



January 11, 2013

Commissioner Joseph Martens
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-6510
Attn: dSGEIS Comments

Dear Commissioner Martens and DEC staff:

Thank you for the opportunity to submit written comments on the Revised Draft Regulations on High Volume Hydraulic Fracturing.

Earthworks is a nonprofit organization dedicated to protecting communities and the environment from the impacts of irresponsible mineral and energy development while seeking sustainable solutions. For over two decades, we have worked nationwide to advance policy reforms, improve corporate practices, and safeguard land and public health. The Oil & Gas Accountability Project (OGAP) of Earthworks works with local communities, landowners, organizations, agencies, and elected officials to advance these goals.

We recognize the time that the Department of Environmental Conservation has invested in determining whether and how New York State should move forward with high-volume hydraulic fracturing using horizontal drilling (HVHF). As the DEC has frequently acknowledged, the proposed actions require much higher volumes of water, toxic chemicals, industrial equipment, and land than current oil and gas development in New York; consequently, the far greater environmental and social impacts that will result can only be mitigated (if not prevented) by the strongest regulatory oversight possible.

With this in mind, the current regulations reflect significant progress over the previous draft issued in 2011. However, flaws in the proposed regulations remain that reflect a lack of consideration of both established and emerging evidence of the negative impacts of gas development in the Marcellus and other deep shale regions. As a result, the draft regulations, as proposed, are not sufficient to protect health, communities, and air and water resources across New York State. Below we detail several subject areas in which revisions to the proposed regulations are necessary.

General comment: neglect to incorporate the NY DOH health impacts analysis into the proposed regulations

As Earthworks and many of our conservation partners have indicated in letters and statements to the DEC and Governor Cuomo, we strongly object to the issuance of draft regulations prior to completion of the health impacts review, rather than waiting for the Department of Health (DOH)

and its expert panel to complete their work. Regulations must be based on a thorough analysis of all possible risks if they are to help prevent them. The current draft regulations simply cannot be analyzed with regard to their effectiveness if critical health information was not included in their development—especially because the health impacts of gas development are directly related to core regulatory aspects such as setbacks, air emission controls, chemical use, and waste disposal.

The DEC has stated that the final regulations will reflect findings from the health analysis conducted by the DOH. However, DEC has not given any indication that the public will have an opportunity to review and comment on any subsequent, specific changes in the regulations before they are finalized. With this in mind, the agency risks establishing limited regulations that do little to protect public health. We therefore ask DEC to extend the public comment period for the regulations before they are finalized, until at least 30 days after the completion of both the DOH health impacts review and DEC's final Supplemental Generic Environmental Impact Statement (SGEIS) on HVHF.

In addition, because the public and many health experts have been kept in the dark about the scope, content, and process of the DOH health analysis, it is impossible to determine whether the latest science and field research has been included. It is therefore possible that DEC will not be taking into account vital information on health impacts, including:

- *Gas Patch Roulette: How Shale Gas Development Risks Public Health in Pennsylvania*, Earthworks' 2012 report based on air and water testing and more than 100 health symptom surveys—the largest such set of information from residents in the Marcellus Shale region to date. The report summary is enclosed, as well as a research paper based on this study that has been peer-reviewed and accepted for publication in spring 2013 in *New Solutions: A Journal of Environmental and Occupational Health Policy*. (Additional information is available at <http://health.earthworksaction.org>.)

In sum, our analysis showed that:

1. Contaminants associated with oil and gas development are present in air and water in many communities where the development is occurring.
 2. Members of households located closer than 1500 feet to gas facilities have statistically significant higher rates of several symptoms (such as throat irritation, skin rashes, headaches, and nosebleeds) than those living farther away.
 3. Symptoms reported at participating households closely match the scientifically established effects of exposure to chemicals detected in the air and water at those locations.
- A study (enclosed) by Theo Colborn, Kim Schultz, and others at The Endocrine Disruption Exchange (TEDX) released in November 2012 and accepted for publication in *Human and Ecological Risk Assessment*. "An Exploratory Study of Air Quality near Natural Gas Operations" is based on a year of weekly air sampling of volatile chemicals 0.7 miles from a natural gas production area in rural Colorado. Dozens of gases and chemicals known to be associated with oil and gas production were detected, including many that can affect the brain/nervous system, the liver/metabolism, the endocrine (reproductive and developmental) system, immune system, cardiovascular/blood systems, and the sensory/respiratory system.
 - A study by L. M. McKenzie, Roxana Witter, and others at the Colorado School of Public Health, published in May 2012 in *Science of the Total Environment*. "Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources," based on three years of air pollution monitoring at gas wells, shows that potentially toxic petroleum hydrocarbons

(including benzene, ethylbenzene, toluene, and xylene) in the air may contribute to acute and chronic health problems for those living near natural gas drilling sites.

