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Date: December 15, 2008
To: Bureau of Oil & Gas Regulation NYSDEC Division of Mineral Resources
cc: Tompkins County Legislature, Tompkins County Planning Department, Tompkins County Board of Health, Susquehanna River Basin Commission, Delaware River Basin Commission, Great Lakes-Saint Lawrence River Water Basin, and NY Water Resources Institute
From: Environmental Review Committee of the Tompkins County Environmental Management Council (EMC)
Subject: Response to October 6, 2008 Draft Scope for Draft Supplemental Generic Environmental Impact Statement (dSGEIS) on the Oil, Gas and Solution Mining Regulatory Program

GENERAL STATEMENTS

This document is our response to the scoping document. We have written it in a way that is very similar to the scoping document; issues are summarized and specific items that we would like to see addressed in the dSGEIS are bulleted at the end of each section. Items in the DEC scoping document are referred to as SD followed by a section number.

In public discussions about drilling in Tompkins County, water quality causes the most consternation. Of greatest concern is that toxic chemicals could drain into surface waters or leak into ground water aquifers. Potential sources of water contamination are present in hydrofracturing fluids and drilling muds, drilling cuttings and flowback from the wells. Activities at the drilling site as well as handling and disposal of these media have the potential to pollute our environment.

The following questions and recommendations result from our review of regulations that govern drilling in NY and other states and our knowledge of environmental concerns discussed in Tompkins County. We ask that our comments be addressed in the DEC's dSGEIS. Also, we think it is essential that drilling issues are discussed among the many sub-units of the DEC and among different State agencies. Only this coordinated approach will be effective and flexible enough to address the many issues surrounding drilling in New York State. We appreciate the benefits of acquiring natural gas and we hope that our comments can help to shape a thorough assessment, which in turn can be used to mitigate associated environmental impacts.

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THE DRILLING SITE

The siting regulations from the 1992 GEIS will be revised in the supplement to account for any concerns associated with the larger project sites proposed for the Marcellus Shale (SD 2.1.4). These larger projects bring with them more complications than just increased volume. Certain boreholes in an

array of horizontal holes may yield too little gas to make a production well, so drilling sites may remain active longer.

The permitting process (CH 3 of the 1992 GEIS) states that each drilling project will be considered an individual project. For this and other reasons construction of a pipeline was not discussed in the GEIS. We suggest that the anticipated increased drilling activity warrants a review of this policy. Once a high concentration of wells has been drilled in an area, there may be increased pressure to transport the gas across an undesirable route if no other alternative exists. We suggest that for the site visit portion of the permitting process that a question be added to the application: if it appears as though the surrounding environment could limit transportation of the acquired gas, a box should be checked and an explanation or proposed solution should be described.

- **The DEC should specify whether well-abandonment procedures for unproductive boreholes in an array that also has productive wells require different procedures from specified in CH 10 & 11 of the 1992 GEIS.**

- **Incorporate a method to flag any environmentally-challenging locations prior to drilling, should they be difficult to transport the acquired gas from.**

COMPOSITION of HYDROFRACTURING FLUIDS

Of particular concern to our group is DEC's proposed policy described in SD 2.1.2.3 regarding the extent to which oil and gas companies must disclose the additives and compounds used in fracturing fluids. The formulations are patented intellectual property that the drilling companies maintain are legally protected from public disclosure. The scoping document states in SD 2.1.2.3 that despite any federal exemptions from regulation (2005 Energy Policy Act) the DEC will require drilling companies to reveal the composition of hydrofracturing fluids for government review, but not to the public. We do not think that this is acceptable to keep the public in the dark. Furthermore, the PA application for drilling already requires a description of chemical analysis of any hydraulic fracturing fluid to be used at the drilling site. In effect, this makes the fracturing fluid contents public knowledge as these completed applications are available for public review.

Gas drilling activities are often actual and perceived threats to many citizens. We realize that patent laws do exist, however the compromise in PA has made the ingredients known to the public without divulging proprietary formulations. We recommend that NY State adopt a similar approach that addresses the public safety and peace of mind of citizens. Landowners and municipalities are concerned about contamination of their ground water wells by hydrofracturing fluids. Contamination of well water can be detected only by establishing the pre-drilling baseline chemistry of well water. Baseline compositions are nearly impossible to measure if the identities of additives are unknown. We strongly urge that the dSGEIS specify that hydrofracturing formulations are in the public domain and that Material Safety Data Sheets for each compound are readily available. Along with each listed compound, the DEC should briefly state its opinion about the actual threat of the additive to public health and to the natural environment. This knowledge must be available to the public to make it possible for citizens to determine whether ground or surface has been contaminated by drilling fluids.

We also have concerns about the capacity to advise emergency personal. Under SD 4.6 Road Use, there is directive for the “coordination with local emergency management agencies and highway departments”. The DEC should include precautionary measures for emergency personal and access to information on the appropriate treatments in hospitals.

