) The name and telephone number of the department representative and, where applicable, of any lead agency representative to contact for further information; (5) The status of environmental reviews conducted under SEQR

Lastly, notice in the ENB alone is insufficient to alert key stakeholders of the pending variance application. Residents who would be most affected may not be aware of such an application, especially given the short timeframe provided for public comment. The UPA regulations provide that the Department may require the applicant to provide other reasonable notice of a complete application, such as distribution or posting of information, public information meetings, or translation of notices for non-English speaking communities. 6 NYCRR § 621.7(e). The regulations further require that a notice of complete application be provided to agencies that have jurisdiction to fund or to approve or that are directly undertaking the project; agencies with which the Department is required to consult prior to its determination of completeness, including but not limited to those responsible for historic preservation and costal management; and any person on a mailing list, developed by the Department, of persons interested in such projects. 6 NYCRR § 621.7(i).

In addition, the public must be granted access to the variance application and supporting documentation. Without access to the variance application and supporting materials the public cannot assess the accuracy of those documents nor comment meaningfully on the application.

Recommendation: NYSDEC should amend 6 NYCRR § 553.4(a) to provide for a 30-day comment period consistent with that required by ECL § 23-0503(3), and incorporate the language of 6 NYCRR § 621.7(b) specifying the information required in the ENB notice. NYSDEC should also make variance applications and all supporting documentation publicly available on its website. Finally, the notice of intent to issue a permit and spacing variance should be provided to all authorities listed in 6 NYCRR 621.7(i), as well as to the municipal and county chief executive officers and all residents and property owners of the spacing unit in which HVHF operations would take place.

6 NYCRR § 553.4(b) Public Hearing for Variance Applications

Revised Proposed Regulation: NYSDEC has proposed a revision to 6 NYCRR § 553.4 to eliminate the provision for a mandatory public hearing when an applicant seeks a variance from a well spacing provision.

Prior Comment and Response: Comment 10942 states that the elimination of mandatory hearings for each variance application “severely limit[s] the role of public participation.” Response 10942 does not address this concern, stating simply:

“[t]he only difference between the existing and proposed regulations is that a public comment period will provide an opportunity for the Department to receive comments on

the application before scheduling a hearing and Department staff will be provided an opportunity to determine whether a hearing is even necessary.” [Response 10942].

NYSDEC mischaracterizes the proposed change. Instead of a mandatory hearing, the change would leave such hearing wholly within NYSDEC’s discretion. When NYSDEC decides that no hearing is necessary, the public’s ability to present oral testimony and participate in NYSDEC decision-making will be eliminated.

Recommendation: NYSDEC should not modify this subsection to eliminate mandatory public hearings. If NYSDEC decides nevertheless to eliminate mandatory hearings, it should specify that the determination to hold a hearing and the hearing process pursuant to NYCRR § 553.4(b) will be governed by the UPA and its implementing regulations at 6 NYCRR § 621.8.

6 NYCRR § 554 Secondary Containment for Fuel Tanks

Revised Proposed Regulation: Proposed 6 NYCRR § 560.6(b)(1)(i) requires secondary containment for HVHF operation fuel tanks, but NYSDEC did not revise 6 NYCRR § 554 to require any improved secondary containment requirements for other wells drilled in NYS.

Prior Comment and Response: Comment 5798 requested “*Secondary containment requirements for fuel tanks should extend to all hydrocarbon drilling and high-volume hydraulic fracturing operations in New York State. The requirements should not be limited to shale gas drilling and high-volume hydraulic fracturing operations. These recommendations should be captured in 6 NYCRR 554.*”

NYSDEC only reaffirmed its plan to required improved secondary containment for HVHF well fuel tanks, but did not respond at all to the recommendation to improve secondary containment for fuel tanks used for all other wells drilled in NYS. [Response 5798].

Recommendation: NYSDEC should revise 6 NYCRR § 554 to require improved secondary containment requirements for all wells drilled in NYS, or provide a technical basis for requiring improved secondary containment for some fuel tanks and not others.

6 NYCRR § 554 Casing Requirements for All Wells

Revised Proposed Regulation: NYSDEC did not include improved regulations under Part 554 for conductor, surface, intermediate and production casing for hydrocarbon wells drilled in NYS that do not meet the HVHF definition.

Prior Comment and Response: NYSDEC did not respond our 2012 Recommendations that casing requirements be improved for all wells, not just HVHF wells (see Harvey Report Recommendations for conductor, surface, intermediate and production casing, which are reproduced in full below).

Recommendations:

NYSDEC should revise its Part 554 regulations to include best practice for oil and gas well construction for all wells drilled in NYS, or provide technical and scientific data and analysis to explain why only HVHF wells deserve to be constructed to current best practice standards and all other wells do not.

Recommendations for Conductor Casing:

Conductor casing requirements listed in the Proposed Supplementary Permit Conditions for HVHF and Existing Fresh Water Supplementary Permit Conditions Required for Wells Drilled in Primary and Principal Aquifers should be codified in the NYCRR and should apply to all wells drilled in NYS, not just HVHF wells. Additionally, NYSDEC should set a conductor casing depth criterion, requiring conductor casing be set to a sufficient depth to provide a solid structural anchorage. Regulations should specify that conductor casing design be based on site-specific engineering and geologic factors. More specifically it should include:

1. New conductor casing must be set to stabilize unconsolidated sediments and isolate shallow groundwater.
2. Conductor casing must be set to a depth sufficient to provide solid structural anchorage for a diverter system, unless the operator provides sufficient technical justification to that the absence of conductor casing will not jeopardize well control.
3. Conductor casing must be new casing and be placed across the entire length of the conductor casing hole.
4. Conductor casing may be driven into the ground, or a hole may be drilled into the ground and the conductor casing set and cemented in that hole.
5. Conductor casing design and setting depth must be based on engineering and geologic factors relevant to the immediate vicinity, including the presence or absence of hydrocarbons, and potential drilling hazards.
6. Conductor casing set in a drilled hole must be cemented by filling the annular space with cement from the shoe to the surface. At least two centralizers must be run with one at the shoe and one at the middle of the casing string. Operator must verify cement is returned to the surface and that the annular space is completely filled with cement.
7. A mechanical or cement seal must be installed at the surface to block downward migration of surface pollutants.

Recommendations for Surface Casing:

Surface Casing Setting Depth: NYSDEC should include 100' protection for all oil and gas wells. Additionally, NYSDEC needs to clarify whether this setting depth is intended to protect potable freshwater only, or include a broader definition of protected groundwater, which would result in deeper surface casing depths. Surface casing must be set deep enough and into a competent formation to ensure the BOP can contain any formation pressure that may be encountered when drilling the next section of the hole below the surface casing shoe. This requirement should apply to all NYS wells.

Protected Water Depth Verification: The freshwater depth should be estimated in the drilling application to aid in well construction design. The actual protected water depth should be verified with a resistivity or electrical conductivity log or other sampling method. If the actual protected water depth extends beyond the estimated protected water depth, an additional string of intermediate casing should be required. This requirement should apply to all NYS wells.

Cement Sheath Width: A cement sheath of at least 1-1/4" should be installed on all oil and gas wells. Thin cement sheaths are easily cracked and damaged. This requirement should apply to all NYS wells.

Amount of Cement in Annulus: The surface casing annulus should be completely filled with cement; this should be clearly specified. There should be no void space in the annulus. This requirement should apply to all NYS wells.

Shallow Gas Hazards: If a shallow gas hazard is encountered, surface hole drilling must stop and surface casing must be set and cemented before drilling deeper into hydrocarbon resources. All oil and gas well designs and applications should plan for shallow gas hazards. Any shallow gas hazards encountered while drilling should be recorded. This requirement should apply to all NYS wells.

Excess Cement Requirements: 25% excess cement is standard practice, unless a caliper log is run to more accurately assess hole shape and required cement volume. This requirement should apply to all NYS wells.

Cement Type: The cement must conform to API Specification 10A, Specifications for Cement and Material for Well Cementing (April 2002 and January 2005 Addendum). Further, the cement slurry must be prepared to minimize its free water content, in accordance with the same API specification, and it must contain a gas-block additive. HVHF cement quality requirements (including API specifications and the use of gas-blocking additives) is best practice. Cement must include additives in areas where CO₂ and H₂S, and other lithologic and physical conditions exist surrounding the wellbore to protect the casing from corrosion and the cement from subsequent deterioration and resist degradation by chemical and physical conditions anticipated in the well. These practices should apply to all wells, not just HVHF wells.

Cement Mix Water Temperature and pH Monitoring: Best practice is for the free water separation to average no more than six milliliters per 250 milliliters of tested cement, in accordance with the current API RP 10B. Best practice is to test for pH to evaluate water chemistry and ensure cement is mixed to manufacturer's recommendations. This requirement should apply to all NYS wells, not just HVHF wells.

Lost Circulation Control: Lost circulation control is best practice. This requirement should apply to all NYS wells, not just HVHF wells.

Spacer Fluids: The use of spacer fluids to separate mud and cement, to avoid mud contamination of the cement, is best practice. This requirement should apply to all NYS wells, not just HVHF wells.

Hole Conditioning: Hole conditioning before cementing is best practice. Require mud to be circulated and conditioned with a minimum of two hole volumes; adjusting drilling fluid rheology to optimize conditions for displacement of the drilling fluid and ensuring that the wellbore is static and that all gas flows are killed. This requirement should apply to all NYS wells, not just HVHF wells.

Cement Installation and Pump Rate: The requirement for cement to be pumped at a rate and in a flow regime that inhibits channeling of the cement in the annulus is a good practice. Float valves must be used and verified to have held to prevent cement backflow in the drill string. This requirement should apply to all oil and gas wells, not just HVHF wells.

Rotation and Reciprocation: Rotating and reciprocating casing while cementing is a best practice to improve cement placement. This requirement should apply to all NYS wells.

Centralizers: The proposed conditions reference an outdated API casing centralizer standard. Best practice is to use at least two centralizers and follow API RP 10D-2 (July 2010). This requirement should apply to all NYS wells, not just HVHF wells.

Casing Quality: New casing should be used in all wells. Once installed, surface casing remains in the well for the life of the well, and typically remains in place when the well is plugged and abandoned. It is important that the surface casing piping string (known as "the water protection piping string") is of high quality to maximize the corrosion allowance and life-cycle of the piping. The installation of older, used, thinner pipe, with less remaining corrosion allowance, may be a temporary solution, but not a long-term investment in groundwater protection. Used piping may pass an initial pressure test; however, it will not last as long as new piping, and will not be as protective of water resources in the long-term.

Casing Thread Compound: The requirement to use casing thread compound that conforms to API RP 5A3 (November 2009) is a good practice. This requirement should apply to all oil and gas wells, not HVHF wells.

Drilling Mud: The use of compressed air or WBM (with no toxic additives) is best practice when drilling through protected water zones. This should be a requirement for all NYS wells.

Cement Setting Time: Best practice is to have surface casing strings stand under pressure until the cement has reached a compressive strength of at least 500 psi in the zone of critical cement, before drilling out the cement plug or initiating a test. Additionally, the cement mixture in the zone of critical cement should have a 72-hour compressive strength of at least 1,200 psi. This requirement should apply to all NYS wells.

NYS Inspectors: Best practice is to have a state inspector on site during cementing operations, to verify surface casing cement is correctly installed, before attaching the blowout preventer and drilling deeper into the formation. This requirement should apply to all NYS wells.