- A study by Michelle Bamberger and Robert E. Oswald published in March 2012 in *New Solutions: A Journal of Environmental and Occupational Health Policy*. “Impacts of Gas Drilling on Human and Animal Health” documented several cases in different regions of the U.S. in which livestock and pets exposed to toxic substances from natural gas operations suffered negative health impacts and even death.
- A study by L. N. Vandenberg, Theo Colborn, and other scientists published in March 2012 in *Endocrine Reviews*. “Hormones and Endocrine-Disrupting Chemicals: Low-Dose Effects and Nonmonotonic Dose Responses,” details how endocrine-disrupting chemicals—many of which are known to be associated with oil and gas development—can have harmful effects even at low doses and concluded that fundamental changes in chemical testing and safety protocols are needed to protect human health.
- A July 2012 research paper (based on an ongoing study) by Cornell University doctoral student Elaine L. Hill. Research. “Unconventional Natural Gas Development and Infant Health: Evidence from Pennsylvania” suggests that exposure of mothers to nearby natural gas operations increases the prevalence of low birth weight and reduces the scores of their newborn infants on basic health criteria.
- A September 2012 report by the government of New Brunswick, Canada, on health-related problems in connection with shale gas development. *Chief Medical Officer of Health’s Recommendations Concerning Shale Gas Development in New Brunswick* reflects an in-depth review of industry practices, health trends in current gas development areas, remaining information gaps, and measures to prevent health problems.

Draft regulations—comments

Enforcement

The best environmental analysis and strongest regulations in the world cannot protect the public health and the environment from the impact of gas development if the agency responsible for implementation and enforcement is not up to the task. With this in mind, in 2011-2012, Earthworks conducted an extensive investigation into the oversight and enforcement capacity of oil and gas regulatory agencies in six states; the resulting report, *Breaking All the Rules*, documents the nationwide crisis in this area (see <http://enforcement.earthworksaaction.org> for more information).

As detailed in the enclosed report, *New York State Department of Environmental Conservation: Inadequate enforcement guarantees irresponsible oil and gas development*, more than 75 percent of currently active oil and gas wells in the state go uninspected each year, the rate of inspections has dropped significantly, few violators are penalized, current penalties are far too low to deter violations, and data on violations are not publicly available.

Faced with the significant challenges posed by HVHF, DEC’s inspection and enforcement capacity needs to be increased, as it has neither the budget nor the staff to actually enforce the proposed regulations. In the revised Regulatory Impact Statement accompanying the draft regulations, DEC states that “There are numerous activities that will need to be addressed by DEC staff to allow

HVHF exploration of low-permeability reservoirs such as the Marcellus and Utica,” including in the areas of monitoring and enforcement, and that pursuit of HVHF in New York will mean significantly increased costs for the DEC and other agencies.

In addition, in the Assessment of Public Comment (Response 4908), DEC states that “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.” According to DEC’s own estimates, effective implementation of an HVHF program would require the hiring, training, and placement of more than 140 new staff—indicating that the agency is not currently in a position to issue permits for new horizontal wells with the assurance of effective oversight, and that it could be months or years before it is. Until a guarantee is in place that staff and all associated costs will be fully covered over several years, the agency should not proceed with permitting.

We also recommend that DEC improve its inspection protocols, increase fines and maximum penalties, assess and collect all penalties that are allowed by law, and expand the collection and public availability of related data. Without such basic elements of a good enforcement program in place prior to allowing gas development to move forward, DEC cannot realistically have any true basis for assuring its citizens that impacts to the environment and human health will actually be addressed.

Further, our enforcement research has shown that citizens living in or near oil and gas fields can play an important role in aiding agency enforcement staff because they are most likely to notice when problems such as spills and releases occur; as a result, complaints have led to inspections that have, in turn, found violations. DEC must have an accessible citizen complaint database that includes information on when complaints occurred, when an inspection occurred, the time taken to resolve complaints, any violations found, any enforcement actions taken as a result, and when and how the complaint was fully resolved. DEC should codify how to respond to citizen complaints (e.g., required response time, follow-up procedures) to ensure fair treatment of all complaints, transparency, and communication with the public. Texas, for example, prioritizes citizen complaints about active pollution or safety and requires inspectors to respond, typically within 24 hours.

In addition, DEC needs to document, track, and publish annual or quarterly statistics on inspections, violations, penalties, enforcement actions, and complaints in order to help agency staff know where to focus enforcement efforts (e.g., highlight bad actors and identify rules that are frequently violated) and to show differences in compliance among operators. The Division of Mineral Resources has pledged to create a database for such information; this must be posted on a publicly available website and be operational before DEC issues any HVHF permits. The DEC should also codify its penalty schedule as a means of reducing the discretion used in assessing the amount of a fine. The DEC should also develop policies for determining the appropriate enforcement action for different types of violations. Policies should include escalating penalties/enforcement for bad actors (i.e., operators who repeatedly violate rules) and multiple offenses of the same type.