Benzene, toluene, ethylbenzene, and xylenes (BTEX compounds) should be banned from use in fracturing fluids in NY State. BTEX compounds are found in gas and diesel and are regulated by the Safe Drinking Water Act. They are of primary concern because of the carcinogenicity of benzene. In the 2004

US EPA Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs (EPA 816-R-04-0003) the EPA acknowledges that diesel fuel contains BTEX compounds and claims that they have addressed the issue through an agreement made with three major drilling companies. In an attempt to minimize the potential for introduction of these compounds into drinking water, the EPA asked these three main drilling companies to eliminate diesel fuel from their hydrofracturing fluids (an action believed to affect 95% of hydrofracturing projects). As the majority of drilling activity has been conducted without diesel, viable alternatives do exist.

- **Examine whether public disclosure of the chemical content of fracturing fluids should be required.**

- **Examine whether baseline water quality testing of potentially affected aquifers and/or wells should be required prior to drilling.**

- **Examine the capacity of emergency personal to safely handle accidents associated with hydrofracturing fluids and treat patients.**

- **Examine whether the DEC should control and regulate the chemical content of fracturing fluids used in NY rather than simply regulate handling.**

DISPOSITION of CUTTINGS and MUDS

While SD 3.0 does indicate the intention to evaluate cuttings disposal concerns associated with radioactive materials, there is very little further discussion of cuttings from the drilled wells. The cuttings can be complex mixtures of drilling fluids, pyrite, organic material, gypsum, calcite, clay minerals and other materials. Chapter 9 of the 1992 GEIS states that drilling mud is rarely used in NY, however we are hearing from the NY drilling companies that mud is commonly used for drilling. The scoping document does not specify if muds are considered fluids, or how they will be handled and disposed of. Our general concerns about radioactive materials, heavy metals and salinity are described under "Environmental Fates of Contaminants". Other concerns specific to cuttings are described below.

Black shale, including the Marcellus shale, contains fine-grained pyrite (FeS_2). Pyrite dissolves into aqueous iron and sulfate on contact with air and water. When these dissolved species react with other aqueous constituents, two products can form. One is the mineral gypsum ($CaSO_4 \cdot 2H_2O$), which has a molar volume three times that of pyrite. The other product is sulfuric acid. The conversion of pyrite to gypsum is accompanied by swelling. The sulfuric acid is of concern as it mobilizes metals from the surrounding shale and facilitates transport of these toxic constituents into adjacent environments.

- **Evaluate the environmental fate of contaminants in cuttings, muds, and associated fluids; consider these fates in a discussion of handling and disposal of these materials.**

- **Examine the disposal of cuttings more broadly, including volume to be disposed of and expansion of volume as pyrite oxidizes to gypsum.**

ENVIRONMENTAL FATE of CONTAMINANTS

Under the current GEIS, waste fluids will be treated at industrial and occasionally municipal wastewater treatment plants (WWTP). Unfortunately, WWTPs do not remove all pollutants efficiently so contaminants are still routinely discharged into aquatic environments in WWTP effluents. The inefficiency of WWTP removal of contaminants is an issue of concern that has become much more evident since the writing of the 1992 GEIS. The DEC should evaluate the increased burden of hydrofracturing-associated contaminants into aquatic environments through WWTPs. Specific disposal requirements should be established for waters exceeding thresholds signifying problematic concentrations of hydrofracturing chemicals, radioactive material, salinity and heavy metals.

Even when efficient removal is achieved, some of this removal is due to sorption of the compounds to sludge. Sludges are often land applied, at which point compounds can then leach into the environment. SD 5.1 discusses the possibility of notifying the public and local governments of fluids discharges into municipal WWTPs. This information must be publicly available because of the commonness of reuse of sludges and to allow scientists to choose locations for study of any potentially deleterious effects.

While the beneficial reuse of waste products is a good industrial ecology practice, there can be associated environmental impacts when these products contain pollutants. There are inaccurate perceptions that "natural" things are not dangerous, and this has led to the use of brines with heavy metals for deicing and dust control. Chapter 9 of the 1992 GEIS discusses the abundance of heavy metals in deep well waters (9.6.f) as well as the threat to aquatic environments and drinking waters posed by repeated application of flowback waters (9.7.d). Chapter 9 of the 1992 GEIS also suggests that metals (associated with flowback such as brines) can be removed from drinking water by a water softener. This solution only addresses the threat to humans but not wildlife. Given the high volume of brines in need of disposal this approach should be reevaluated. Section 9.8 of the GEIS states that most brines are disposed of on dirt roads for dust control and highways for deicing, however local permission is required. As science has advanced, we have become increasingly aware of the long term concerns associated with applying contaminated wastes to the environment, therefore the DEC should reevaluate their recommendations for disposal of brines and other flowback. We do support the reuse of waste products when it is safe; however the DEC must evaluate the potential for pollution associated with their use.