Cement QA/QC: Circulating cement to the surface is one indication of successfully cemented surface casing, but it is not the only QA/QC check that should be conducted. Cement circulation to surface can be achieved even when there are mud or gas channels, or other voids in the cement column. Circulating cement to the surface also may not identify poor cement to casing wall bonding. These integrity problems, among others, can be further examined using a cement evaluation tool and temperature survey.

Formation Integrity Test: It is best practice to complete a formation integrity test to verify the integrity of the cement in the surface casing annulus at the surface casing shoe. The test should be conducted after drilling out of the casing shoe, into at least 20 feet, but not more than 50 feet of new formation. The test results should demonstrate that the integrity of the casing shoe is sufficient to contain the anticipated wellbore pressures identified in the application for the Permit to Drill. This requirement should apply to all NYS wells.

BOP Installation: The Appendix 8 requirement is best practice. Additionally, the surface casing should be pressure tested to ensure it can hold the required working pressure of the BOP. This requirement should apply to all NYS wells.

Record Keeping: Best practice is to keep permanent records for each well, even after the well is plugged and abandoned ("P&A'd"). This information will be needed by NYSDEC and industry during the well's operating life, will be critical for designing the P&A, and may be required if the well leaks post-P&A.

This requirement should apply to all NYS wells, not just HVHF wells. P&A'd wells do occasionally leak, and well information is may be needed to develop a re-entry, repair, re-P&A plan.

Additional Casing or Repair: NYSDEC should reserve the right to require industry to install additional cemented casing strings in wells, and repair defective casing or cementing, as deemed necessary for environmental and/or public safety reasons. This requirement should apply to all wells, not just HVHF wells.

Pressure Testing: Casing and piping should be pressure tested. Complete a formation integrity test to verify the integrity of the cement in the surface casing annulus at the surface casing shoe. The test must be conducted after drilling out of the casing shoe, into at least 20 feet, but not more than 50 feet of new formation. The test results must demonstrate that the integrity of the casing shoe is sufficient to contain the anticipated wellbore pressures identified in the application for the Permit to Drill. Pressure test surface casing should be pressure tested to ensure it can hold the required working pressure of the BOP.

Intermediate Casing Recommendations for All Wells:

Setting Depth: Best practice is to set intermediate casing at least 100' below the deepest protected groundwater, to seal off anomalous pressure zones, lost circulation zones, and other drilling hazards. Although intermediate casing setting depth is site specific, there should be criteria for determining that depth. This requirement should apply to all NYS wells.

Protected Water Depth Verification: The freshwater depth should be estimated in the drilling application to aid in well construction design. The actual protected water depth should be verified with a resistivity log or other sampling method during drilling, ensuring intermediate casing protects that groundwater. This requirement should apply to all NYS wells where intermediate casing is set.

Cement Sheath Width: A cement sheath of at least 1-1/4" should be installed. Thin cement sheaths are easily cracked and damaged. This requirement should apply to all NYS wells where intermediate casing is set.

Amount of Cement in Annulus: It is best practice to fully cement intermediate casing if technically feasible to isolate protected water zones, and to seal off anomalous pressure zones, lost circulation zones, and other drilling hazards. If the casing cannot be fully cemented, most states require cement to be placed from the casing shoe to a point at least 500-600' above the shoe. This requirement should apply to all wells where intermediate casing is set.

Excess Cement: 25% excess cement is standard practice, unless a caliper log is run to assess the hole shape and required cement volume. This requirement should apply to all wells where intermediate casing is set.

Cement Type: Cement must conform to API Specification 10A, Specifications for Cement and Material for Well Cementing (April 2002 and January 2005 Addendum). The cement slurry must be prepared to minimize its free water content, in accordance with the same API specification, and it must contain a gas-block additive. HVHF cement quality requirements (including API specifications and the use of gas-blocking additives) are best practice. Cement must include additives in areas where CO₂ and H₂S, and other lithologic and physical conditions exist surrounding the wellbore to protect the casing from corrosion and the cement from subsequent deterioration and resist degradation by chemical and physical conditions anticipated in the well. However, these practices should apply to all wells where intermediate casing is installed, not just HVHF wells.

Cement Mix Water Temperature and pH Monitoring: Best practice is for the free water separation to average no more than six milliliters per 250 milliliters of tested cement, in accordance with the current API RP 10B. Best practice is to test for pH to evaluate water chemistry and ensure cement is mixed to manufacturer's recommendations. These requirements should apply to all NYS wells where intermediate casing is required, not just HVHF wells.

Lost Circulation Control: Lost circulation control is best practice. This requirement should apply to all NYS wells where intermediate casing is required.

Spacer Fluids: The use of spacer fluids to separate mud and cement, to avoid mud contamination of the cement, is best practice. This requirement should apply to all NYS wells where intermediate casing is used, not just HVHF wells.

Hole Conditioning: Hole conditioning before cementing is best practice. Require mud to be circulated and conditioned with a minimum of two hole volumes; adjusting drilling fluid rheology to optimize conditions for displacement of the drilling fluid and ensuring that the wellbore is static and that all gas flows are killed. This requirement should apply to all NYS wells, not just HVHF wells.

Cement Installation and Pump Rate: The requirement for cement to be pumped at a rate and in a flow regime that inhibits channeling of the cement in the annulus is a good practice. Float valves must be used and verified to have held to prevent cement backflow in the drill string. This requirement should apply to all oil and gas wells, not just HVHF wells.

Rotation and Reciprocation: Rotating and reciprocating casing while cementing is a best practice to improve cement placement. This requirement should apply to all NYS wells.

Centralizers: The proposed conditions reference an outdated API casing centralizer standard. Best practice is to use at least two centralizers and follow API Recommended Practice for Centralizer Placement, API RP 10D-2 (July 2010). This requirement should apply to all NYS wells where intermediate casing is installed.

Casing Quality: The use of new pipe conforming to API Specification 5CT is best practice. This requirement should apply to all NYS wells where intermediate casing is set.

Casing Thread Compound: The requirement to use casing thread compound that conforms to API RP 5A3 (November 2009) is a good practice. This requirement should apply to all oil and gas wells, not just HVHF wells.

Drilling Mud: The use of compressed air or WBM (with no toxic additives) is best practice when drilling through protected water zones. This should be a requirement for all wells during the period when drilling occurs through protected water zones.

Cement Setting Time: Best practice is to have casing strings stand under pressure until cement reaches a compressive strength of at least 500 psi in the zone of critical cement, before drilling out the cement plug or initiating a test. Additionally, the cement mixture in the zone of critical cement should have a 72-hour compressive strength of at least 1,200 psi. This requirement should apply to all NYS wells, not just HVHF wells.

NYSDEC Inspector: Best practice is to have a state inspector onsite during cementing operations. This requirement should apply to all NYS wells where intermediate casing is installed.

Cement QA/QC: The use of a cement evaluation logging tool is best practice. This requirement should apply to all wells where intermediate casing is set.

Record Keeping: Best practice is to keep permanent records for each well, even after the well is plugged and abandoned ("P&A'd"). This information will be needed by NYSDEC and industry during the well's operating life, will be critical for designing the P&A, and may be required if the well leaks post P&A. This requirement should apply to all NYS wells, not just HVHF wells. P&A'd wells do occasionally leak, and well information is may be needed to develop a re-entry, repair, re-P&A plan.

Additional Casing or Repair: NYSDEC should reserve the right to require industry to install additional cemented casing strings in wells, and repair defective casing or cementing, as deemed necessary for environmental and/or public safety reasons. This requirement should apply to all wells.

Pressure Testing: Casing and piping should be pressure tested.

Production Casing Recommendations for All Wells:

Casing Design: For all wells, it is best practice for the productive horizon(s) to be determined by coring, electric log, mud-logging, and/or testing to aide in optimizing final production string design and placement. Casing used to isolate protected water must not be used as the production string in the well in which it is installed, and may not be perforated for purposes of conducting a hydraulic fracture treatment through it. It is best practice to install production casing on a case-by-case basis for most wells; however, it is best practice to install a full string of production casing on HVHF wells to provide a conduit for the HVHF job and provide an extra layer of casing and cement.

Cement Sheath Width: A cement sheath of at least 1-1/4" should be installed on all oil and gas wells. Thin cement sheaths are easily cracked and damaged. This requirement should apply to all NYS wells.

Amount of Cement in Annulus: Cementing production casing to surface if technically feasible (becomes more difficult with increasing depth), or at least 500' into the intermediate casing string is best practice. This requirement should apply to all NYS wells where production casing is set.

Excess Cement Requirements: 25% excess cement is standard practice, unless a caliper log is run to assess the hole shape and required cement volume. This requirement should apply to all wells where production casing is set.

Cement Type: Cement must conform to API Specification 10A, Specifications for Cement and Material for Well Cementing (April 2002 and January 2005 Addendum). Further, the cement slurry must be prepared to minimize its free water content in accordance with the same API specification and it must contain a gas-block additive. HVHF cement quality requirements (including API specifications and the use of gas-blocking additives) are best practice. Cement must include additives in areas where CO₂ and H₂S, and other lithologic and physical conditions exist surrounding the wellbore to protect the casing from corrosion and the cement from subsequent deterioration and resist degradation by chemical and physical conditions anticipated in the well. However, these practices should apply to all wells where production casing is installed, not just HVHF wells.

Cement Mix Water Temperature and pH Monitoring: Best practice is for the free water separation to average no more than six milliliters per 250 milliliters of tested cement, in accordance with the current API RP 10B. Best practice is to test for pH to evaluate water chemistry and ensure cement is mixed to

manufacturer's recommendations. These requirements should apply to all NYS wells where production casing is required, not just HVHF wells.

Lost Circulation Control: Lost circulation control is best practice. This requirement should apply to all NYS wells where production casing is required.

Spacer Fluids: The use of spacer fluids to separate mud and cement, to avoid mud contamination of the cement, is best practice. This requirement should apply to all NYS wells where production casing is used, not just HVHF wells.

Hole Conditioning: Hole conditioning before cementing is best practice. Require mud to be circulated and conditioned with a minimum of two hole volumes; adjusting drilling fluid rheology to optimize conditions for displacement of the drilling fluid and ensuring that the wellbore is static and that all gas flows are killed. This requirement should apply to all NYS wells, not just HVHF wells.

Cement Installation and Pump Rate: The requirement for cement to be pumped at a rate and in a flow regime that inhibits channeling of the cement in the annulus is a good practice. This requirement should apply to all oil and gas wells, not just HVHF wells.

Rotation and Reciprocation: Rotating and reciprocating casing while cementing is a best practice to improve cement placement. This will become more difficult with a deviated wellbore, but should be attempted if achievable. This requirement should apply to all NYS oil and gas wells, not just HVHF wells.

Centralizers: Best practice is to use at least two centralizers and follow API Recommended Practice for Centralizer Placement, API RP 10D-2 (July 2010). This requirement should apply to all NYS wells where production casing is installed.

Casing Quality: The use of new pipe conforming to API Specification 5CT is best practice. This requirement should apply to all NYS wells where production casing is set.

Casing Thread Compound: The requirement to use casing thread compound that conforms to API RP 5A3 (November 2009) is a good practice. This requirement should apply to all oil and gas wells, not just HVHF wells.

Cement Setting Time: Best practice is to have casing strings stand under pressure until cement reaches a compressive strength of at least 500 psi in the zone of critical cement, before drilling out the cement plug or initiating a test. This requirement should apply to all NYS wells, not just HVHF wells.

NYSDEC Inspector: Best practice is to have a state inspector onsite during cementing operations. This is more typical for surface and intermediate casing, but can be considered for production casing as well.

Cement QA/QC: The use of a cement evaluation logging tool is best practice. This requirement should apply to all wells where production casing is set.

