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December 2, 2008

Scope Comments
Bureau of Oil & Gas Regulation
NYSDEC Division of Mineral Resources
625 Broadway, Third Floor
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To whom it concerns:

Please consider these comments on the draft scope of work for a supplement to the generic environmental impact statement on the oil, gas, and solution mining regulatory program. The proposed supplement to the 1988 and 1992 draft and final GEIS is to address impacts of horizontal drilling and high-volume hydraulic fracturing in the Marcellus Shale and other low permeability gas reservoirs.

Section §617.8 of the State Environmental Quality Review Act (SEQRA) outlines the steps required for the scoping process. The DEC, which is acting as the lead agency, has not complied with the rules that it itself is supposed to enforce. Specifically, the requirements found in sections §617.8 (b), §617.8 (f) (3), and §617.8 (f) (4), have not been followed. "The extent and quality of information, … existing information, and required new information, including the required methodology(ies) for obtaining new information; … an initial identification of mitigation measures" are all missing from the document.

I request that a new draft scope of work be prepared and distributed, and any person or entity that wishes to alter their testimony, or submit new testimony, be allowed to do so.

Also, after reading the 1988 and 1992 draft and final GEIS, I find the current draft scope of work to be filled with many unwarranted and unsubstantiated assumptions.

Assumption # 1

The most pervasive assumption is that a supplement to a twenty-year-old draft and final GEIS will be sufficient to protect the environment of half of the State of New York from an entirely new form of gas drilling.

Fact # 1

A new GEIS is needed to study the full impacts of the new drilling techniques.

Twenty years ago the DEC studied the potential impacts of drilling vertical wells into various sedimentary rock formations. The geographic area, well density, and impacts of extraction were entirely different than what is being proposed today.

For example, the word "horizontal" does not appear once in any of the chapters of the multi-volume draft and final GEIS. The word "fracing" is used twice, and the words "hydrologic fracturing" appear six times. In all eight cases, the word "fracturing" is in reference to vertical, not horizontal wells.

In the old GEIS, the anticipated fracking pressure for vertical wells was 2,000 to 3,500 psi. The pressure used for horizontal wells in low permeable shale is 8,000 psi,. One might call it high-volume, high pressure, hydraulic fracturing.

The new form of hydro-fracking is dependent on a toxic brew of chemicals whose impacts were never reviewed in the old GEIS. While the proportion of these chemicals is small, their volumes are significant because of the huge amount of water used. In addition, some of these chemicals are extremely toxic in miniscule quantities.

In section 2.0 the DEC states, "Review will be focused on topics not addressed by the original GEIS, with emphasis on potential impacts associated with the large volumes of water required to hydraulically fracture horizontal shale wells using the slick water fracturing technique. *** However, it is not the Department's intent or objective to re-open the 1992 Findings for any activity that was reviewed in the GEIS and which will remain consistent."

The point is that nothing remains consistent because the technique, scale, intensity, location, and scope of the proposed activity are entirely different.

Assumption # 2

In section 2.1.2 the DEC states, "The Department has no record of any documented instance of groundwater contamination caused by hydraulic fracturing for gas well development in New York, despite the use of this technology in thousands of wells across the state during the past 50 or more years. Division of Mineral Resources staff responsible for permitting and oversight of gas well drilling since 1980 also do not recall any such instance."

By making this claim, the DEC is assuming that staff recall and department documentation of groundwater contamination are complete and fulfill the requirements of SEQRA.

Fact # 2

No study has been performed to find out whether or not ground water contamination has occurred. In addition, as stated in Assumption #1, NYS has no experience with horizontal drilling and high-volume hydraulic fracturing, so the claim of having used "this technology" for over 50 years is erroneous and misleading.

Groundwater contamination may have taken place before the DEC was formed, without DEC notification, or with no DEC documentation of the events. For example, when groundwater contamination occurred, the industry may have brought in water to affected households, filtered dirty water, dug new water wells, paid landowners, or "solved" the

problem of contamination in some other manner. Or landowners whose wells were contaminated may have lacked the resources to do anything about it.

The DEC should contact all current and past landowners whose land has been drilled to find out whether or not there have been instances of contamination in vertical wells. In addition, scientific literature, court documents and newspaper articles should be reviewed. To learn about ground water contamination, the DEC needs to review the records of other states where horizontal drilling and high-volume hydraulic fracturing has been taking place.

Assumption # 3

The DEC assumes that because well casings (may) have protected ground water supplies in vertical wells they will also do so in horizontal wells that will be fracked, and re-fracked, at much higher pressures with greater amounts of water, sand, and other chemicals.

Fact # 3

Concrete breaks down, particularly under stress, as anyone can observe in foundations and sidewalks.

