TOWN OF ULYSSES
RESOLUTION NO _____ OF 2011

RESOLUTION TO SUBMIT COMMENTS TO THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION ON THE REVISED DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT (sGEIS) ON OIL, GAS AND SOLUTION MINING.

WHEREAS the New York State Department of Environmental Conservation (DEC) has issued a sGEIS on oil, gas and solution mining in New York State; and

WHEREAS once the sGEIS is codified into regulations, municipalities will no longer have a direct bearing on the **regulation** of drilling for natural gas using high volume hydraulic fracturing, leaving municipalities with little recourse on the drilling process nor the rate at which drilling occurs within their borders; and

WHEREAS municipalities will bear the burden of an inadequate sGEIS and regulations, which in Pennsylvania and other states has led to detrimental changes in the character of communities; huge increases in truck traffic; contamination of air and water resources; pressure on municipal services such as emergency response, police, hospitals, schools, jails, road maintenance, and municipal administration; and spoiling of scenic and natural resources; and

WHEREAS the Town of Ulysses is, by law, charged with protecting the health, safety and welfare of the people of the Town; and

WHEREAS the Town of Ulysses intends to abide by its Comprehensive Plan to provide a high quality of life for its residents and the current revised sGEIS makes that goal unachievable.

THEREFORE, BE IT RESOLVED that the Town of Ulysses submits the following comments to the Department of Environmental Conservation on the revised draft supplemental Generic Environmental Impact Statement (sGEIS) on Oil, Gas, and Solution Mining; and

BE IT ALSO RESOLVED this resolution be sent by U.S. mail to Peter Briggs, Director of DEC Bureau of Oil and Gas Permitting and Management; Bradley Field, Director of the Division of Mineral Resources; Commissioner Joe Martens; Governor Andrew Cuomo; NYS Senators Dean Skelos, Brian Kolb, Thomas O'Mara, James Seward, and Michael Nozzolio; Speaker Sheldon Silver; Assemblywoman Barbara Lifton; Chair of Senate Committee on Environmental Conservation Mark Grisanti; Chair of Assembly Committee on Environmental Conservation Robert Sweeney; Attorney General Erik Schneiderman; U.S. Senators Charles Schumer and Kirsten Gillibrand; Secretary of the Interior Ken Salazar, Representative Richard Hanna and Representative Maurice Hinchey; EPA Administrator Lisa Jackson, EPA Region 2 Administrator Judith Enck; New York State Association of Counties; New York State Association of County Health Officials (NYASCHO); the Tompkins County Board of Health; Chair of Tompkins County Legislature.

MOVED BY: SECONDED BY:

VOTE

COMMENTS ON THE sGEIS FROM THE TOWN OF ULYSSES

GENERAL/MISSING SECTIONS

COMMENT PERIOD

- The regulations governing gas drilling have been simultaneously released with the sGEIS for review. Managing comments for the 1500+ sGEIS is enough of a burden for municipalities without adding the need to comment on regulations at the same time. The regulations should be based on the sGEIS. The DEC should allow additional time to comment on the regulations AFTER the sGEIS has been completed.

- The DEC must not issue any drilling permits until after the sGEIS and regulations are complete.

- The sGEIS does not require or refer to an analysis of public health impacts, despite the fact that fracking-related air pollution and the potential for water contamination may have serious effects on people-especially the elderly and children, and communities downwind and downstream of proposed fracking operations. There is growing evidence of negative health impacts related to gas extraction in other states. The DEC in its sGEIS must undertake further review of fracking and the impacts of horizontal drilling to ensure that all environmental and public health impacts are mitigated or avoided.

- As suggested by the United States Environmental Protection Agency (USEPA) in its 12/30/2009 commentary on the dSGEIS, the DEC must actively involve the Department of Health in the review process. Indeed, the problems associated with shale gas development near housing have only recently been catalogued as drilling has moved into suburban locations and farming communities. http://abcalliance.org/wp-content/uploads/2011/09/hydraulic_fracturing_and_children_2011_health_prof.pdf

- There is a growing body of evidence on the health impacts associated with shale gas industrialization, yet the DEC has avoided a health impact assessment of them. The DEC must require an in depth review of health impacts. http://www.scribd.com/doc/64476300/Fracking-Health-Impact-Assessments.