Record Keeping: Best practice is to keep permanent records for each well, even after the well is P&A'd. This information will be needed by NYSDEC and industry during the well's operating life, will be critical for designing the P&A, and may be required if the well leaks post P&A. This requirement should apply to all NYS wells, not just HVHF wells. P&A'd wells do occasionally leak, and well information is may be needed to develop a re-entry, repair, re-P&A plan.

Additional Casing or Repair: NYSDEC should reserve the right to require industry to install additional cemented casing strings in wells, and repair defective casing or cementing, as deemed necessary for environmental and/or public safety reasons. This requirement should apply to all wells, not just HVHF wells.

Pressure Testing: Casing and piping should be pressure tested.

6 NYCRR § 554 Prohibit Fracture Treatment Additives

Revised Proposed Regulation: NYSDEC did not add any new regulations at 6 NYCRR § 554 to limit the type of chemicals used in hydraulic fracture or re-fracture treatments.

Prior Comment and Response: Our 2012 Recommendations requested that NYSDEC: develop a list of recommended/approved fracture treatment additives that have been scientifically and technically reviewed by NYSDEC and NYSDOH and confirmed to pose little or no risk to human health or the environment; develop a list of prohibited fracture treatment additives based on the known list of chemicals currently used in hydraulic fracturing; and develop a process to evaluate newly proposed chemicals to determine if they should be allowed or prohibited. *See Harvey Report Recommendations Nos. 37 and 39.*

NYSDEC did not respond to this comment.

Recommendation: NYSDEC should revise 6 NYCRR § 554 to include a list of prohibited fracture treatment additives based on the known list of chemicals currently used in hydraulic fracturing. The list of prohibited fracture treatment additives should apply to all hydraulic fracture treatments, not just HVHF treatments. NYSDEC should also develop a process to evaluate newly proposed hydraulic fracturing chemical additives to determine whether they should be added to the prohibited list. No chemical should be used until NYSDEC and/or the NYSDOH has assessed whether it is protective of human health and the environment, and has determined whether or not it warrants inclusion on the list of prohibited hydraulic fracturing chemical additives for NYS. The burden of proof should be on industry to demonstrate, via scientific and technical data and analysis and risk assessment work, that the chemical is safe.

In addition to a list of prohibited chemicals, NYSDEC should develop a list of recommended/approved fracture treatment additives that have been scientifically and technically reviewed by NYSDEC and NYSDOH and confirmed to pose little or no risk to human health or the environment. This list could be provided to industry for immediate use and would provide industry with a simplified list of chemicals that have already been determined to pose the least risk. Any chemical not found on this list, or on the list of prohibited chemicals, could be proposed by industry for future use but would be subject to an in-depth scientific and technical justification and risk assessment review process before being added to the approved chemical list for NYS.

6 NYCRR § 554 Hydrogen Sulfide

Revised Proposed Regulation: NYSDEC did not add any new regulations at 6 NYCRR § 554 to require close monitoring of hydrogen sulfide (H₂S) for human health protection and explosion mitigation.

Prior Comment and Response: Our 2012 Recommendations requested that NYSDEC require H₂S monitoring and reporting requirements. *See Harvey Report Recommendation No. 84.*

NYSDEC did not respond to this comment.

While NYS did include a requirement for industry to meet its own unspecified “industry standards” if H₂S is encountered at a HVHF well (6 NYCRR § 560.6(c)(4)), there is no requirement to monitor, report or notify the public. The very limited H₂S requirements at Part 560 apply only to HVHF wells and would not apply to all other wells drilled and operated in NYS that could present a H₂S hazard.

Recommendation: NYSDEC should revise 6 NYCRR § 554 to include H₂S monitoring and reporting requirements. Operators should be required to follow H₂S detection and handling procedures to protect employees and the public. Initial H₂S testing should be conducted at each well pad. Subsequent test frequency should be based on the results of initial testing. H₂S levels can increase over time as gas fields age and sour. H₂S requirements should be included in the regulations for both drilling and production operations, and should not just be relegated to a drilling permit condition. Additionally, when H₂S is present, nearby neighbors, local authorities, and public facilities should be notified, and provided information on the safety and control measures that the operator will undertake to protect human health and safety. In cases where elevated H₂S levels are present, audible alarms should be installed to alert the public when immediate evacuation procedures are warranted.

6 NYCRR § 554 Secondary Containment for Chemical Storage

Revised Proposed Regulation: NYSDEC did not add any new regulations at 6 NYCRR § 554 to improve secondary containment requirements for well site chemical storage.

Prior Comment and Response: Our 2012 Recommendations requested that NYSDEC improve secondary containment requirements for well site chemical storage. *See Harvey Report Recommendation No. 85.*

NYSDEC did not respond to this comment.

Chemicals, especially corrosive chemicals, can result in storage container leaks and spills to the environment. Best practice for permanent chemical storage is to install secondary containment under the storage container and ensure the containers are not in contact with soil or standing water.

Recommendation: NYSDEC should revise 6 NYCRR § 554 to include secondary containment for chemicals stored on the well pad or, alternatively, require the use of double-wall tanks.

6 NYCRR § 554 Storage Tank Inspections

Revised Proposed Regulation: NYSDEC did not add any new regulations at 6 NYCRR § 554 to require storage tank inspections and alarm systems.

Prior Comment and Response: Our 2012 Recommendations requested that NYSDEC require storage tank inspections and alarm systems. *See Harvey Report Recommendations No. 97 and 98.*

NYSDEC did not respond to this comment.

Recommendation: NYSDEC should revise 6 NYCRR § 554 to require storage tank inspections and alarm systems including periodic fuel tank inspections to examine structural conditions and document corrosion or damage; the installation of high-liquid-level alarms that sound and display in an immediately recognizable manner; the installation of high-liquid-level automatic pump shutoff devices, which are

designed to stop flow at a predetermined tank content level; and a means of immediately determining the liquid level of tanks. NYSDEC should clarify whether vaulted, self-diking, and double-walled portable tanks will be allowed, and codify in the NYCRR the requirements for the use of those tanks, including inspections and spill prevention alarm systems.

6 NYCRR § 554 Reference Errors and Inconsistencies

Revised Proposed Regulations: NYSDEC did not remove the reference errors or make the surface casing requirement changes in 6 NYCRR § 554 as recommended by commenters.

Prior Comment and Response: NYSDEC did not respond to our 2012 Recommendations on reference errors and changes to surface casing requirements. *See Harvey Report Recommendation No. 10.*

Harvey recommended that NYCRR § 554.4 should be revised to be consistent with the proposed RDSGEIS surface casing conditions and to remove reference errors. 6 NYCRR § 554.4(a) provides the operator with a **choice of installing surface casing** in accordance with 6 NYCRR § 554.1(b) (which appears to be a typo and should read 554.1(d)) **or by cementing the production casing** from below the deepest potable fresh water level to the surface.

6 NYCRR § 554.1(b) is a general pollution prohibition that does not relate specifically to surface casing. 6 NYCRR § 554.1(d) provides: “*Except as hereinafter provided, sufficient surface casing shall be run in all wells to extend below the deepest potable fresh water level.*”

6 NYCRR § 554.4(a) does not provide any specific direction on the type or amount of surface casing to be installed, other than to say that it must be set below *the deepest potable fresh water level*, but the minimum depth that the casing must be set below the deepest freshwater located is not specified.

Harvey recommended that 6 NYCRR § 554.1(d) and 6 NYCRR § 554.4(a) should be combined or at least be made consistent by requiring the surface casing setting depth to be at least 100’ below protected groundwater.

6 NYCRR § 554.4(b) correctly requires that cement be placed by the pump and plug or displacement methods; that cement be placed in the entire annulus; and that there be a wait on cement time before further drilling. However, 6 NYCRR § 554.4(b) does not include the best practices listed in the permit conditions (Appendices 8 and 9). Additionally, many of the best practices included in Appendix 10 for HVHF wells should be included in regulations for all oil and gas wells.

Recommendation: 6 NYCRR § 554.1(d) and 6 NYCRR § 554.4(a) should be combined or at least be made consistent by requiring the surface casing setting depth to be at least 100’ below protected groundwater.

6 NYCRR § 554.4(b) should be revised to be consistent with the proposed Appendices 8 and 9 permit conditions. Also, the best practices listed in Appendix 10 for HVHF should apply to all oil and gas wells and be included in 6 NYCRR § 554.4(b).

6 NYCRR § 554.1(a) Surface Casing Setting Depth

Revised Proposed Regulations: NYSDEC did not improve the surface casing setting depth for oil and gas wells regulated under Part 554.

Prior Comment and Response: Comment 6371 recommended the surface casing setting depth for all oil and gas wells regulated under NYCRR § 554.1(a) be increased from 75' to 100' to provide additional water resource protection and reduce the risk of contamination. We also made this same request.

NYSDEC responded that the existing surface casing setting depth of 75' provided "adequate protection." NYSDEC provided no technical justification for retaining a 75' standard or analysis of increased protection and reduced risk associated with increasing the setting depth to 100', especially when NYSDEC currently requires a 100' setting depth in its Existing Fresh Water Aquifer Supplementary Permit Conditions Required for Wells Drilled in Primary and Principal Aquifers.⁶ [Response 6371].

Recommendation: NYSDEC should revise Part 554 to increase the surface casing setting depth to 100' or provide a technical justification for rejecting this recommendation.

6 NYCRR § 554.1(c) Drilling Fluid Type Limits Through USDWs

Revised Proposed Regulations: NYSDEC did not propose any drilling fluid type limitations when drilling through USDWs.

Prior Comment and Response: NYSDEC did not respond to our 2012 Recommendations that drilling fluid types be limited when drilling through USDWs. *See* Harvey Report Recommendation No. 40.

Recommendation: 6 NYCRR § 554.1(c)(1) should be revised to limit the types of drilling muds that can be used while drilling through subsurface formations that contain protected groundwater. Drilling muds should be limited to Water-Based Muds ("WBM") or drilling with air. Any additives required for safe drilling through the protected groundwater interval with WBM should be limited to additives that are bio-degradable, are non-toxic, and do not bio-accumulate.

6 NYCRR § 554.1(c) Baseline Aquifer Testing

Revised Proposed Regulations: NYSDEC included a new requirement for baseline water testing in Part 560 for HVHF wells under some conditions, but did not revise 6 NYCRR § 554.1(c) to require baseline testing prior to drilling other hydrocarbon wells in NYS.

Prior Comment and Response: Comment 4596 requested that NYCRR § 554.1(c) be amended to require that ". . . *the aquifer be tested for concentrations of hydrocarbons, arsenic, mercury, total dissolved solids, and radium before drilling commences so that a baseline of background concentrations is known and the Department will know whether gas well drilling and production have contaminated an aquifer.*"

NYSDEC rejected the recommendation to apply baseline testing requirements to all wells without explanation and without providing technical justification for why baseline testing is necessary only in the case of HVHF wells under some conditions. [Response 4596].

Recommendation: NYSDEC should require baseline aquifer testing for all wells subject to hydraulic fracture treatment in NYS, regardless of hydraulic fracture treatment volume and size. The detailed recommendations provided below in connection with 6 NYCRR § 560.5(d)(1)-(2) should be incorporated

⁶2011 NYSDEC RDSGEIS, Appendix 9.

into 6 NYCRR § 554.1(c), to protect water sources potentially affected by all hydraulically fractured oil and gas wells.