When drilling vertically, or when fracturing rock in a vertical well, it may be possible to contain the flow of materials up and down the drill hole if the casing has been perfectly constructed. However, there are substantive questions about how long a well casing can maintain its integrity, and whether the quantity of water being used in horizontal hydro-fracking, and the pressure under which it is being injected, will break down the cement.

The DEC needs to study the impact of higher pressures, increased volumes, and repeated hydrofracking on well casings. The department also needs to study plugged wells to determine how the concrete is decaying over time, and whether that decay threatens our water and soil from subsurface contaminants. What happens if a plugged vertical well is reopened and horizontal wells drilled through it? The DEC should also document how many wells were never plugged, and discuss what will happen if a new well is fracked near an older unplugged well.

Assumption # 4

The DEC assumes that toxic materials cannot migrate from horizontal drill holes through layers of shale into water supplies, soil, or air.

Fact # 4

Geologists acknowledge that the layers of shale are filled with vertical cracks and fissures. In some places these layers have been displaced so that the angle of sedimentation is no longer horizontal, but folded and angled 45 degrees or more towards the surface.

The sediments that lie beneath our feet are not solid bedrock; they are porous and permeable. They have been subjected to different forces, including tectonic pressures and seismic activity that have created cracks and fissures. These openings allow liquids and gases to move within the earth.

Even the DEC has admitted this:
"Once gas escapes from the wellbore, under certain geologic conditions it can travel considerable distance either laterally or vertically and through natural fractures reach the surface or infiltrate a water zone. Gas in an aquifer can enter the water wells which tap it. The presence of gas in a water well presents a safety hazard. The gas can accidentally be ignited at the water tap or it can build-up inside the house in explosive quantities." [1988 DGEIS, chapter 10, p. 4-5]

Horizontal drill holes, unlike vertical wells, will not be cased. As the gas companies bore through fractured sedimentary rock, they will create new pathways for the migration of naturally occurring and injected toxic chemicals. Since nobody has a map of where these cracks and fissures are located, their width, or their course, there is no way to know how the liquids and gases will travel through the cracks, and when or where they might emerge at the earth's surface. Nor does anybody know how these cracks might change over time with the use of high-pressure fracking, deep impact bombing, geothermal wells, or future seismic or tectonic activity.

The new GEIS should include maps showing areas of potential seismic activity, fractures, and how the number and intensity of fractures increase as you move east. It should also include lists of the natural and injected materials that are chemically capable of seeping through cracks into aquifers, or to the earth's surface. The potential environmental impacts of all these materials, including methane, (future) sequestered CO2, injected fracking fluids, and radioactive gases should be reviewed.

Assumption # 5

In section 4.1 Noise, Visual and Air Quality Impacts, the DEC refers to the old GEIS, where they are described "in terms of both the short duration well drilling phase – when the well site is, in effect, a small construction site – and the long-term production phase when such impacts are drastically reduced because the equipment used during drilling operations is removed and the areas not needed for production operations are reclaimed."

Fact # 5

The construction phase of drilling and fracking deep horizontal wells is likely to be long term and continuous, so these old construction and production phases no longer apply.

A number of things make the assumptions in the GEIS totally out of date:

- The new spacing rule allows 16 well pads per square mile, which is denser than before.
- The amount of materials needed to frack each well has increased exponentially.
- The amount of pressure needed to frack low permeable shale is 3 to 4 times what was needed for vertical wells.
- The amount of time needed to drill and frack each well has quadrupled (from 1 or 2 weeks to 4, 5, or 6 weeks).
- Horizontal wells in shale have low pressure, and frequently need to be re-fracked.

- Horizontal wells often need compressors during the production phase, and these noisy machines run 24/7.

It is likely that a property owner would be suffering the impacts of well drilling in one spacing unit for over a year. If their property adjoins two or more units, then the "construction phase" could be a multi-year process. By the time the first series of wells have been drilled, they might need to be re-fracked.

When the well goes from "construction" to "production," the noise emanating from the pad does not diminish; it just switches from rigs to compressors.

Unlike construction zones, the noise, lights, visual blight, and air pollution would be spewing forth 24 hours a day, 7 days a week.

Since the environmental impacts from horizontal drilling and high-volume hydraulic fracturing are repeated and long lasting, they require a totally new environmental review.

The DEC should study noise levels and review literature on noise impacts of horizontal drilling and high-volume hydraulic fracturing in other states. Monitoring equipment should be established at set distances, and based on the information acquired, statewide standards should be established. When houses or adjoining property lines fall within zones of unacceptable levels, noise buffers around drilling sites should be required.

The DEC should study visual impacts by reviewing literature and making site visits to other states where horizontal drilling and high-volume hydraulic fracturing have been established. Statistics on spacing density and re-fracking activity in those states should be published. Using that information, images of rigs and well pads should be superimposed on aerial photographs of NYS. If done with a GIS system, topographical information and spacing units can be layered onto the images, and impacts on a viewshed deduced.