- The DEC Advisory Committee must have representation from County Health Departments in order to understand the impacts the proposed regulations will have on local governments.

DEC STAFFING and MANAGEMENT

- The DEC has an inherent conflict of interest since its duty is to "conserve, improve and protect New York's natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well-being", but it also issues gas drilling permits which have been shown in other areas to likely harm the environment.

- New York DEC has been subject to steep budget and staff cuts and does not have adequate staff or resources to properly oversee high volume hydraulic fracturing (HVHF). This reality raises the possibility that the DEC will be forced to be less thorough than is required for its reviews and permitting despite the risks.

- The thousands of miles of pipelines (and compressor stations required for drilling) to transport natural gas to market will be reviewed by the Public Service Commission, a different agency than

under a different process than the DEC. Without an accounting of the impacts from pipelines and compressors, New York's environmental assessment is incomplete and the full impact of fracking is unknown. As such, Governor Cuomo should direct state agencies to coordinate their efforts in order to protect our air, water and communities.

PROCESS – DSGEIS and REGULATIONS

New York State's SEQRA law provides for the gathering of environmental information to inform the creation of regulations prior to the implementation of projects. DEC's proposal to write and perhaps promulgate regulations concurrently with the SEQRA review certainly violates the intent of the law and may invite legal challenge.

CUMULATIVE IMPACTS and GENERAL COMMENTS

1) **Cumulative Impacts for Water Withdrawals -** The SGEIS addresses cumulative impacts for water withdrawals by using the pass-by flow determinations; however, the SGEIS needs to address cumulative impacts on water resources in all areas. Although the Water Resources Bill passed in 2011 would address cumulative impacts of groundwater and surface water withdrawals, when and if regulations are developed, rules governing water withdrawal permits must be developed before permits are issued for drilling. Without the permitting framework for water withdrawals, it is not possible to determine if there are adequate safeguards for surface water and groundwater.

2) Cumulative Impacts for all Interconnected Drilling Activities A process needs to be established to address impacts from all interconnected activities, including drilling operations, that are regulated by DEC and pipelines and compressor stations that are regulated by the Public Service Commission (PSC). An Environmental Impact Statement for the gas lines and compressor stations must be performed by the PSC to assess the cumulative impacts on water resources, community infrastructure and quality of life issues such as noise, road damage and air quality from the additional pipelines and compressor stations that will be needed to transport the gas from the thousands of individual well pads to the regional pipelines. Compressor stations will be needed, with pipelines from each well to the compressor station, and additional pipelines from the compressor station to the main transmission line. However, the rdSGEIS does not address the impacts of the pipelines or compressor stations necessitated by well drilling operations. The impact of the vast network of access roads, pipelines and compressor stations must be addressed by the SGEIS. The rdSGEIS identifies the PSC as the responsible agency to oversee construction and protection of the environment for pipeline construction. This segmentation of the environmental impact assessment makes it difficult for decision makers and the public to adequately assess the total environmental impacts anticipated from gas drilling activities.

3) **Program to Monitor and Protect Drinking Water Resources**

Proper monitoring and assessment strategies must be in place to protect the State's water resources, and sufficient laboratory capabilities for analysis must be in place prior to drilling. The state currently does not have a strategy in place for data collection and analysis. Such a strategy is key to developing a comprehensive regulatory process that must be in place prior to drilling. All stakeholders (regulatory personnel, drilling companies, and the public) need to be ensured that valid data are being collected and disseminated in a cost effective manner.. Considering the volume of environmental and public health data that will be generated by HVHF gas drilling, it is essential that NYS Department of Health develop and manage comprehensive databases in order to facilitate effective, comprehensive oversight and public protection during gas drilling. A program must be developed for electronic sharing of monitoring data and must be

shared with local health departments as they will be the agency first contacted if any contamination is detected.