Unfortunately, with regard to the proposed regulations, we see little progress made over the previous draft in the area of oversight and enforcement mechanisms. A key aspect in this regard is inspections, which are necessary to ensure that problems are identified in a timely manner and operators held accountable. In the Assessment of Public Comment, DEC says it will “perform inspections during all phases of drilling” (Response 4555) and that it “anticipates conducting inspections for compliance with regulations and permit conditions, including monitoring requirements” (Response 5880). If this is true, DEC should provide greater oversight certainty by

formally listing these steps as required Departmental inspections in the final regulations—particularly because the agency has the statutory authority to conduct additional inspections.

Recent press reports have indicated that the DEC intends to ultimately require at least 13 inspections during well drilling and completion. (See for example www.timesunion.com/local/article/State-well-inspections-inadequate-3714717.php.) Such a protocol belongs in the final regulations with a clear statement that DEC will conduct the inspections, rather than a mere requirement that an operator make inspection results available upon request or hints that inspections will occur. In fact, in the proposed regulations there are only two inspection phases that are mandatory (Sec. 556.2(g)(6)(ii) after initial completion when an operator requests to fracture or re-fracture a well and Sec. 560.6(b)(2) before reuse of the waste pit). As accidents nationwide demonstrate—including the 2010 Macondo well blowout in the Gulf of Mexico and the 2011 blowout in Leroy, Pennsylvania—there is no voluntary way to change the manner in which the industry functions. Narrative language that relies on self-enforcement by the industry will do little or nothing to change the way things are done and the problems that frequently and inevitably arise.

Additional specific comments on enforcement are as follows:

- Sec. 560.6(c)(26)(i) on secondary containment, Sec. 560.3(a)(15) on blowout preventer tests, Sec. 560.3(a)(15)(vi) on pressure test results, and Sec. 560.7(g) on acid rock drainage mitigation plans – These (among others) are critical inspections, but may occur at either the Department’s or the operator’s discretion, without any clarity regarding how often, if ever, the Department will check the accuracy of operator recordkeeping. All language pertaining to these and any other inspection phases should be revised to clearly delineate that they are mandatory and to be carried out by the DEC, and will occur during each phase of drilling operations, as applicable (i.e., from site preparation through site reclamation).
- Some inspection requirements have been removed from the 2011 draft regulations. The 2011 draft included Sec. 750-3.2(b)(35), which required a DEC inspection for partial site reclamation; the current draft does not. A previous provision in Sec. 560.6(c)(30)(ii) stated that “Any HVHF operations are subject to the department’s approval after...a site inspection by department staff;” the current draft limits required DEC site inspections only to the window of time between initial completion and fracture or re-fracture. We recommend that these provisions be reinstated.
- Sec. 552.1 (e) – We do not believe that including a provision for good cause suspension of the term of a permit is necessary, as the regulations allow for a variance should an exception be needed. Otherwise, in the absence of criteria for what constitutes good cause, experience indicates that operators will use this section to “stockpile” permits, and will commence operations largely in conjunction with the market price for natural gas. There is no reason to believe that the time and expense of securing HVHF permits will discourage this practice, particularly because additional time is exactly what the permittee is seeking in this case. What is more, any additional expense to the permittee will be more than offset by the economic flexibility this provision allows. To be effective, a compliance policy must include specific, binding criteria for taking enforcement actions (including fines, penalties, and permit revocations); DEC should not proceed with permitting for HVHF until its compliance policy is updated in this regard.
- Sec. 552.3 (a) – We suggest allowing reissuance of a permit to a different operator only if that operator is not the subject of a DEC sanction, fine, or penalty. The DEC compliance policy should be further updated to reflect this change. Our research across several states indicates that

operators do not seem to pay much attention to penalties unless they interfere with their ability to obtain new well permits—making this subsection an appropriate place for such an enforcement mechanism.

Chemical use and disclosure

Earthworks firmly believes that full public disclosure of all oil and gas drilling, stimulation, and workover chemicals is necessary to ensure that the agency, property owners, policymakers, and the public understand the environmental and health risks associated with operations. We welcome the progress that the DEC has made with regard to disclosure in the proposed regulations, including requirements that operators provide well-specific information on volumes, concentrations, and weights of all chemical constituents to be used and demonstrate that constituents do not pose undue risk to water resources.