6 NYCRR § 554.1(c)(1) Reuse and Recycling

Revised Proposed Regulations: NYSDEC added 6 NYCRR § 554.1(c)(1), which provides in part:

The owner or operator must state in its plan that it will maximize the reuse and/or recycling of used drilling mud, flowback water and production brine to the maximum extent feasible . . .

Prior Comment and Response: NYSDEC's Response to Comments stated:

Recycling and reuse of flowback water is anticipated and encouraged by the Department. On-site processing of hydraulic fracturing fluids and reuse may not always be practical, technically viable and/or economical, and therefore it is not a requirement of the proposed regulations. [Response 3422].

Recommendation: NYSDEC should clearly define the term "to the maximum extent feasible" or revise this regulation to require all drilling mud, flowback water and production brine to be reused and recycled, whether it is processed on-site or at an off-site facility, unless the operator provides a technical infeasibility determination showing that the drilling mud, flowback water, or production brine is too contaminated to be processed for reuse.

6 NYCRR § 554.1(c) Drilling Fluid Disposal

Revised Proposed Regulations: NYSDEC did not make any improvements at 6 NYCRR § 554.1(c)(1) to drilling fluid disposal requirements.

Prior Comment and Response: Our 2012 Recommendations include improvements to drilling fluid disposal requirements. See Harvey Report Recommendation No. 41, 44, 79, 81 and 83. NYSDEC did not respond to our comments.

The NYCRR does not instruct the operator on how to properly dispose of drilling fluids. The NYCRR requires a disposal plan and that drilling fluids be removed from the well pad within 45 days; however, 6 NYCRR § 554.1(c)(1) does not provide specific instructions or criteria for acceptable drilling mud disposal plans. This problem was identified by Harvey in 2009 and is still unresolved.

This problem is magnified in light of new language in the 2011 RDSGEIS that appears to contemplate allowing drilling muds to be spread on non-active agricultural fields and other soils. The 2011 RDSGEIS includes a discussion on proposed Agricultural District requirements. One of the requirements discussed is for "spent drilling muds to be removed from active agricultural fields." The RDSGEIS is silent on provisions for non-active agricultural fields and other soils, and it is unclear what NYSDEC has planned for drilling mud disposal. NYSDEC should clarify its intentions in regards to spreading drilling muds.

The 2011 RDSGEIS correctly notes that drilling mud can be reconditioned and used at more than one well, but it must eventually be disposed. Drilling muds may contain mercury, metals, naturally occurring radioactive material ("NORM"), oils, and other contaminants. This is especially true for Marcellus Shale operations, where NORM and potential acid generating material are present in the shale drill cuttings and mud mixture. Therefore, drilling muds require proper handling and disposal.

Solid waste management regulations at 6 NYCRR Chapter IV, Subchapter B (Solid Waste) provide the authority by which the state (through the Division of Solid and Hazardous Materials) establishes standards and criteria for solid waste management operations, including landfills and land application. However, Part 554 is unclear about what disposal options will be allowed when approving a well plan.

Recommendation: 6 NYCRR § 554.1(c)(1) should be revised to provide specific instructions on the best practices for drilling mud handling and disposal, including detailed instructions on collection, testing, transportation, treatment, and disposal of waste.

1. NYSDEC should explicitly state that land and road spreading for any purpose is prohibited. Drill cuttings should be tested for NORM prior to disposal in a landfill.
2. Onsite burial of drill cuttings should be prohibited.
3. A maximum allowed NORM threshold for drill cuttings disposal in the landfill should be clearly established and scientifically justified. Testing and threshold requirements should be included in the SGEIS as a mitigation measure and codified in the NYCRR. Waste exceeding the established NORM threshold should be handled under NYS' radioactive waste handling rules.

6 NYCRR § 554.1(d) Surface Casing Requirements for All Wells

Revised Proposed Regulations: NYSDEC included improved surface casing requirements for HVHF wells in Part 560, but did not include improved practices in Part 554 that would apply to all other hydrocarbon wells.

Prior Comment and Response: Comments 6361 and 6362 stated that best surface casing practices proposed for HVHF wells are standard industry best practices that should be applied to all oil and gas wells. These requirements should be included in Part 554 (drilling practices for all oil and gas wells) and not contained just in Part 560 (drilling practices for HVHF wells).

NYSDEC responded that it would be unreasonable and/or impractical for an operator of a geothermal, monitoring, or shallow oil well to comply with the same surface casing requirements as a HVHF well [Response 6361]. NYSDEC distorts the comment by suggesting that the comment recommended HVHF surface casing requirements to be applied to geothermal or shallow monitoring wells; it did not. The recommendation was specific to improving surface casing practices of all oil and gas wells in NYSDEC. As stated above, if NYSDEC finds that these widely acknowledged best practices for oil and gas wells are unreasonable or impractical for geothermal or shallow monitoring wells, it could extract the requirements for geothermal or shallow monitoring wells into a separate NYCRR part or allow a waiver for geothermal or shallow monitoring wells, where technically justified.

NYSDEC argues that HVHF surface casing requirements could not be met by a shallow oil well, but provides no technical justification for its response and makes no effort to explain what would be unreasonable or impractical. [Response 6361].

NYSDEC is silent on why improved surface casing requirements would not be a best practice for all other oil and gas wells that do not fit the definition of a HVHF well, and are not "shallow oil wells." [Responses 6361 and 6362].

NYSDEC does not explain what constitutes a "shallow oil well," yet uses this term throughout its response to reject most best practice improvements for hydrocarbons drilled in NYSDEC that do not meet the HVHF definition, ignoring all the other oil and gas wells that don't fit within NYSDEC's "shallow oil well" or HVHF definition.

NYSDEC restates its Part 554 standard that requires surface casing to be installed 75' below potable water, but provides no technical justification for rejecting a 100' best practice standard. [Response 6361].

NYSDEC incorrectly concludes that the Harvey Report recommendations for surface casing only related to HVHF wells. [Response 6362]. Harvey clearly recommended that surface casing best practices for HVHF wells at Part 560 should also apply to all other NYSDEC oil and gas wells to modernize the Part 554 regulations which were last revised in 1992, over two decades ago. *See* Harvey Report Recommendations No. 7-14 and Appendix A.

Recommendation: NYSDEC should revise Part 554 to include best surface casing practices proposed for HVHF wells for all other oil and gas wells in the state, or NYSDEC should provide technical justification why it would be unreasonable and/or impractical to implement these best practices for oil and gas wells other than HVHF wells.

NYSDEC should respond to all the points made in our comments and comments 6361 and 6362. NYSDEC's response only addressed a fraction of the comments, and most of NYSDEC's response lacked technical justification, distorted the comment, or did not address substantive portions of the recommendations made. The recommendations listed in Comment 6361 and 6362 are all valid and should be considered seriously in the revised rulemaking.

6 NYCRR § 554.2 Well Spud Notification

Revised Proposed Regulations: NYSDEC revised 6 NYCRR § 554.2 to clarify that the county must be notified at least 24 hours prior to spudding the well, but there is no requirement to notify the local government or nearby landowners. Landowners may need time to find alternative places to stay to avoid high noise levels, especially at night.

Recommendation: Revise 6 NYCRR § 554.2 to include a requirement to notify the local government at least 24 hours prior to spudding the well, in addition to the county. Landowners within 1 mile of the well should be notified at least 7 days prior to spudding.

6 NYCRR § 554.3 Cable Tool Drilling

Revised Proposed Regulations: NYSDEC did not propose any changes to 6 NYCRR § 554.3.

Prior Comment and Response: NYSDEC did not respond to our 2012 Recommendations inquiring about the current and projected future use of cable tool drilling in NYSDEC and suggesting regulatory revisions to ensure that wells drilled using cable tool methods did not construct sub-standard wells.

Recommendation: NYSDEC should verify whether cable tool drilling is still anticipated in NYS. If cable tool drilling is still allowed, 6 NYCRR § 554.3 should be revised to require these wells be constructed to the same quality standards as wells drilled with rotary drilling equipment.

6 NYCRR § 554.4(c) Requirement for a Blowout Preventer

Revised Proposed Regulations: NYSDEC did not propose changes to 6 NYCRR § 554.4(c) to clarify when a blowout preventer would be required. The regulation provides:

In areas where the subsurface formations and pressures have been reasonably well established by prior drilling experience, the use of blowout equipment shall be in accordance with the established local practice [emphasis added].

Prior Comment and Response: Comment 3788 opposed this potential exemption not to require a blowout preventer in certain cases: “Part 554.4(c) seems to allow operators to not use blowout equipment in areas where subsurface formations and pressures have been reasonably well established by prior drilling practice if it is in accordance with established local practice. Yet Section 5.2.1 of the rdSGEIS states that Part 554.4 requires blowout equipment to be maintained and in proper working order during operations with no such caveat mentioned. Part 554.4(c) should state that blowout equipment is always required.”

NYSDEC rejected the recommendation stating that it would be unreasonable to require installation of blowout preventer equipment for geothermal, monitoring or shallow oil wells. NYSDEC points out that it requires all HVHF wells to install a blowout preventer, but does not explain why other oil and gas wells in NYSDEC could be exempt from installing a blowout preventer if drilled under Part 554 regulations [Response 3788].

It is best practice to always install a blowout preventer when drilling an oil well or any well where hydrocarbons (oil, gas, gas condensates) may be encountered after surface casing is set. Surface casing should be set and cemented prior to drilling into any formations that may contain hydrocarbons. The blowout preventer should be installed on the surface casing.

NYSDEC should explain under what circumstances it thinks that a blowout preventer should not be installed on a hydrocarbon well when drilling below surface casing, and provide a technical assessment to support such a proposal.

The current regulatory language at 6 NYCRR § 554.4(c) allows the decision whether a blowout preventer is required to be based on whether: (1) pressures have been “reasonably well established by prior drilling experience;” and (2) a blowout preventer is “in accordance with established local practice.” The quoted phrases are undefined and offer only a subjective basis for the decision. Are pressures “reasonably well established by prior drilling experience” when there have been a dozen well penetrations and pressure measurements in an area, or is just one pressure point sufficient?

NYSDEC should revise this regulation to provide specific quantitative limits and criteria for when a blowout preventer is not required. For example, NYSDEC should establish the maximum reservoir pressure, above which a blowout preventer is mandatory.

NYSDEC should remove the term “local practice” and set objective criteria. As written, it is unclear to whose local practice this regulation refers. Does this mean that if local drilling operators are not electing to use blowout preventers, NYSDEC will default to that local practice, even when it is not the best or safest plan? Who records local practices, and how can a member of the public, industry, or NYSDEC staff reference a generally accepted local practice to know what NYSDEC would actually be relying on to enforce this regulatory requirement?

Recommendation: The regulation should be revised to provide objective standards for use of blowout preventers that are identical to the standards applied to HVHF wells. If NYSDEC’s objective is to not require a blowout preventer for a geothermal or shallow monitoring well that has no risk of spilling hydrocarbons at high pressure, then the regulation should clearly state that these types of wells are exempt from the blowout preventer requirement. If NYSDEC refuses to revise the regulation to allow only the

narrow exemption for such wells, it should include a technical justification of its decision not to require blowout preventers for oil and gas wells other than HVHF wells.

6 NYCRR § 554.5(d) Directional Drilling Requirements

Revised Proposed Regulations: NYSDEC did not improve directional drilling reporting or baseline monitoring requirements for oil and gas wells drilled under NYCRR § 554.5(d).

Prior Comment and Response: Comment 6372 recommended “*Part 554.5(d): The required information for horizontal or directional wells under this subsection must also include the names and contact information for landowners, the location of any water wells within one mile of the down hole location, baseline monitoring data for each of those water wells, and documentation of delivery of that baseline data to each water well owner.*”

NYSDEC responded that “. . . it would be unreasonable and/or impractical for an operator of a non-vertical geothermal, monitoring or solution mining well to comply with the same requirements placed on high-volume hydraulically fractured wells.” [Response 6372].