Funding for Environmental Oversight
Permit fees must be increased to cover the entire cost of a regulatory program for environmental oversight of the Marcellus gas drilling.
The State will incur increased costs for 1) DMR personnel to oversee field operations and process the associated paperwork, 2) health department personnel to develop and maintain a database, and to evaluate drinking water quality data collected from groundwater wells near the drilling sites and respond to water quality complaints, 3) NYSDEC personnel to monitor surface water discharges from treatment plants, 4) personnel in the NYSDEC to develop and maintain a database on surface water flows and quality in the areas where drilling is occurring, 5) other regulatory personnel needed in the NYSDEC Division of Water and Bureau of Hazardous Waste and Radiation Management as well as the DMR to oversee the immense program that drilling in the Marcellus Shale will necessitate, and 6) local municipalities will need support to cover increased costs for expanded services caused by drilling activities. The Division of Budget must perform an economic analysis to ensure the fees are adequate to fund the necessary environmental oversight.

ECL 27-0903(2) Environmental Conservation Law statutory language does not support an exemption for High Volume Hydraulic Fracturing wastes from management as hazardous waste. ECL 27-0903(2) provides for an "exemption from the provisions of this title (Title 9, Industrial Hazardous Waste Management) for the management of small quantities of wastes listed or identified as hazardous when generated by research and limited use operations". The SGEIS, relying on data from High Volume Hydraulic Fracturing operations in Pennsylvania, estimates that flowback water recovery is in the 9-35% range. If 2.4 -2.7 million gallons is used for each wells' hydraulic fracture, flowback water generated will range from 216,000-945,000 gallons. This is neither a "small quantity" nor "limited use operation". The provision in Part 371.1(e)(2)(v) to exclude drilling fluids, produced water, and other wastes associated with the exploration, development, or production of natural gas", whether justified for application to vertical well wastes or not, clearly does not apply to HVHF wastes. If not treated properly, these hazardous wastes will contaminate both drinking water and soil. The NYSDEC, the agency delegated to protect our environment, has no compelling reason to support this loophole to the proper transportation, treatment, and disposal of such wastes. Continued advocacy by the NYSDEC in support of this interpretation of the statute will undermine the agency's stated objective of protecting NYS's environment and public health.

Permit Re-evaluation.
The NYSDEC re-evaluation of specified permit condition in two or three years should involve public review and comment.

Other low permeability shale formations
The scope of the dSGEIS includes all low permeability shale formations where HVHF gas drilling will be employed. However, many sections of the document only reference the Marcellus Shale. Environmental impacts associated with other low permeability gas reservoirs where the hydrogeochemistry is different than the Marcellus shale are not addressed in the dSGEIS. The SGEIS must be expanded to include potential impacts from other formations.

Local Government

Local municipalities are already burdened by additional costs to their budgets in the review of the dSGEIS and proposed regulations and in preparing for potential gas drilling impacts. There is no structure for municipalities to recover those costs other than to raise taxes. If/when gas drilling occurs, there will be even more financial burdens on many rural municipalities that lack the staff to monitor activities within their borders.

All other states other than New York and Pennsylvania have an extraction tax of between 7% and 25%. Local municipalities (not to mention NYS) have already expended hundreds of thousands – if not millions – of dollars preparing for the expansion of the gas industry. An extraction tax of at least 12% must be imposed in order to pay for NYS's regulation, inspection and enforcement of the gas industry and local municipalities' costs as a result of the impact of gas drilling. The 12% tax should be evenly divided between the state and the local municipalities. The ad valorem tax should be increased to at least 8% and at least 4% go to towns, which are the level of government which must absorb most of the costs of gas drilling.