However, our experience working with landowners in Colorado, Pennsylvania, Texas, Wyoming, and other states shows that effective, full public disclosure must also prohibit exceptions for “trade secrets” or proprietary chemicals; provide notice to nearby water users of the availability of the chemical constituent list prior to well operations; require drillers to submit any deletions or additions to the initial chemical list after completion of operations; and include a presumption that contamination of water within one mile of the well by any of the chemicals on the list was caused by the well operation (unless the operator has baseline monitoring data taken prior to the operations that shows the existing background levels for the specific chemicals used). With this in mind, we offer the following comments:

- Sec. 552.1 - We suggest that this subsection include a provision to require pre-fracture notice, and disclosure of chemicals to be used in pre-fracture processes, to both the DEC and the landowner (as has been done under Wyoming’s and Colorado’s disclosure regulations).
- Sec. 560 - We recommend that DEC replace the word “product” wherever it appears in this section with “chemical,” as product is a broader term that is subject to trade secret claims and can be a mix of chemicals.
- Sec. 560.2 (b)(16) refers to “material safety data sheet” and (27) to “safety data sheet.” If there is a difference, it should be indicated; if not, only one term should be used. In addition, MSDS’ have numerous accuracy issues and only cover about half of the chemicals used during hydraulic fracturing, making it necessary for regulations to address those chemicals without MSDS’ as well.
- Sec. 560.2 (b)(7) defines a “chemical disclosure registry” as the FracFocus website, which is based on voluntary reporting by companies and allows them to withhold an unlimited amount of information deemed to be “proprietary” or based on “trade secrets.” We recommend that DEC work to develop a publicly accessible database of chemicals used by operators in the state, which is functionally searchable (at a minimum) by well, geographic area, and operator. Such a website should list all chemicals used and their concentrations, regardless of whether they have an associated MSDS or not.
- Sec. 560.3 (d) and Sec. 560.5 (h) should be revised to remove all references to or allowances for any exemptions to disclosure based on “trade secrets,” which experience has proven to be a way for operators to avoid disclosure requirements and limit oversight of chemical use. Recently proposed rules for hydraulic fracturing by the Alaska Oil and Gas Conservation Commission specifically prohibit a trade secrets exemption—a protective, forward-looking measure that New York should emulate. If an operator wishes to make a trade secret claim for a specific chemical,

the regulations should require that a specific exemption request be made to the DEC, with justification for the claim based upon the factors listed for such claims in the federal Emergency Planning and Community Right to Know Act.

- Sec. 560.5(h) requires that information be posted on a chemical disclosure registry concurrent with submission of a Well Drilling and Completion report. This implies that such information will become available to the public only after drilling has already taken place—severely compromising the very point of disclosure, which is to inform the public of risks to their health and environment posed by toxic chemicals.
- Sec. 560.6 (9) – We suggest that the regulation specify how biocides are to be registered. As with other chemicals, we urge that they be posted to a publicly accessible website.
- Sec. 560.6 (24) – We support the prohibition on the use of diesel fuel as a base fluid. However, to be effective in protecting water supplies and public health, the definition must be broadened to ban the use of diesel fuel and petroleum distillates in all forms (for example, as additives). As documented by the Environmental Working Group in its report, *Drilling Around the Law* (see www.ewg.org/drillingaroundthelaw), the oil and gas industry routinely uses petroleum distillates (of which diesel is just one) in hydraulic fracturing that contain benzene, a known carcinogen—in many cases at higher levels than diesel fuel.

We also strongly recommend that the DEC prohibit toxic chemicals for use in hydraulic fracturing, including those scientifically known—and acknowledged in the draft Supplemental Generic Environmental Impact Statement—to have serious human and animal carcinogenic, mutagenic, and other health effects, for example benzene, toluene, 2-butoxyethanol (2-BE), ethylene glycol, and formaldehyde. There is simply no way to ensure that these chemicals will not reach water supplies and impact health, particularly when problems such as accidents, spills, and casing failures inevitably occur.

- Sec. 750-3.7 (k)(2) – We support the requirement of analysis of chemical alternatives. However, we recommend language be added requiring that the criteria for evaluating chemical alternatives with lower toxicity, etc., be carried out by someone with advanced scientific training and expertise. An operator cannot simply be allowed to determine its own criteria, select any studies, or use any available data it wishes—doing so would render this requirement meaningless.
- Sec. 750-3.12 (5)(ii) should be broadened to require that all the chemicals used and their concentrations be posted to a publicly accessible website.

Waste

As Earthworks and many other organizations and members of the public repeatedly stated in comments on the 2011 draft regulations and in other contexts, it is critical that the DEC include in its regulations measures to provide that if wastes generated by the oil and gas industry meet the definition of hazardous waste in the state’s Environmental Conservation Law, they be managed as such. Ending the special exemption from state regulations governing hazardous waste transport, storage, treatment, and disposal is the only way to reduce the risk of water and soil contamination and related impacts on human health, wildlife, and ecosystems.