SD 3.0 states that the DEC will investigate if the presence of radioactive materials "warrants special precautions regarding cuttings or fluids handling and disposal". Other potential contaminants in stagnant deep well waters and cuttings must be given more stringent review. The DEC should evaluate the handling and disposal of cuttings and fluids with respect to heavy metals and salinity as well.

- **Either clarify that drilling mud is included in the waste fluids for which disposal options will be examined, or add drilling mud as a separate category that must be examined.**

- **Examine the cumulative impacts of contaminants on aquatic environments from WWTP effluents and terrestrial environments from sludge application, and specify threshold concentrations for concern and disposal requirements.**

- **Evaluate the cumulative impacts of using waste brines for road spreading to determine the potential for heavy metal pollution associated with their use, including impacts on drinking water and aquatic environments. Use this information to set safe concentrations for brines used for road spreading.**

- **Evaluate the handling and disposal of cuttings and fluids with respect to heavy metals and salinity.**

ASSESSMENT of POLLUTION EVENTS

SD 2.1.2 discusses precautions taken to seal off groundwater aquifers and states that instances of groundwater contamination have not been documented in NY State. A similar statement was made by the EPA in reference to the whole United States in their 2004 evaluation (EPA 816-R-04-003) even though several instances of contamination had been cited elsewhere, such as in the 2002 NRDC report "Hydraulic Fracturing of Coalbed Methane Wells; A Threat to Drinking Water". Certainly, geological and hydrological conditions vary greatly between the eastern and western states, however there have already been instances of groundwater contamination in the state of PA. When an accident happens, a drilling company may offer a water treatment option to the landowner in order to quickly remedy the situation and avoid litigation. These instances of contamination may be less well documented, however they illustrate the fact that accidents do happen. The DEC should evaluate the circumstances leading up to these (suspected) pollution events and prescribe appropriate mitigation measures for remediation.

In order to be certain that funding is available to perform any necessary remediation efforts, a bond should be posted during the permitting process. Chapter 7 of the 1992 GEIS describes bonds for well capping and surface restoration. We suggest that a refundable financial security be required for potential remediation of polluted water sources.

- **The DEC should evaluate the circumstances leading up to these (suspected) pollution events and prescribe appropriate mitigation measures for remediation.**

- **Examine whether the financial security described in chapter 7 of the 1992 GEIS should be expanded to include a bond for remediation of these previously unrecognized pollution events.**

STORAGE of FLUIDS in OPEN PITS

It is unclear what fluids may be stored in open pits and for how long. Most likely, this is because these regulatory discussions will be based on the operational steps of drilling. We suggest that a safe standard be set for the storing of each fluid, and that can then be applied to different applications of the drilling process. SD 2.1.2.1 states that fracturing fluid additives are blended as they are pumped into the wellbore so there is "no long-term on-site storage of pre-mixed fracturing fluid". Then, it goes on to explain that the fracturing fluid may be stored in open pits after it is recovered as flow back. SD 4.2.3 states that fluids may only be stored on site for 45 days after drilling is completed, unless an extension is approved. However, there is no mention whether these fluids are contained or stored in open pits. Furthermore, with the proposed high-volume multi-well projects, there should be specific clarification in regards to when drilling is considered complete and how long fluids may be stored on site. In addition, SD 4.2.1 aims to reduce water withdrawals with "alternative sources of water such as (WWTP) effluent, cooling water or saline aquifers". Later in section 4.2.1.1 it is stated that the SRBC will encourage the use of "sources such as flowback, production brines, and other wastewaters". The DEC should clarify which of these fluids may be stored in open pits, and, since it may be tempting to view these water sources as comparable to fresh water brought on site, their handling should be clarified as well.

We do not support the use of any open pits except for the storage of clean fresh water. In addition to threats from overflow or compromised pit linings, a functioning pit with contaminated water remains a threat to wildlife in search of a body of water. At the very least, the banning of open pits for contaminated water storage should be given extra consideration as a mitigation measure for the protection of specific wildlife habitats, floodplains, and wetlands (SD 4.3, 4.4, and 4.5). We urge you not to allow the use of larger lined pits in high-volume operations (SD 4.1.2), except for storing clean water. Therefore, we would support a requirement to use steel tanks to contain flowback fluids as suggested in SD 2.1.2.1, especially for high-volume operations as discussed in SD 6.0.

- **Examination of whether open pits should be banned for storage or mixing of any fluids other than clean fresh water prior to use in the drilling process.**

IMPACTS on WILDLIFE

- **SD 4 on Noise, Visual and Air Quality Impacts should be broadened to include noise and air quality impacts on wildlife.**

Thank you for evaluating the environmental impacts of high-volume hydraulic fracturing in NY State, and thank you for the opportunity to comment.

Sincerely,

Amy Risen, Co-Chair of the Environmental Review Committee