Accidents and Violation Reporting

Currently the DEC does not have an adequate electronic record-keeping system of violations, accidents, and spills which makes aggregating problems and notifying local governments and residents so difficult as to be nearly impossible. The DEC must bring their violations reporting system into the 21st century by making them easily available to the public electronically.

Compulsory Integration

New York State is one of the few states to allow compulsory integration and possibly the only one to allow it against individual homeowners. NYS must rescind compulsory integration to respect the rights of its homeowners.

PERMIT RE-EVALUATION

The NYSDEC re-evaluation of specified permit conditions in two or three years should involve public review and comment.

EXECUTIVE SUMMARY

- The dSGEIS allows any 'proprietary' chemical constituents not to be subject to public disclosure. It appears that the companies can avoid disclosure, if they simply claim the additive is "confidential". The DEC must require full disclosure of all chemicals and additives used in the hydro-fracturing process. - SGEIS 2011 Executive Summary "Mandatory Disclosure of Fracking Additives and Alternatives Analysis" - page 22

- The dSGEIS only weakly suggests operators "evaluate the use of alternative fracturing additive products that pose less risk"- SGEIS 2011 Executive Summary "Mandatory Disclosure of Fracking Additives and Alternatives Analysis" - page 22.

CHAPTER 1 – INTRODUCTION

1.7 ENHANCED IMPACT ANALYSIS AND MITIGATION MEASURES

1.7.5 Local Planning Documents

- Article 8 of the ECL, commonly known as SEQRA, has necessitated the current Supplemental Generic Environmental Impact Statement (SGEIS) which DEC must adopt for the technique known as high volume hydraulic fracturing natural gas drilling. As part of that review, the DEC is

required to evaluate and consider the character of the communities in which natural gas drilling is proposed to take place. This character is best determined by the individual localities, and those that have passed bans on natural gas drilling or "heavy industrial uses," statements in their zoning ordinances, and/or resolutions stating objections to the practice, have clearly shown a collective determination that such activity is not consistent with the character of their communities. Such a determination would constitute an adverse environmental impact which could not be mitigated. DEC should include this analysis and determination within the SGEIS.
Further, as regulations have been proposed, they are the appropriate place for this issue to be addressed. DEC is charged with implementing the proper and constitutional meaning of ECL 23-0303(2); this may be accomplished by the express acknowledgment of local authority to regulate land use controls of gas, oil and mineral mining activities, or the determination by DEC that no permits shall be issued where an adverse impact to community character is determined under SEQRA, as laid out above.

1.7.9 Flowback Water Disposal

- The state must not allow municipal sewage treatment plants to treat drilling wastes, because such plants are not permitted to handle the toxic elements in such wastes.

- Some components of drilling waste would normally qualify as **hazardous waste** under state and federal law but have been exempted from these laws. The DEC must not allow any waste that would qualify as hazardous waste in any other settings to be sent to municipal sewage treatment facilities or disposal wells in New York nor allow it to be shipped to other states.

- **Toxicity monitoring plan must be improved.**
  The toxicity monitoring program proposed for the hydraulic-fracturing industrial process is inadequate. To the layman the plan may seem reasonable but not from a chemical and toxicological point of view. The suggested monitoring does not protect the health and safety of the public who rely upon clean water and clean air. As a first step in water monitoring, the flow back must be declared a hazardous waste so that there is a written paper trail following each load of waste. A chemical analysis of the flow back water would provide inspectors with concentrations of various components but it would not give them the overall health effects. The MSDS sheets and the listed properties do not apply to mixtures of the chemicals. Those mixtures themselves must be tested as to their properties so that emergency personnel know what measures to take if there is a spill. In addition, there are unknown components in the flowback water that will be produced by high pressure reactions of the hydraulic fracturing fluid and the shale. Monitoring of this flowback water will be important because it may have very different properties from the hydraulic fracturing fluid that will relate to its proper treatment and storage. A thorough chemical analysis should be done of the flow back fluid with special attention to its corrosiveness and its stability in storage. Complex mixtures such as hydraulic fracturing fluids and flowback fluids can be more harmful than their component parts. Therefore comprehensive toxicological testing is appropriate because it would identify the effects of the overall fluid in terms of endocrine disruption and carcinogenic effects. Concern over these toxicological effects was stated in response to the draft SGEIS (The Environmental Magazine, April 2010) but has not been dealt with in the current document. Modern toxicological methods would have to be adapted to this use in order to determine potential deleterious effects of hydraulic fracturing mixtures.