NYSDEC can easily avoid the problem it identifies by revising the regulation to exclude geothermal, monitoring, or solution mining wells from requirements that would be reasonable for all oil and gas wells in NYS.

Recommendation: NYSDEC should revise 6 NYCRR § 554.5(d) to include recommended Comment 6372 as it applies to oil and gas wells in NYS. Geothermal, monitoring, and solution mining wells could be exempt from this requirement.

6 NYCRR § 554.7 As-Built Drawing and Well Completion Report Contents

Revised Proposed Regulation: NYSDEC did not require an as-built well construction drawing to be filed with NYSDEC at 6 NYCRR § 554.7 to document the actual manner in which the well was constructed or to certify that the well was constructed to meet all applicable NYCRR requirements. Absent submittal of an as-built drawing the regulator would only have on file a draft plan to construct and complete a well; however, the as-built drawing provides the actual specifications of how the well was constructed. Additionally, NYSDEC did not specify the required well completion report contents.

Prior Comment and Response: Commenter 4558 proposed an improved well completion report requirement. NYSDEC refused to include the improvement in the NYCRR, citing the need for flexibility in applying requirements to future permits. [Response 4558]. The response is inadequate because the requested improvement sets a regulatory floor but does not bind operators to a particular technology, which could improve over time.

Recommendation: Add the following requirements in 6 NYCRR § 554.7:

1. Upon completion of each well, an as-built well construction drawing, along with a casing and cementing report, shall be filed with the Department.
2. The as-built well construction drawing and casing and cementing report shall be signed by the owner or operator’s lead engineer certifying that the well has been constructed to meet all applicable requirements specified in the NYCRR.

3. The completion report shall include: a complete description and list of all materials installed in the well; specifications for all materials installed in well; casing length, grade and weight; hole sizes and condition; depth of lost circulation zones, depth of over-pressured zones and pressure; cement type and grade; list of all cement additives; mix water pH and temperature; cement volume, yield, and density; amount of cement returned to surface; cement pumping rate and pressures; a complete description of the sequence of events during the cementing operation; a copy of all temperature logs and cement evaluation tool tests; a complete description of the sequence of events during all required BOP and casing tests and copies of test results; depth of protected water zone and data used to determine this depth; depth and type of all hydrocarbons encountered; and results of coring, electric log, mud-logging, or testing.

The information required to be submitted pursuant to 6 NYCRR § 554.7 should be made publicly available on NYSDEC's website.

6 NYCRR § 554.7(b) and § 550.3(az) Well Logs to be Submitted

Revised Proposed Regulations: 6 NYCRR § 554.7(b) requires well logs to be provided to the Department with the Well Drilling and Completion Report:

*[Each copy of the completion report on form OG10] The Well Drilling and Completion Report also shall be accompanied **by a well log** and such other information as the department may specifically require. The measurement datum for the well log and all other measurements in connection with the well shall be clearly . . . [emphasis added].*

6 NYCRR § 550.3(az), which is not proposed to be changed by NYSDEC, provides the definition of a well log:

Well log shall mean the written record progressively describing the strata and any oil, gas or water encountered in drilling the well together with such additional information as volumes, pressures, rate of fill up, water depths, caving strata, casing record, etc., as is usually recorded in the normal procedure of drilling. The term shall include, if taken or performed, any electrical or other surveys and the details of all cores, and all drill stem tests, including depth tested, cushion used, significant time intervals, flowing and shut-in pressures, and recoveries.

NYSDEC does not respond to any comments regarding well logs other than to say they cannot make them public information without legislative approval. [Response 4602]. The existing requirements include strata and descriptions of oil, gas, and water encountered during drilling. Additional logging would assist the Department, public, and researchers to analyze the potential for movement of fluid and gas from the formation and from leaks in the wellbores. It will be critical to collect information on confining layers to prevent vertical movement, fractures and faults, and water quality specifically conductivity to identify freshwater zones. For this reason, the Department should require the operator to obtain geophysical logs to improve the understanding of the aquifers and potential for transport above the formation. Caliper logs help identify the location of fractures. Gamma logs identify layers of clay and shale which may serve as confining layers. Resistivity logs can identify among all lithologies. Electrical conductivity helps to identify fresh and salty water.

Recommendation: NYSDEC should amend 6 NYCRR § 550.3(az) as follows:

Well log shall mean the written record progressively describing the strata and any oil, gas or water encountered in drilling the well together with such additional information,

including but not limited to volumes, pressures, rate of fill up, water depths, casing strata, and casing record recorded in the procedure of drilling from the ground surface to the target formation. The term shall include any electrical or other surveys and the details of all cores, and all drill stem tests, including depth tested, cushion used, significant time intervals, flowing and shut-in pressures, and recoveries. For oil and gas wells, the following geophysical logs should be completed at a minimum for all formations from the ground surface to the target formation and submitted to the Department:

- (1) Caliper logs in open or uncased wellbore
- (2) Gamma logs
- (3) Resistivity logs or single point resistance logs
- (4) Electrical conductivity or specific conductivity

Well logs should be made publicly available on NYSDEC's website.

6 NYCRR § 554.7(e) Data Confidentiality

Revised Proposed Regulations: NYSDEC revised NYCRR § 554.7(e) to reduce the amount of time data can be held as confidential to a six-month period, with extensions up to a total of two years. However, NYSDEC deleted the requirement for the operator to demonstrate sufficient good cause to extend the time period.

Prior Comment and Response: We have consistently supported increased public access to oil and gas records, and support this change. However, we recommend additional language be added to NYCRR § 554.6(e) to specify the criteria for granting an extension beyond the six month confidentiality period.

Recommendation: Revise NYCRR § 554.7(e) to require an operator to show good cause for extending data confidentiality time period, including proof that drilling has been continuous throughout the prior period, as is required by ECL § 23-0313.

6 NYCRR § 555 Plugging and Abandonment of Existing Wells

Revised Proposed Regulation: NYSDEC did propose improved regulations to address the backlog of improperly abandoned wells that could potentially create vertical pathways for contamination to reach USDWs or explosion hazards.

Prior Comment and Response: Comment 4908 raises concerns about inadequate staffing, funding, and plugging of existing wells prior to approving additional drilling operations.

NYSDEC acknowledges this significant problem, but defers resolution to a future process with an unknown outcome. NYSDEC states “. . . *The Department has recognized for some time that its personnel resources would be a limiting factor on the rate of development of proposals for high-volume hydraulic fracturing. However, it is not within the Department's sole discretion to either hire additional staff or increase funding (bonding). The advisory panel assembled to advise the Department will assess the needs of all.*” [Response 4908].

NYSDEC points out that the HVHF regulations require improperly plugged and abandoned (“P&A’d”) wells to be identified. [Response 4908]. However, NYSDEC does not explain why this is not a

requirement for other oil and gas wells that may be hydraulically fractured under Parts 550-555. NYSDEC does not specifically require improperly abandoned wells nearby new hydrocarbon drilling operations to be P&A'd.

Comment 4918 raises concerns about explosions from existing gas wells that were not properly P&A'd in Bradford Pennsylvania and other wells that were not properly P&A'd.

NYSDEC points out that the RDSGEIS documents hazards from improperly P&A'd wells, but NYSDEC offers no improved NYCRR requirement to remedy the known problems. [Response 4918].

Recommendation: NYSDEC should revise 6 NYCRR § 555 to prohibit any operator from drilling a new well in NYS until all the wells it is financially responsible for in NYS that are no longer producing and are not properly P&A'd are P&A'd consistent with NYSDEC's new Part 555 regulations.

Additionally, NYSDEC should make it clear in 6 NYCRR § 555 and 6 NYCRR § 560 that operators applying for a permit to drill a new well nearby an improperly P&A'd well must either locate the well's owner and arrange for the well to be P&A'd consistent with NYSDEC's new Part 555 regulations or the operator applying for the permit to drill the new well must P&A the well before NYSDEC issues a permit.

It is not acceptable for NYSDEC to defer resolution of improperly P&A'd wells to a future, yet-to-be-determined process with an unknown outcome, and proceed with approval of new wells. New wells drilled and hydraulically fractured near improperly P&A'd wells can result in groundwater contamination.

6 NYCRR § 555 Plugging and Abandonment Cement Type and Verification

Revised Proposed Regulation: NYSDEC does not require wells to be plugged using cement containing gas blocking additives, or require all cement plugs to be tagged and verified.

Prior Comments and Response: Comment 6567 from the Harvey Report recommended: *"The regulations and the rdSGEIS mitigation measures should be revised to require cement quality standards, including the use of gas blocking cement. The regulations should require tagging of all cement plugs and provide instructions on when additional cement evaluation tools must be run."*

While NYSDEC agreed with Harvey on both recommendations, it made no change to the proposed regulation to include these best practices. [Response 6567]. NYSDEC notes it has discretion under NYCRR § 555.5(a) to require plug tagging, but that does not make it a mandatory requirement. And, as NYSDEC noted in Response 4911, it does not have adequate resources to be present at all P&A jobs. Therefore, cement plugs would only be tagged if an inspector was present and the inspector required it, meaning very few plugs would be verified. It is best practice to tag all cement plugs to verify placement depth; this should not be an optional, discretionary procedure.

Recommendation: NYSDEC should revise NYCRR § 555 to require wells to be plugged using cement containing gas blocking additives, and require all cement plugs to be tagged and verified. The information required to be submitted pursuant to 6 NYCRR § 555.5 should be made publicly available on NYSDEC's website.

6 NYCRR § 555.5 Logging Prior to P&A

Revised Proposed Regulation: NYSDEC did not propose changes to NYCRR § 555.5 to require casing and cement well logs prior to plugging and abandoning a well to verify the casing and cement condition and develop an optimized plan to permanently seal the well to prevent ground water contamination and well leaks.

Prior Comments and Response: Comment 4913 submitted by the U.S. Fish and Wildlife Service recommended that: *“the Department require evaluation logs (on the well casing and cement) for all wells to be plugged, and that this not be a discretionary requirement. This evaluation would be important to determine the integrity of the casing and cement along with the proper procedure and materials needed for a successful plugging of the well.”*

NYSDEC agreed that: *“. . . quality cement bond evaluation logs are valuable tools in the assessment of well integrity. However, it may not be prudent to mandate this costly procedure in all cases. Older or abandoned wells may contain obstructions, such as production tubing, that preclude the use of down-hole tools for logging. In other circumstances, some wells may have been installed by driving casing, so there would be no cement to evaluate.”* [Response 4913].

NYSDEC agrees casing and cement logging is an important step, when technically feasible, but instead of including this additional requirement in the proposed regulations at NYCRR § 555.5, NYSDEC dismisses the recommendation, taking no action, by focusing only on the exceptions to the rule.

Recommendation: NYSDEC should revise NYCRR § 555.5 to require casing and cementing logs for all wells unless there is a well obstruction that is technically infeasible to remove or cement was not installed at all (in which case the cementing log would not be run, but the casing inspection log would be).

6 NYCRR § 556.2(b), § 556.2(c) and § 556.2(g)(7) Gas Venting and Flaring

Revised Proposed Regulations: NYSDEC's proposed change to 6 NYCRR § 556.2(b) allows wells to vent to the atmosphere for 48 hours after a completion, stimulation, or workover and for 24 hours during well testing. NYSDEC allows additional gas venting for an indeterminate amount of time for an undefined set of other “operational requirements” that may result in gas venting.