In the Assessment of Public Comment (Response 5914), DEC stated that “The exclusion has existed since the beginning of the RCRA [Resource Conservation and Recovery Act] regulatory program”—implying that weak environmental regulation on the federal level renders acceptable equally weak

regulation on the state level. This view also ignores the fact that the hazardous waste loophole in RCRA was established decades before the oil and gas industry routinely produced large amounts of wastewater and solid waste containing high levels of salt, chemicals, and Naturally Occurring Radioactive material (NORM).

DEC also seems to base its decision on a view expressed in 1988 by the U.S. Environmental Protection Agency that the loophole in RCRA was needed to promote oil and gas exploration and production—reasoning that should not be allowed to trump protection of health and the environment, a presumed goal of DEC’s proposed regulations. DEC then goes on to say that regulation of hazardous waste would “increase the cost of regulation with little, if any, additional environmental benefit,” but does not provide any scientific or factual basis for such a determination. Furthermore, DEC’s subsequent point that the change would “likely eliminate the recycling of flowback water” would only be true if the flowback were deemed to be hazardous waste—at which point its proper disposal would, in fact, provide environmental benefit.

Additional comments regarding the proposed regulations on waste are as follows:

- Section 554.1 – We support the requirement that operators have plans for the disposition or disposal of wastes and that an acceptable contingency plan will be needed. However, we strongly recommend that, to avoid safety risks and the precipitous or improper disposal of waste, a contingency plan should be required in concert with the disposal plan, i.e., *before* the operator learns that its initial plan is not acceptable. In addition, subsection (b) should be amended to add that pollution of the air is also prohibited. We also recommend that DEC explicitly take into account the seismic history of the area before approving any plan for disposal of fluids (see comments below on seismicity).
- Section 560.6 (c)(7) – We support the requirement that closed loop systems be used for fluids and drill cuttings produced through horizontal drilling, but recommend that this be extended to all such waste produced through vertical drilling as well (rather than reserve pits being allowed for such waste per Sec. 750.3.4(b)(2)). The lower volume of waste produced through vertical drilling does not change the fact that it is the same type of waste as that produced during horizontal drilling, with the same contaminants and associated environmental risks.
- Sec. 560.3 (10) and (11) – As the proposed changes to these regulations greatly and beneficially restrict the availability of reserve pits as fluid management structures, we suggest that the regulations simply be changed to prohibit the use of pits for any process but freshwater storage and that closed loop systems instead be required for all waste storage and handling. However, if DEC persists in allowing reserve pits, the following changes to the draft regulations should be made to minimize the risk of water contamination and safety hazards:
 - Sec. 555.5 (c) needs to state specifically that no waste from well operations (such as contaminated soil or pit liners) can be buried as part of the “earth” used to fill in any pit. In addition, no waivers should be allowed with regard to the fill contents, even with landowner consent, as allowance for contaminated items in particular locations will result in mini-dumps situated across the New York landscape.
 - Sec. 560.6 (a)(4) should clearly state that multi-well pits must use geomembrane type liners (and not clay/bentonite) and require secondary containment and leak detection systems for all multi-well pits. We object to the removal in the revised draft of the requirement of two feet of freeboard in pits, and strongly recommend that it be reinstated. The regulation

should also specify that any liner with damage (such as holes or tears) must be replaced before use of the pit can be resumed.

- Sec. 560.7 (d, e) – As noted in our 2011 comments, pit liners are non-exempt waste under the Resource Conservation and Recovery Act and must be disposed of accordingly. Therefore, the revised regulation should be further modified to ensure that DEC not allow burial of pit liners unless standards and testing protocols are first established to ensure that soil will not be contaminated, for example the closure soil standards that exist in both Colorado’s and New Mexico’s regulations.
- Sec. 560.5(f) – We cannot find elsewhere in these amended regulations what information will be included on a Drilling and Production Waste Tracking Form. We suggest that the minimum information requirements be specified in this section to provide clarity for both operators and the public regarding how waste will be tracked and disposed. For the same reason, we suggest that the term “off site” in Sec. 560.5(g) be more clearly defined, i.e., would this simply mean away from the well site or taken to a centralized facility that services several wells?
- Sec. 560.7 (i) – We support the requirement that flowback fluids and production brine be tested for NORM, but note that the draft regulations do not provide guidance or any numeric standards for what levels of NORM would prompt further action, or what that action would be. The regulation should be changed to specify both standards for NORM levels and appropriate disposal options depending upon the NORM levels present. Consistent with the State Review of Oil and Natural Gas Regulations (STRONGER) guidelines, we suggest that these regulations should establish risk-based numerical action levels above which NORM is regulated, taking into consideration the risk of exposure to human health and the environment.
- Sec. 750-3.12 (b) states that discharge to the ground of flowback, including production brine, is prohibited unless a Beneficial Use Determination (BUD) is made. We recommend that DEC completely prohibit the road-spreading of brine since scientific, factual evidence on the risks of that process to water supplies, health, and wildlife does not exist. DEC is therefore not currently in a position to evaluate individual petitions for road-spreading with (as required by the BUD process) a focus on the “possibility that the handling, transfer, and storage of the waste material may have an adverse impact on the public health, safety or welfare, the environment, or natural resources.” In addition, this section does not specify that a BUD for road-spreading would only be granted pursuant to comprehensive testing for the presence of chemicals, excessive salinity, and NORM. Should DEC persist in considering applications for this process, extensive testing requirements must first be developed and included in the regulations and buffer zones established around water bodies, aquifers, and natural areas.
- Sec. 750-3.12 (c) – We recommend that DEC only allow specially designed facilities to accept, test, and treat HVHF wastewater. Publically Owned Treatment Works (POTWs) should be prohibited from accepting HVHF wastewater, which they were never designed to do. POTWs greatly influence the quality of New York’s drinking water supplies, which must not be placed at risk. Too much remains unknown about the chemicals used in HVHF, DEC has refused to prohibit the use of chemicals with known toxic effects, and POTWs are not equipped to test for and subsequently treat all chemicals that may be present in HVHF waste—some of which could in fact be hazardous waste. A headworks analysis will not be sufficient to address these concerns and ensure that the wastewater is completely treated before being released to rivers and streams.