1.7.10 Management of Drill Cuttings

- The plan by the DEC to track the solid and liquid wastes, generated in connection with fracking, is positive; however under the sGEIS, tracking of these wastes is the responsibility of the gas

industry operators. The DEC must take a more active role in tracking waste that, in other settings, qualifies as hazardous. The gas industry must not be allowed to oversee itself in this area.

1.7.15 Community and Socioeconomic Impacts

- The DEC needs to do a comprehensive, focused plan to review and analyze the consequences of a full build out of many wells on a community.

- A monetary value must be assigned to potential degradation of the environment in a comprehensive review of community and environmental impacts from drilling.

- As proposed, the DEC staff will review the well applications one at a time, without considering the impact of many wells being permitted in close proximity. Impacts on communities must be considered from the standpoint of multiple wells being introduced to an area not one at a time since the industry profits from a high drilling density within an area.

- In its considerations of the economics of drilling, the DEC and the State must acknowledge that:
  - Relatively few local jobs will be produced by the gas companies. Many of the higher paying jobs associated with HVHF go to employees who are residents of other states and will not be paying state income taxes. Likewise, most of the technical field jobs go to transient workers with no social or other connection to the local community. The experience in other communities has demonstrated an increase in crime, local housing costs, and a strain on health care resources (see Sayre Health report).
  - Small businesses will face higher labor costs as a result of competing with wages paid by the gas companies in order to keep their employees on the job. http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_CaRDI.pdf.

- The SGEIS is incomplete; it does not yet contain the socio-economic analysis of whether there is a balance between risk/reward.

CHAPTER 2 – DESCRIPTION OF PROPOSED ACTION

2.4.4 Public Water Systems

2.4.4.1 Primary and Principal Aquifers

- **Prohibit HVHF near all primary aquifers.**
  The DEC is proposing to prohibit fracking in primary aquifers that serve as public drinking water supplies, but this "prohibition" is only limited to a couple of years after which the state could "reconsider" the bans. In addition, the DEC does not lay out the conditions under which "reconsideration" would be reviewed. The DEC needs to prohibit HVHF near all aquifers.
- **Sunset date for buffers.**
  The preliminary draft proposes to place some areas of the state off limits to gas drilling, but upon closer examination, many of the restrictions have sunset dates and some of the protective buffers only call for site-specific individual environmental review, rather than clear restrictions. The DEC needs to strengthen and clarify restrictions and the requirements for buffers and site-specific environmental review.
- **Mapping of aquifers is inadequate.**
  In order to determine a 500 foot buffer to a principal aquifer, the aquifer must be mapped at least to the scale of 1:24,000 feet but many aquifers are only mapped at the 1:250,000

foot scale. The DEC must increase buffer requirements overall but particularly when mapping of the aquifers is inadequate. Part of the fee structure for permitting should go to funding better maps of aquifers throughout the state.

CHAPTER 4 – GEOLOGY

4.1 INTRODUCTION

- Extent of Marcellus Shale, Section 4: Lateral drilling should be prohibited below the Finger Lakes and "Dry" Finger Lake valleys because of the thinness or absence of Marcellus shale in these areas.

- *NYSDEC must establish a set back distance for well bores and laterals from salt mines***.** Past solution mining practices for salt mines has typically caused collapses and disruptions of bedrock structure. These zones of disrupted bedrock structures could act as conduits through which fluids could flow, including methane-rich formation fluids and fracking fluids. During hydrofracking, it is possible that highly-pressurized drilling fluids will force methane-rich fluids in the disrupted zones to flow into the salt mines.