NYSDEC removed the automatic administrative extensions of time for the 48- and 24-hour gas venting periods in the current version of 6 NYCRR § 556.2(b), but created the ability to request extensions for periods of flaring in a newly created regulation at 6 NYCRR § 556.2 (g)(5). Therefore there is potentially no upper limit on the amount of gas flaring that could be approved by NYSDEC, and no criteria have been set in 6 NYCRR § 556.2(g)(5) for granting applications for extended gas flaring.

NYCRR § 556.2(c) requires a flare permit to be submitted if gas released from a well will be flared; but flaring is not mandatory under NYCRR § 556.2(b); the gas could be vented to the atmosphere.

Prior Comment and Response: Comments 3084, 3085, and 3095 all recommend that gas venting not be allowed during well completions; that instead green completions be used; and that flaring, where necessary for safety, be minimized.

Our 2012 Recommendations included suggestions for reduced gas venting and flaring that NYSDEC did not address. *See* Harvey Report Recommendations No. 52- 55.

NYSDEC responded that it will require green completions for HVHF wells. [Response 3084]. NYSDEC does not explain why the green completion requirement does not apply to all other oil and gas wells drilled in NYS.

NYSDEC maintains that gas flaring and venting is needed for operational safety in some circumstances, but provides no technical basis for setting a predetermined 48-hour and 24-hour allowance. [Response 3095]. Nor do the proposed regulations set any upper bounds on the maximum volume of gas venting or gas flaring.

While the commenters recommend a prohibition of raw gas venting (uncombusted), NYSDEC responds that gas released from the wells will always be flared under a flare permit required at § 556.2(c). However, the regulations at § 556.2(b) allow the “release” (venting) of gas, instead of flaring. The required flare permit under § 556.2(c) does not appear to apply to the “release” of gas that is not flared. Therefore, as written, § 556.2(b) allows gas to be vented near homes, schools and other sensitive locations for a period of several days, without the permit identified under § 556.2(c). If NYSDEC will not allow venting, both § 556.2(b) and § 556.2(c) should be revised to eliminate the term “release” and to state expressly that venting is prohibited.

Additionally, NYSDEC proposes to allow continued gas flaring beyond the 48- and 24-hour periods for an indeterminate amount of time for an undefined set of other “operational requirements.”

NYSDEC refuses to establish in regulation any flaring efficiency standards or best practice technology requirements for flares. [Response 7817].

Recommendation: NYSDEC should revise NYCRR § 556.2(b) and § 556.2(c) as follows:

- prohibit intentional, planned gas venting from wells, unless it occurs during an unavoidable emergency well control event;
- Use green completion equipment to capture gas and liquids coming out of wells as they are being drilled, repaired, or stimulated during hydraulic fracturing.
- Coordinate drilling and well completion operations with gas line installation, enabling green completions for all wells drilled subsequent to the initial exploration well.
- For operations without a gas line, use collected gas onsite to generate power, or provide it to local residents as an affordable fuel supply.
- If green completions are not technically feasible, require that gas released during the allowed 48- and 24-hour periods for completion, stimulation, or workover must be routed through a flare.
- Set limits on the maximum amount of gas that can be vented per well;
- Define other “operational requirements” that will justify gas venting or flaring and set limits on gas venting and flaring to the amount required for emergency or safety purposes only, that cannot otherwise be eliminated by prudent operational planning; and
- Limit planned⁷ flaring and venting during gas production to the smallest amount possible and allow even that amount only for purposes of safety. A minimum flare efficiency of 98% should

⁷ There is a difference between planned flaring and emergency flaring. Emergency flaring is conducted to safely route combustible and potentially toxic gas (e.g. hydrogen sulfide gas) and in most cases cannot be avoided. Planned flaring can be avoided in most cases.

be achieved. Gas should be collected for sale, or used as fuel, unless it is proven to be technically and economically unfeasible.

Additionally, NYSDEC should respond to and revise the NYCRR to address Harvey Report Recommendations Nos. 52-55.

- **Recommendation No. 12:** Planned flaring should be limited to no more than three days. In all other cases flaring should be limited to safety purposes only. If NYSDEC finds there is an operational necessity to flare an exploration well for more than a three-day period, the SGEIS impact analysis should evaluate the air pollutant impact, particularly the potential for relatively high short-term emission impacts from longer flaring events, before approving such operations. Flaring restrictions should be included in the SGEIS as a mitigation measure and codified in the NYCRR. This requirement should apply to all natural gas operations, not just HVHF operations.

When flaring or venting does occur, there is the potential for relatively high short-term VOC and CO emission impacts that need to be considered.⁸ The RDSGEIS states that industry only plans to flare for a maximum of three days, and NYSDEC only modeled a 3-day impact; yet, the RDSGEIS states that flaring can occur for up to a month (30 days) in some cases.⁹ NYS's proposed regulations allow planned flaring for three days (48 hours+ 24 hours) in the case of a well completion, stimulation, testing period, but also allow for more gas to be flared and vented if an extension of time is requested or if other operational issues arise. NYS has not modeled the air quality impacts of more than 3 days of flaring, and has not modeled the impacts at all of raw gas venting near populated areas.

Modeling needs to represent a reasonable worst case scenario. Because only a three day flaring period was considered in the RDSGEIS modeling, planned flaring should be limited to no more than three days. Alternatively, modeling analysis should be based on the maximum time period that flaring would be allowed.

- **Recommendation No. 13:** The SGEIS should provide justification for allowing a maximum of 5 MMscf of vented gas and 120 MMscf of flared gas at a well pad during any consecutive 12-month period. The RDSGEIS does not contain information to show that these limits are equivalent to the lowest levels of venting and flaring that can be achieved through used of best practices, and it is unclear if these rates were used in the modeling assessment. Flaring and venting limits, once justified, should be included in the SGEIS as a mitigation measure, codified in the NYCRR, and should apply to all natural gas operations, not just HVHF operations.

NYSDEC examined maximum gas venting and flaring scenarios in the SGEIS but did not set any corresponding gas volume limits in regulation.

- **Recommendation No. 14:** The SGEIS should require flare systems to be designed in a manner that optimizes reliability, safety, and combustion efficiency, including requirements to: minimize the risk of flare pilot blowout by installing a reliable flare system; ensure sufficient exit velocity or provide wind guards for low/intermittent velocity flare streams; ensure use of a reliable ignition system; minimize liquid carry over and entrainment in the gas flare stream by ensuring a suitable liquid separation system is in place; and maximize combustion efficiency by proper control and optimization of flare fuel/air/steam flow rates. Flare design requirements should be

⁸ 2011 NYSDEC, RDSGEIS, Page 6-103.

⁹ 2011 NYSDEC, RDSGEIS, Table 5.29 on Page 5-136 shows that well cleanup and testing can take 12 hours to 30 days. Modeling on Page 6-192 assumes only 3 days of flaring.

included in the SGEIS as a mitigation measure and codified in the NYCRR. These requirements should apply to all natural gas operations, not just HVHF operations.

NYSDEC did not include any improved technical specifications for flare combustion efficiency. Harvey recommended that NYSDEC should require operators to flare gas as a preferred method over venting. Gas flaring is environmentally preferable over venting because flaring reduces HAP, VOC, and GHG emissions.¹⁰ Proposed revisions to 6 NYCRR § 560.6(c)(28) would require that gas be flared whenever technically feasible instead of vented,¹¹ which is a significant improvement, but this corresponding improvement is not found at Part 556 for all NYS wells.

- **Recommendation No. 15:** Drilling and well completion operations should be coordinated with gas line installation, enabling RECs for all wells drilled subsequent to the initial exploration well. Alternatively, methane gas should be used onsite to generate power, re-injected to improve well performance, or provided to local residents as an affordable fuel supply. NYSDEC should not defer the decision to implement RECs for two more years. The requirement to use RECs in all practicable situations should be included in the SGEIS as a mitigation measure and codified in the NYCRR. This requirement should apply to all natural gas operations, not just HVHF operations.

NYSDEC required green completions only for HVHF wells and not all hydrocarbon wells in NYS.

Additionally, there are alternatives to piping methane such as using it onsite to generate power, re-injecting it to improve well performance, or providing it to local residents as an affordable power supply. Therefore, RECs do not need to rely solely on the installation of a nearby pipeline.

6 NYCRR § 556.2(g)(7) Verbal Approval to Commence Operations

Revised Proposed Regulation: NYSDEC added a new regulation at 6 NYCRR § 556.2(g)(7) allowing NYSDEC to grant a verbal approval to commence operations in cases of unusual or emergency circumstances, or for other good cause shown, as long as a Sundry Well Notice and Report form request is on file. NYSDEC does not explain what circumstances would trigger “*cases of unusual or emergency circumstances, or for other good cause shown.*”

Recommendation: No operations should commence without a formal written permit approval. Even in the case of unusual or emergency circumstances, there is sufficient time for the Department to issue a brief letter clearly stating what operations are or are not approved and justifying the unusual or emergency circumstances that prompted the expedited approval. If NYSDEC wants to allow operations without a written permit, the agency should clearly delineate in the regulation the type of unusual or emergency circumstances that would warrant and justify a verbal approval.

6 NYCRR § 554 and 556 Corrosion and Erosion Mitigation and Integrity Monitoring

Revised Proposed Regulation: NYSDEC did not add any new regulations at 6 NYCRR § 554 or 6 NYCRR § 556 to require corrosion and erosion mitigation and integrity monitoring.

¹⁰ Fugitive and Vented methane has 21 times the global warming potential as combusted methane gas. Methanetomarkets.org; epa.gov/gasstar.

¹¹ 2011 NYSDEC, RDSGEIS, Page 7-117.

Prior Comment and Response: Our 2012 Recommendations requested that NYSDEC require corrosion and erosion mitigation and integrity monitoring because downhole tubing and casing, surface pipelines, pressure vessels, and storage tanks used in oil and gas exploration and production can be subject to internal and external corrosion. Corrosion can be caused by water, corrosive soils, oxygen, corrosive fluids used to treat wells, and the carbon dioxide (CO₂) and H₂S present in gas. High velocity gas contaminated with water and sediment can internally erode pipes, fittings, and valves. See Harvey Report Recommendation No. 99.

Well casing, once installed and cemented into place, will remain in the well for its entire lifecycle and is often abandoned in place. Therefore, it is in the operator's best economic interest to ensure that its casing investment is protected from corrosion and erosion.

It would be shortsighted for NYS to require a robust well casing program and not build in a corrosion and erosion control program. Chemicals, metallurgy, monitoring, and repair techniques are available to the operator to manage corrosion and erosion downhole (in the well) and at its surface facilities (e.g. corrosion inhibitors, cathodic protection systems, and coatings).

Corroded well casings can provide a pathway for gas and well fluids to leak into protected aquifers. Therefore, it is important to install a robust casing system, and it's equally important to ensure that the casing system's integrity is maintained during the well's life.

Corrosion measured on production casing is an important piece of information because corrosive fluids are known to also degrade the quality of the cement barrier. Corrosive fluids reduce the cement strength and make it more permeable, potentially providing a pathway for hydrocarbons to migrate from zones of higher pressure to lower pressure freshwater zones.

Additionally, the bond between the casing and cement can be compromised over the well's life, creating a "micro-annulus" (a space between the outer pipe wall and cement sheath) that allows vertical migration of hydrocarbons along the outside of the pipe wall. Micro-annuluses can be formed during initial cementing, or later in the well's life due to: pipe wall thinning; cement deterioration; the shock of additional well workover activities (perforations, stimulation, drilling); pressure and temperature changes in the well; or by seismic vibrations.