The same concerns apply to Sec. 750-3.12(d), as privately owned industrial wastewater treatment facilities may be equally unable to fully test for or identify, let alone remove, chemicals

associated with HVHF—aspects that would not be reflected in a treatability analysis. It is notable that the release of treated wastewater in Pennsylvania—which was highly saline and, through the combination of chlorine with bromide, produced compounds that threaten human health—contaminated the Monongahela River and its tributaries, a problem that persists years later despite new treatment requirements and restrictions.

Setbacks

As described in the general comment section above, recent studies clearly show that polluting and harmful chemicals exist in the air around natural gas operations—often at much longer distances than has previously been assumed due to a mix of geographical, meteorological, and topographical factors. Given the serious implications of such emerging evidence for public health and the environment, it is highly unfortunate that the DEC has ignored air emissions as a concern in establishing setbacks.

With this in mind, we recommend that DEC develop strong setback requirements for homes and public buildings that are based on air emission considerations. Ideally, this would be done not only for wells but also other infrastructure (e.g., compressor stations and dehydration units) associated with gas drilling and production. Air emissions is, in fact, one of key areas of focus for other states drafting or updating their oil and gas regulations; for example, Colorado recently extended its setback from schools and hospitals to 1000 feet.

Additional comments on setback requirements are as follows:

- Sec. 553.2, Sec. 560.4, and Sec. 750-3.3 – We must repeat our comment from 2011 that setbacks of at least 3,000 feet from a primary aquifer, private water well, or any other water resource is needed. There is simply no established scientific basis or credible risk analysis that specifies that a 500-foot buffer is sufficient protection. In responding to this and similar comments on setbacks in both the current and previous draft regulations, DEC has not provided any factual rationale or source for a setback determination of 500 feet.
- Sec. 560.4 – The setback requirements in the draft regulations are based on protection against runoff and spills from well pads at the surface, but DEC continues to ignore the issue of sub-surface contamination despite emerging science on this issue. For example, a 2011 study by Stephen G. Osborn, Avner Vengosh, and others at Duke University on methane migration associated with hydraulic fracturing indicated the need for setbacks of at least 2,500-3,000 feet (see “Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing” at www.nicholas.duke.edu/cgc). Revisions to oil and gas regulations in Pennsylvania in 2012 increased the presumption of liability for water supply contamination for unconventional wells to 2,500 feet (see www.portal.state.pa.us/portal/server.pt/community/act_13/20789/act_13_faq/1127392). In 2008, an opinion by the Supreme Court of Texas in a groundbreaking case involving gas drainage (Coastal Oil & Gas Corp. v. Garza Energy Trust) indicated that distances of horizontal hydraulic fractures could vary by as much as 3,000 feet. A 2012 paper by Lara O. Haluszczak and other researchers at Penn State University showed that flowback water and brine from Marcellus Shale gas wells contains naturally occurring radioactive elements can be brought to the surface by drilling activities from thousands of feet below, posing a risk to water quality (see <http://live.psu.edu/story/63286>).
- Sec. 560.4 (c) and 750-3.3 (a)(6) – Given the very limited setback requirements proposed, and the lack of any evidence that they are protective, we question the stated intention to grant variances

that would place gas wells in even closer proximity to water supplies used for drinking, crops, or livestock. We recommend that this section be removed. If it is retained, language should be added to specify that applications for variances will be considered only because drilling in certain settings would be technically unfeasible. This section should also specify that variances will be considered only during the initial permit review process and will not be granted after operational permits have been approved or any gas development activities (e.g., site preparation or road construction) have already commenced.