The proposed drilling for natural gas in areas of low-permeable shale could affect many areas of NYS where there are a substantial number of second home owners and/or in areas where people have chosen their property, and made substantial investments to it, based on existing patterns of open space. Information on population density and the average number of acres per property owner per town should be gathered and published.

In addition, the new type of drilling will require larger well pads and this will affect hilly and mountainous regions that were not studied in the last GEIS. The impact of changing the topography of rural areas to create five or more acres of level land per well pad, at a density of 16 pads per square mile, needs to be studied.

The proposed drilling could severely impact the pristine air quality in the southern half of NYS. Exhaust from the huge number of diesel trucks, dust from construction activity, emissions from wells that will be flared (either intentionally or accidentally), as well as the evaporation of hazardous materials in waste pits, could lead to a profound deterioration of

NYS' air quality. The use and emission of volatile organic compounds (VOCs) in fracking fluids could have a profound impact on all ecosystems.

The DEC should study air quality levels and review literature on air quality impacts of horizontal drilling and high-volume hydraulic fracturing in other states. Monitoring equipment should be established at set distances in those states, and based on the information acquired, standards established for NY. Strict regulations, such as the required use of low sulfur fuel and the prohibition of toxic chemicals in hydro-fracking, should be promulgated.

Assumption # 6

The old GEIS assumes that a municipal water supply can be impacted by a natural gas well located 2000 feet away. Simultaneously it is assumed that a natural gas well can be located 150 feet from a water well serving a single-family home with no impact at all.

Fact # 6

The discrepancy in standards and impact areas defies logic. If a municipal well can be impacted at 2000 feet, then it is possible, depending upon the aquifer being tapped, that a homeowner's well can also be impacted at 2000 feet.

In the draft scope of work, it is implied that the NYC watershed area is somehow "more sensitive" than other areas of the state. This is an unjustified prejudice, not a scientific fact.

According to the old GEIS, over two million people are dependent on springs and wells for their drinking water. Few of these families are financially able to either prove that a gas driller has ruined their water supply or pay for a new source of water.

Updated information on the number of households dependent of springs and wells, as well as the average income per household per town and county, should be gathered and published. The costs of supplying water to a household, business, and farm if their well is contaminated should also be provided.

The DEC should study surface and ground water contamination caused by horizontal drilling and high-volume, high pressure hydraulic fracturing in other states. Based on that information, strict, uniform, statewide regulations should be promulgated. There should be equal protection for the water supplies of all New Yorkers.

Assumption # 7

In section 4.8 Community Character, the DEC refers back to section 4.1: "As with the noise and visual impacts discussed above, any potential negative community impact occurs primarily during the drilling phase, which includes stimulation and completion. The impacts are similar to those of a construction site, analogous to road improvement or sewer excavation projects, with similar potential for temporary community impacts."

Fact # 7

The construction phase of drilling and fracking deep horizontal wells is likely to be long term and continuous, so the DEC's assumptions, based on its experience with vertical wells, no longer apply. (For details see Fact # 5.)

A full build out of natural gas wells in the southern half of NYS will alter each rural community beyond recognition.

The DEC should study social impacts and review literature on social impacts of horizontal drilling and high-volume hydraulic fracturing in towns in other states. Information on population changes, demands for services, fire and emergency budget rates, drug and alcohol addiction rates, crime rates, etc. should be gathered and published.

Other Topics

The following topics have not been mentioned in the draft scope of work and need to be studied:

1. Odors
   It appears that there can be extremely unpleasant smells in gas drilling areas. Information on what chemicals or minerals are causing these odors should be provided, and methods of containment/mitigation should be developed
2. Lights
   Well pads use high intensity lights while they are being developed. Standards should be established so that all lights have hoods or protectors so that the light only shines directly down, not laterally into other people's property, or up into the night sky.
3. Use of gray water
   It has been suggested that one way to avoid water withdrawals is to use water from wastewater treatment plants, or other industrial facilities, for fracking wells. This could potentially lead to new contamination problems at the well pads, in drinking water aquifers, or surface water supplies.
4. Wastewater treatment plants
   It appears that local authorities may be asked to treat fracking fluids in municipal wastewater treatment plants. The impacts of brine, arsenic, NORMS, and fracking fluids on their equipment, operations, and discharge permits should be evaluated.
5. Illegal dumping
   Study impacts from the illegal dumping of drilling waste and fracking fluids.
6. Health impacts
   A full build out of the natural gas industry over half of NYS could have dire consequences on people's health, through soil, air, and water contamination. A full study, preferable by the Department of Health, should be undertaken.

Thank you for consideration of my comments.

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