Failures of equipment handling or producing natural gas occur in the absence of an adequate corrosion-control program. A successful program is shown to include (1) anticipation of corrosion in design factors of all equipment, (2) detection of corrosion within the system and measurement of its severity for future reference, (3) use of mitigation measures, and (4) continual follow-up and adjustment of control techniques.

Corrosion and erosion programs that are instituted early can prolong the life of equipment and well casings, and reduce environmental risk. Delayed attention to corrosion and erosion mitigation can result in increased safety, environmental, and human health risks.

NYSDEC did not respond to this comment.

Recommendation: NYSDEC should revise 6 NYCRR § 554 and 6 NYCRR § 556 to require equipment be designed to prevent corrosion and erosion; monitoring programs be put into place to identify corrosion and erosion over the well and equipment operating lifetime; and repair and replacement of damaged wells and equipment be completed.

6 NYCRR § 554 and 556 Emergency Response Plan

Revised Proposed Regulation: NYSDEC did not add any new regulations at 6 NYCRR § 554 or 6 NYCRR § 556 to require improved emergency response planning.

Prior Comment and Response: Our 2012 Recommendations requested that NYSDEC require improved emergency response planning. *See Harvey Report Recommendations Nos. 100-102.*

NYSDEC did not respond to this comment.

Recommendation: NYSDEC should revise 6 NYCRR § 554 and 6 NYCRR § 556 to:

- Require a well blowout response plan (either included in the Emergency Response Plan (ERP) or as a separate plan), a contract retainer with an emergency well control expert, and prearranged access to a relief well rig.
- Identify an ERP review, approval, and audit process to ensure that quality plans are developed, including adequately trained and qualified personnel and the availability of adequate equipment.
- Require, if local emergency response resources are relied on in the ERP, that operators ensure they are trained, qualified, and equipped to respond to an industrial accident, and if not should be required to provide its own industrial response equipment and personnel.
- Require that NYSDEC conduct audits of drills, exercises, equipment inspections, and personnel training.
- Require that the plan be submitted to NYSDEC with the well application for NYSDEC review and approval.

6 NYCRR § 554 and 556 Seismic Data Acquisition

Revised Proposed Regulation: NYSDEC did not add any new regulations at 6 NYCRR § 554 or 6 NYCRR § 556 to include seismic data acquisition regulations.

Prior Comment and Response: Our 2012 Recommendations requested that NYSDEC include seismic data acquisition regulations. *See Harvey Report Recommendations Nos. 105-107.*

NYSDEC did not respond to this comment.

Recommendation: NYSDEC should revise 6 NYCRR § 554 and 6 NYCRR § 556 to establish regulatory requirements for seismic data collection to reduce impacts to the environment and the public including:

- A permitting process for these activities and institute mitigating measures in the SGEIS to minimize surface impacts and disruptions, and require rehabilitation of impacted areas.
- The best practices and model permit requirements proposed in Harvey Consulting, LLC., Onshore Seismic Exploration Best Practices & Model Permit Requirements Report to: Sierra Club and Natural Resources Defense Council, January 20, 2011.

All information required to be submitted pursuant to 6 NYCRR § 556 should be made publicly available on NYSDEC's website.

6 NYCRR § 560 Marcellus Shale Only

Revised Proposed Regulations: NYSDEC proposes new regulations at 6 NYCRR Part 560 for all operations associated with HVHF wells targeting the Marcellus Shale and other low-permeability formations in NYS.

Prior Comments and Response: NYSDEC did not respond to our 2012 Recommendations, which criticized the agency's attempt to develop regulations for all shale and low-permeability reservoirs in NYS, while evaluating data and potential impacts in the SGEIS only with respect to the Marcellus Shale. See Harvey Report Recommendation No. 1 and Joint Legal Memorandum at 2.

In our 2012 Recommendations we stated:

The SGEIS should either include additional information and analysis on the impacts of exploring and developing the Utica Shale and other unnamed low-permeability gas reservoirs, or acknowledge that there is insufficient information and analysis to study the impacts of this development. In the latter case, the SGEIS should conclude that its examination of impacts and mitigation measures is limited to the Marcellus Shale Gas Reservoir, and therefore any Utica Shale or other unnamed low-permeability gas reservoir development will warrant a site-specific supplemental environmental impact statement review or should be covered under another, future SGEIS process.

As explained in the Harvey Report, there are low-permeability gas reservoirs that are present at depths shallower than the Marcellus Shale which were not studied at all. Those unnamed, unanalyzed low-permeability reservoirs are in closer proximity to protected water resources and warrant a complete technical and scientific assessment. Most importantly, HVHF modeling and fracture design requirements should be established to ensure that man-made induced fractures in these shallower reservoirs do not propagate in a manner that pollutes protected groundwater resources. Man-made induced fractures in shallower formations will tend to propagate on the horizontal plane; however, the size of that horizontal fracture must be constrained so that it does not intersect with existing improperly constructed or improperly abandoned wells or transmissive faults and fractures that can provide a direct pollution pathway to protected groundwater resources.

It is also important not to site shallower HVHF operations in locations above Marcellus Shale, because the industry relies on these low permeability formations to prevent vertical movement of contaminants from the target shale to the surface.

Best technology and best practices and cumulative impacts, in many cases, are reservoir specific. Because the RDSGEIS does not contain information on the depth, type, activity, or equipment requirements for the general category called "*other low-permeability gas reservoirs*," it is not possible to determine if the maximum impact assessment for a Marcellus Shale well sufficiently covers the maximum impact from "*other low-permeability gas reservoirs*." Nor is it possible to determine whether best technology and best practices developed for the Marcellus Shale would apply to the Utica Shale, or other shale formations since there is very little information and understanding of the optimal Utica Shale stimulation method at this time.

Therefore, developing 6 NYCRR Part 560 regulations to cover all HVHF wells in NYS, based on a SGEIS that examined only the Marcellus Shale, may result in regulations that are not appropriate for the wide range of low-permeability gas resources.

NYSDEC's proposed regulations at 6 NYCRR § 560.6(c)(7) and 6 NYCRR § 560.7(g), NYSDEC only proposes to require certain best practices only for the Marcellus Shale because it hasn't studied other "low-permeability reservoirs" in NYS enough to know where to establish best practice requirements for other "low-permeability reservoirs."

For example, 6 NYCRR § 560.6(c)(7) requires closed-loop tanks to be used only for "horizontal drilling" in the Marcellus Shale and 6 NYCRR § 560.7(g) requires a site-specific acid rock drainage mitigation plan only for "horizontal drilling" in the Marcellus Shale. Closed loop tanks and acid rock drainage mitigation plans were not required in NYCRR for any other low-permeability reservoirs, but that decision is not supported by either the RDSGEIS or NYSDEC's response to comments.

Recommendation: We recommend that NYS make it clear that Part 560 applies to HVHF operations only in the Marcellus Shale and that no other HVHF operations be permitted until a SGEIS is developed to thoroughly analyze the impact of developing other formations. Once that SGEIS work is completed, Part 560 can be amended or a new 6 NYCRR Part can be developed to regulate those formations in the event that different mitigation measures are determined through proper analysis to be necessary.

6 NYCRR § 560.2(b)(2) Definition of Additive

Revised Proposed Regulation: NYSDEC proposes a new definition of the term "additive" at 6 NYCRR § 560.2(b)(2) to mean "a substance composed of one or more chemical constituents that is intentionally added to a base fluid."

We support the inclusion of a new definition of the term "additive" but do not support its limitation to chemical constituents that are intentionally added to a base fluid. Any chemical constituents that are known by the operator to exist in a base fluid, including any proppant, should be disclosed, whether added by the operator or another entity.

Recommendation: 6 NYCRR § 560.2(b)(2) should be amended to read as follows:

"'additive' shall mean a substance composed of one or more chemical constituents that is ~~intentionally added~~ known by the operator to be present in a base fluid, including any proppant."

6 NYCRR § 560.2(b)(7) Definition of Chemical Disclosure Registry

Revised Proposed Regulation: NYSDEC proposes a new definition of the term "chemical disclosure registry" to mean the industry-operated website FracFocus.org.

Prior Comments and Response: Our 2012 Recommendations noted that the RDSGEIS "propose[d] to provide a listing of high-volume hydraulic fracturing additive product names and links to the associated MSDSs on an individual basis on [the NYSDEC's] website." While noting that this requirement was not reflected in the then-proposed regulations, we praised NYSDEC's decision to require disclosure on its own website rather than FracFocus.org, which suffers from several crippling limitations. Joint Legal Memorandum at 20.

NYSDEC did not respond to this comment, but did respond to a comment recommending pre-fracture notice and disclosure of chemicals to the Department and landowners, similar to those employed in Wyoming and Colorado, by including a new requirement for pre-fracture disclosure to the Department and post-fracture disclosure to the Department and via FracFocus.org. [Response 7796].

In addition to adding a new definition of the term “chemical disclosure registry” at 6 NYCRR § 560.2(b)(7) to mean FracFocus.org, 6 NYCRR § 560.5(h)(4) requires post-fracture disclosure of hydraulic fracturing fluid information via the chemical disclosure registry.

While we support NYSDEC’s inclusion of a regulatory requirement for post-fracture disclosure of hydraulic fracturing fluid contents, we do not support the use of FracFocus.org for that purpose. As noted in our 2012 Recommendations, FracFocus.org suffers from a number of critical limitations. Most significant among these deficiencies is the inability to search and aggregate data. The Natural Gas Subcommittee of the Secretary of Energy Advisory Board, which was directed by the President to make recommendations about improving the safety and environmental performance of hydraulic fracturing, recommended that regulators ensure that disclosures are “posted on a publicly available website that includes tools for searching and aggregating data by chemical, well, by company, and by geography.”¹²

It is our understanding that FracFocus.org is in the process of improving search capabilities. This is an important improvement. However, FracFocus.org prevents aggregation, which unnecessarily restricts full public access and use of the information. The Natural Gas Subcommittee explained that one significant “limitation of FracFocus.org is that the information is not maintained as a database. As a result, the ability to search for data is limited and there are no tools for aggregating data.”¹³ Unfortunately, the limitations with FracFocus.org are not only technical ones. The website’s terms of use also purport to prohibit others from compiling the data and publishing it elsewhere.¹⁴ NYSDEC should not require the use of any site which claims to prevent public use of data collected for the public benefit. Public access to the information provided in hydraulic fracturing disclosures is not only useful on a well-by-well basis, but allows scientists to develop a better understanding of the effects of hydraulic fracturing.

Accordingly, NYSDEC should follow the path proposed in the RDSGEIS, and develop its own site for publication of fracturing fluid constituents, independent of FracFocus.org. Alternatively, if NYSDEC chooses to adopt FracFocus.org, NYSDEC must ensure that FracFocus.org is improved to cure the technical and potential legal deficiencies identified above. We are not aware of any reason why these deficiencies could not be solved on a very short timeframe. Thus, it would be appropriate for NYSDEC to follow Colorado’s lead in stipulating that unless these deficiencies are cured within a fixed period of time, NYSDEC will adopt (creating, if necessary) an alternative disclosure registry.¹⁵

Recommendation: The term “chemical disclosure registry” should be redefined to mean a registry that will be maintained and monitored on NYSDEC’s website, and which is searchable and permits for aggregation of data. In the event the Department continues to define this term to mean FracFocus.org, it must create and implement a plan to ensure that each disclosure made to the registry is reviewed by NYSEC staff for full compliance with the Department’s disclosure requirements as set forth in 6 NYCRR §§ 560.3(d) and 560.5(h).