Air emissions

In 2012, the U.S. Environmental Protection Agency (EPA) issued four new rules for the oil and gas industry under the Clean Air Act, all of which are based on proven technology and best practices that the industry already uses in some states. Not only will these rules reduce air pollution levels, but also provide some relief for communities with new oil and gas development, as emissions often show up as noxious odors in the short term and (as described above in the general comment section) can have considerable health impacts in the long term.

The DEC's proposed regulations do not contain any requirements that reflect a comprehensive level of protection from air emissions. This implies that the agency is not aware of the very real dangers posed by air pollution from the gas industry and the very real need to reduce them. As a result, DEC needs to update regulations within the Division of Air Resources to reflect current science and these new federally mandated protections. Other states are working to do so; for example, Colorado's Regulation 7 is based on a system-wide control approach that requires each operator to achieve a percentage-emission reduction level, with the emissions reduction requirements becoming more stringent each year. This regulation provides operators with flexibility to service and reposition their emission control devices as production levels in the field change. Regulation 7 also requires the capture of emissions from flowback, pneumatic devices, compressor stations, and storage facilities.

Additional specific comments pertaining to air emissions are as follows:

- Section 560.6(c)(4) still leaves management of hydrogen sulfide to conformance with industry standards. The Assessment of Public Comment (Response 6179) acknowledges that the release of hydrogen sulfide is a non-routine event for reporting purposes, a critical point with which we agree. But given this, DEC should add language to require the preparation of a hydrogen sulfide management plan where the gas is present—as is done in most states where this toxic gas is found in connection with oil or gas. In addition, this regulation should require DEC to perform periodic, mandatory inspections to ensure zero hydrogen sulfide emissions.
- Sec. 556.2 (c) needs to specify an efficiency standard for flaring of at least 98 percent (as is required in Colorado's Regulation 7). While flaring may sometimes be necessary as a safety measure, as DEC notes, the practice generates air pollution and is highly undesirable for communities where it takes place. Requiring a high level of efficiency is necessary to increase safety and decrease emissions.
- Sec. 560.3(12) – The type of fuel, engine, and emission controls used in operations greatly determine the level of air pollution that results. DEC should therefore detail specific aspects of an air emissions control and monitoring plan and require the provision of such a plan by operators. As currently worded, this subsection is so vague as to be meaningless, as it implies that operators could submit any type of information and does not tie such information to requirements that operators employ stringent air emission control measures.

Seismicity

In the Assessment of Public Comment (Responses 4401 and 5946), DEC states that regulations are not needed related to the risk of induced seismicity posed by gas development because “the rdSGEIS has characterized the risks of seismicity impacts from high-volume hydraulic fracturing as low.” We disagree with this conclusion by the agency and its use as a rationale for not developing related regulations, particularly in light of recent research undertaken following seismic events.

For example, according to a 2012 report from the British Columbia Oil and Gas Commission, *Investigation of Observed Seismicity in the Horn River Basin*, seismicity in that region between 2009-2011 was induced by fault movement resulting from injection of fluids during the hydraulic fracturing process. In 2011, both an analysis by the British Geological Survey and a report from natural gas company Cuadrilla Resources (*Geomechanical Study of Bowland Shale Seismicity*) concluded that two earthquakes near Blackpool were linked to the injection of hydraulic fracturing fluid. Similarly, a 2011 report from the Oklahoma Geological Survey, *Examination of Possibly Induced Seismicity from Hydraulic Fracturing in the Eola Field, Garvin County, Oklahoma*, linked hydraulic fracturing activities with dozens of small earthquakes in the area.

Given that injection of fracturing fluids clearly creates the possibility of triggering seismic activity, DEC should adopt measures to require operators to avoid the practice in areas with known, mapped faults. Specifically, operators should be required to consult maps of faults in New York and to avoid faults when drilling. Additional comments regarding seismicity are as follows:

- Sec. 750-3.12 (f)(3)(iv) – We understand that DEC would require operators to obtain a permit for deep injection of waste through the Environmental Protection Agency Underground Injection Control program. However, this does not obviate the need to require that fault line mapping be part of the geotechnical information must provide to DEC under this section.
- Sec. 552.1 (b) – We repeat our recommendation from 2011 that the plat map show all known seismic fractures within one mile of the well, similar to the requirement under Sec. 560.3 for abandoned wells. DEC rejected this comment, but we believe that the plat map is, in fact, an appropriate tool to provide both the agency and operators with the information they need to minimize drilling and waste disposal along fault lines.

Additional comments

Sec. 551.6 – We urge the addition of language that costs be calculated based upon third party contractors carrying out the work, as is done, for example, in New Mexico’s oil and gas regulations. As DEC indicates in this section, the regulations can include such administrative costs (including to cover contamination, spill clean-up, and other aspects) as amounts “specified by the department” and provide clarification of how those costs are to be calculated—a basis that could be applied to third party analyses as well.

Section 560.3 (e)(5) provides 15-day public comment period from the date a draft permit is published in the Environmental Notice Bulletin. We recommend that DEC also post the permit notification on its website so that the public can easily access this information, and extend the comment period to at least 30 days.

Sec. 560.5 (d) – We welcome the DEC’s addition of a list of minimum parameters for water quality sampling. We recommend language specifying that the DEC can change this list to add parameters. Understanding of which contaminants can be associated with oil and gas activities continues to emerge through scientific research (for example with regard to mobilization of naturally occurring substances) and as more water testing is conducted in oil and gas fields. DEC should also include in the current minimum list additional key parameters not included in this list that are recommended by the Pennsylvania Department of Environmental Protection (“Recommended Basic Oil & Gas Pre-Drill Parameters”), Penn State University (“Testing Drinking Water Supplies Near Gas Drilling Activity”), and Pennsylvania-based Independent Water Testing (“Baseline Testing Options,” see www.independentwatertesting.com). These include barium, bromide, calcium, conductivity, iron, lead, magnesium, nitrate, potassium, selenium, strontium, sulfate, surfactants (MBAS), total suspended solids, and oil/grease.

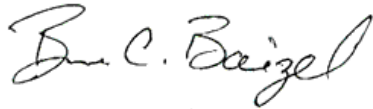
Sec. 750-3.2 (33) – We suggest that the definition of NORM be modified to read, in accordance with the definition used by STRONGER, “Any naturally occurring radioactive materials not subject to regulation under the Atomic Energy Act, whose radionuclide concentrations have been enhanced by human activities such that potential risk to human health or the environment are increased.”

Sec. 750-3.4 (b)(1) – The draft regulations issued in 2011 provided detailed requirements for how to obtain a permit for HVHF operations and required operators to certify, for example, their use of a closed loop system, compliance with pit rule requirements, and fluid disposal plans. This subsection specifically listed a series of operator certifications with respect to a number of critical waste management activities. Since certified statements can be subject to perjury penalties, they serve as an essential form of enforcement assurance. Despite this clear benefit to anyone negatively impacted by operations, Sec. 750-3.4 in the current proposed regulations eliminates all certification requirements. Further, in the Assessment of Public Comment (Response 7036), DEC completely ignores the enforcement mechanism that certification provides. We strongly recommend that the Department reinstate the provisions under Section 750-3.4(b) with these amendments:

- “Documentation” should be changed to “certified statement,” as the term documentation could include almost any document, whether accurate or not. Moreover, the remaining subsections under this section require certification for other items that are required as part of the HVHF permit application; it is logical that certification should also be required here.
- The certification that HVHF operations will take place at least 1,000 feet below the base of fresh groundwater requires a geologic and/or seismic evaluation in order to have any actual meaning. Such an evaluation must consider whether that 1,000 foot interval is impervious to the movement of all fluids, for example, and what the factual basis for the certification is.
- It should be stipulated that certifications must be made by someone with technical training and/or a degree in chemistry, hydrology, or geochemistry. Demonstrating reduced aquatic toxicity or that something poses less risk to water resources and the environment requires scientific training in those areas, and is not credible when asserted by a petroleum geologist or engineer, for example. In addition, the language allowing documentation of less effectiveness or feasibility “to the Department’s satisfaction” should either be removed or strengthened to require a showing of technical infeasibility as the only exception. Based upon experience in other states, if not removed, this “loophole” will quickly swallow the requirement, as operators will not make the effort to provide certifications but rather, as a matter of course, simply assert infeasibility.

Thank you again for your time and attention. Please contact me if you require additional information or clarification.

Sincerely,



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Enclosures

1. Nadia Steinzor, Wilma Subra, and Lisa Sumi. "Investigating links between shale gas development and health impacts through a community survey project in Pennsylvania." Accepted for publication in *New Solutions: A Journal of Environmental and Occupational Health Policy*, Vol. 23(1), Spring 2013, Baywood Publishing Co., Inc.
2. Theo Colborn, Kim Schultz, Lucille Herrick, and Carol Kwiatkowski. "An Exploratory Study of Air Quality near Natural Gas Operations." Accepted for publication by *Human and Ecological Risk Assessment* (November 2012).
3. Earthworks Oil & Gas Accountability Project, 2012. *Gas Patch Roulette: How Shale Gas Development Risks Public Health in Pennsylvania* (summary document).
4. Earthworks Oil & Gas Accountability Project, 2012. *New York State Department of Environmental Conservation: Inadequate enforcement guarantees irresponsible oil and gas development*.