¹² Natural Gas Subcommittee of the Secretary of Energy Advisory Board, 90-Day Report, 24 (Aug. 18, 2011) (emphasis added), available at <http://www.shalegas.energy.gov/>.

¹³ *Id.*

¹⁴ See <http://fracfocus.org/terms-of-use> Section 7.

¹⁵ 2 Colo. Code Regs. § 404-1:205A(b)(2)(3).

6 NYCRR § 560.2(b)(12) and § 560.2(b)(13) Flowback Definitions

Revised Proposed Regulation: In 2011 NYSDEC proposed a definition of flowback (to include solids and liquids) and flowback fluid (to include only liquids).

*'flowback' shall mean **liquids and solids produced** during initial completion and clean-up of the well or clean-up of a well following a re-fracture or workover" [emphasis added].*

*'flowback fluids' shall mean **liquids** produced following drilling and initial completion and clean-up of the well or clean-up of a well following a re-fracture or workover" [emphasis added].*

In 2012 NYSDEC revised the definition of flowback to mean a period of time and flowback water to mean liquids and solids:

*'flowback' shall mean **phase or period** during initial completion and clean-up of the well or clean-up of a well following a re-fracture or workover" [emphasis added].*

*'flowback water' shall mean **liquids and solids** produced following drilling and initial completion and clean-up of the well or clean-up of a well following a re-fracture or workover" [emphasis added].*

The definitions do not follow common usage. The term "flowback" is not a period of time in common oil and gas industry usage. It is fluid that returns to the surface after a hydraulic fracture treatment. The phase or period of time during which flowback is produced would be the "flowback period."

Recommendation: The definition of "flowback water" should be deleted. The term flowback should be restored to its form in the 2011 proposed regulations and defined as follows:

'Flowback' shall mean liquids and solids produced following drilling and during initial completion and clean-up of the well or during clean-up of a well following a re-fracture or workover.

6 NYCRR § 560.2(b)(20) and § 560.2(b)(21) Primary and Principal Aquifer Definition

Revised Proposed Regulation: 6 NYCRR §§ 560.2(b)(20) and (21) provide as follows:

(20) 'primary aquifer' shall mean a highly productive aquifer presently being utilized as a source of water supply by a major municipal supply system.

(21) 'principal aquifer' shall mean an aquifer known to be highly productive or whose geology suggests abundant potential water supply, but which is not intensively used as a source of water supply by a major municipal system at the present time.

The only difference between a principal and primary aquifer is that the primary aquifer is currently being utilized as a water supply by a "major municipal supply system." NYSDEC does not define "major" or how few people can be using a principal aquifer without it being considered a primary aquifer. Currently, there are setbacks from primary but not principal aquifers – indeed, there is only one reference to principal aquifers anywhere in the regulations other than in the definitions. NYSDEC is choosing not to

protect aquifers that are water sources for private wells and may be important sources for municipal supply systems in the future.

Prior Comment and Response: Comment 6089 states the Department “*continues to illogically distinguish between principal and primary aquifers*” based on the number of people served. NYSDEC’s response claims that setbacks are to provide a margin of safety and to balance “*the protection of the water resource*” with promotion of gas development. [Response 6089 (emphasis added)]. Basically, NYSDEC claims that setbacks are for current drinking water supplies, meaning individual well owners would not qualify for protection and that potential future water supplies will not be protected under the proposed regulations. If failure to protect a principal aquifer results in its contamination with drilling fluids or other pollutants, prohibitive remediation costs likely will mean that the water source is lost permanently.

Recommendation: NYSDEC should provide the same protection to principal aquifers that it currently proposes for primary aquifers. The definitions do not require revisions, but each regulation addressing a primary aquifer should be amended to apply equally to principal aquifers. *See, e.g.*, our recommendations and proposed revisions to 6 NYCRR §§ 750-3.3(a)(2) and 3.11(d).

6 NYCRR § 560.3 Application Requirements, Procedures and Fees

Revised Proposed Regulation: 6 NYCRR § 560.3 lists additional application requirements, procedures and fees required for HVHF.

NYSDEC improved the HVHF application requirements at 6 NYCRR § 560.3(a)(5) to include scaled distance to water “*intakes*” and “*water well or spring used for water supply for crops or livestock.*”

NYSDEC included a requirement that a HVHF application must “*include measures being used to prevent new invasive species from being transported to the site*” at 6 NYCRR § 560.3(a)(17).

NYSDEC limited the transportation plan required in the HVHF application at 6 NYCRR § 560.3(a)(18) to cover only delivery of water to the site, instead of covering all “*raw materials and chemical additives,*” which would include water, among other things. The transportation plan does not include produced water transportation plans, but should. As explained in Attachment 3 to our 2012 Recommendations (Miller Report) produced water quality can be as bad as, or worse than, flowback water especially if there is significant naturally occurring radioactive material (“NORM”) in the water.

NYSDEC reduced the distance required from a well pad to a primary or principal aquifer boundary, perennial or intermittent stream, wetland, storm drain, lake, or pond, and any surface water body that is a tributary to a public drinking water supply from the 660’ proposed in 2011 to 500.’ *See* 6 NYCRR § 560.3(a)(6). NYSDEC also deleted its 2011 proposal that the application include “*the capacity of the rig fueling tanks and their proposed distance to any public or private water well, domestic-supply spring, reservoir, perennial or intermittent stream, storm drain, wetland, lake or pond within 500 feet.*”

Prior Comment and Response: Our 2012 Recommendations requested that Parts 550-556 be modernized to include best available technology and operating practices for all oil and gas wells drilled and completed in NYS, including but not limited to oil and gas wells that are hydraulically fractured with less than 300,000 gallons of water.

The application requirements at 6 NYCRR § 560.3(a), which are intended to apply only to HVHF wells, would improve the quality of the application for all oil and gas wells because the protections they provide are not specific to HVHF operations in all cases. For example:

- 6 NYCRR § 560.3(a)(1), § 560.3(c), and § 560.3(f) requires the operator to identify the depth to the objective formation and provide maps of the planned wellbore and area and pay all required fees. This should be an application requirement for all wells in NYS, not just HVHF wells.
- 6 NYCRR § 560.3(a)(2) requires the operator to identify the depth of “potential freshwater”, such that casing can be set at the correct depth. This should be an application requirement for all wells in NYS, not just HVHF wells. Additionally, the term “potential fresh water” should be revised to our recommended term “protected ground water,” which would protect all potable fresh water and all USDWs.
- 6 NYCRR § 560.3(a)(3)-(4), § 560.3(a)(11), § 560.3(a)(19) and § 560.3(d) requires the operator to identify water uses, tankage for handling flowback, and chemical additives for hydraulic fracturing operations. These requirements should apply to all wells in NYS that conduct hydraulic fracturing operations, not just HVHF wells. Multiple wells conducting hydraulic fracture operations in an area, even if less than 300,000 gallons per treatment, can cumulatively use a significant amount of water and chemicals and NYSDEC should be aware of, and mitigate, that potential adverse impact.
- 6 NYCRR § 560.3(a)(5)-(7) requires the application to include scaled distances to sensitive receptors. This should be an application requirement for all wells in NYS, not just HVHF wells.
- 6 NYCRR § 560.3(a)(9)-(10), § 560.3(a)(12)-(18), and § 560.3(b) require the application to include information in reserve pits, tank systems, air emission sources, availability of pipelines to conduct RECs, waste disposal plans, blowout preventer use and testing, invasive species mitigation, site reclamation, transportation plans, and GPS coordinates for access roads. The issues addressed by these application requirements are not unique to HVHF and should be addressed by application requirements for all wells in NYS, not just HVHF wells.

While NYSDEC made a number of improvements to the Part 560 regulations, it did not carefully examine and specify which improvements should apply only to HVHF wells, and which should apply to all oil and gas wells in NYS. NYSDEC provides no basis for improving the 6 NYCRR § 560.3 Application Procedures and Fee regulations, while leaving the Part 552 regulations unchanged and seriously outdated. NYSDEC responds only that HVHF operations have higher impacts than smaller HF operations, but does not explain why standard application contents would not be required for both. [Response 3789].

Recommendation: The proposed requirements at 6 NYCRR § 560.3 described above should also be included in Part 552, or NYSDEC should justify why these same requirements should not apply to other oil and gas wells in NYS.

We support the improvements made to 6 NYCRR § 560.3(a)(5) and § 560.3(a)(17).

We urge NYSDEC to eliminate the proposed changes at 6 NYCRR § 560.3(a)(6) and § 560.3(a)(18), as well as the deletion of the 2011 proposed language that required “*the capacity of the rig fueling tanks and their proposed distance to any public or private water well, domestic-supply spring, reservoir, perennial or intermittent stream, storm drain, wetland, lake or pond within 500 feet*” to be included in the application. Additionally, please see our recommendations for setback improvements at 6 NYCRR § 553.2 which, if adopted, will require the 660’ requirement to increase.

Revise 6 NYCRR § 560.3(a)(18) to include produced water.

The information required to be submitted pursuant to 6 NYCRR § 560.3 should be made publicly available on NYSDEC's website.

6 NYCRR § 560.3(a)(2) Depth to Protected Water

Revised Proposed Regulation: 6 NYCRR § 560.3(a)(2) proposes that a HVHF well application include

the estimated maximum depth and elevation of bottom of potential fresh water, and the basis for such estimate (water well information, other well information, previous drilling on the well pad, published or private reports, or other department-approved source).

Recommendation: Revise 6 NYCRR § 560.3(a)(2) to specify that the protected water measurement must be provided all along the wellbore for non-vertical wells not just within the vertical section of the wellbore. This is necessary to be certain the entire wellbore is the proper distance below the bottom of protected water.

6 NYCRR § 560.3(a)(2) should be revised to read:

the estimated maximum depth and elevation of bottom of protected ground water must be provided for the vertical section of the wellbore and along the entire non-vertical section of the wellbore when deviated (high-angle or horizontal) wells are planned and the basis for such estimate (water well information, other well information, previous drilling on the well pad, published or private reports, or other department-approved source).

6 NYCRR § 560.3(d)(2)-(3) & 560.5(h)(2)-(3) HF Fluid Disclosure Trade Secret Protection

Revised Proposed Regulations: NYSDEC's proposed regulations governing pre- and post-fracture disclosure of hydraulic fracturing fluid contents at 6 NYCRR §§ 560.3(d)(2) and 560.5(h)(2) provide that: "the [D]epartment will disclose to the public the information submitted [on hydraulic fracturing fluid contents] except that owner [sic] or operators or other persons who supply [such] information . . . may request such records to be exempt from disclosure as trade secret as provided by [6 NYCRR] Part 616"

Prior Comments and Response: Our 2012 Recommendations encouraged NYSDEC to adopt the trade secret standards of the federal Emergency Planning and Community Right to Know Act ("EPCRA"). Joint Legal Memorandum at 18-19. NYSDEC did not respond to this comment.

Regarding other comments recommending that no trade secret protection should be afforded to hydraulic fracturing fluid contents, NYSDEC provided the following response:

Existing state law, [Public Officers Law ("POL")] 87(2)(d), recognizes the right of persons who submit information to the Department to request that such information be exempted from public disclosure if the information qualifies as a trade secret. The Department's existing Records Access Regulations, 6 NYCRR 616.7, which implement POL 87(2)(d), lay out the process for making such requests, as well as the Department's procedure for independently evaluating whether the subject information qualifies as trade secret. Additive information determined by the Department to be trade secret could not be disclosed to the public; however, all other additive information would be made available to the public. [Response 6116].