4.4 MARCELLUS FORMATION

- **Figures 4.8 through 4.12:** These figures which show the extent and thickness of the Marcellus Shale are inaccurate in the Finger Lakes troughs (for ex. Cayuga, Seneca, Skaneateles, Canandaigua Lake troughs) and in some "Dry Finger Lakes valleys" (for ex. Tully Valley and Genesee Valley). Seismic work done by Mullins and others (1996) and well data collected by USGS (Yager and others, 2001, and Yager and others, 2007) have shown that, in these deep trough valleys, the glaciers had eroded down to the Onondaga Limestone (completely removing the Marcellus Shale) and then rode from 5 to 10 miles southward on top of the Onondaga Limestone until it began to rise up back onto the Hamilton Group (including the Marcellus Shale). Since the Marcellus Shale is absent in much of the deep Finger Lakes (ex. Cayuga and Seneca Lakes) and is missing in the northern 2/3 thirds of the medium-deep Finger Lakes (ex. Canandaigua Lake) and in some "Dry" Finger Lake valleys (ex. Tully valley), the extent of the Marcellus Shale is not correct in the figures 4.8.- 4.12. Also, in the southern 1/3 of the medium deep Finger Lakes, where the Hamilton Group begins to reappear in the bottom of the trough and where the overlying rock is much thinner than depicted in fig. 4.8, the depths to tops and thickness of the Marcellus Shale are inaccurate. David Barclay (Geology Professor, SUNY Cortland) adds "*The basic issue is that the outcrop maps of the Marcellus Shale being used in the SGEIS ignore the deeply scoured troughs of the Finger Lakes. The maps suggest that Marcellus is present and is over 1000' below the land surface throughout the central and southern Finger Lakes region. However, subsurface data along the lakes collected by Mullins and others in the 1980s and 1990s show that bedrock in the troughs is scoured down to the Onondaga Limestone and so the overlying Marcellus is either locally absent or only thinly buried by Pleistocene lake clays. This means that the Marcellus is much closer to contact with the waters of the Finger Lakes than has been generally assumed. The concern here is that lateral drilling of the Marcellus from well pads near lakeshores may breach into the unconsolidated lake floor sediments, from where drilling fluids may then escape into overlying lake waters. Even if drilling does not cross the bedrock-sediment contact, drilling close to this boundary may still enable fluids to escape horizontally when wells are pressurized during hydrofracking. Nowhere in the SGEIS do I see consideration of the natural topography of the Finger Lakes troughs and how it might affect drilling operations."* Therefore, since the Marcellus is absent, thinner (by ice erosion), or overlain by much less rock than depicted in figs. 4.8 – 4.12, lateral drilling should be prohibited below the Finger Lakes and "Dry" Finger Lake valleys. In addition, a buffer should be included along the

trough walls for both well bores and laterals to prevent fracking solution from entering the lake trough.

4.5.1 Background

- There is no discussion of the nature, type, history of tectonic stresses, and timing of the formation of faults in central NY. There is only discussion of the occurrence of faults in eastern and northern NY. This is a major oversight since the main subject of this document is gas drilling that is most likely to occur in the southern central NY.

- There is no discussion that some faults could result in disturbed zones of crushed (brecciated) rock, and if these zones are not healed by precipitation of minerals, igneous intrusions, or movement of salt, then the secondary permeability formed along these fault planes could act as conduits through which fluids could flow, including methane-rich formation fluids and fracking fluids. During hydrofracking, it is possible that highly-pressurized drilling fluids will force methane-rich fluids in the faults to flow upward, possibly discharging to shallow aquifers (if present) or to land surface. Case history- at the Watkins Glen salt brine field, Jacobi and Dellwig (1974) reported that while hydraulic fracturing was being conducted in one of the wells at a depth of 970 meters (3,180 ft), a flow of brine developed at land surface about .7 kilometer (0.4 mi) to the north probably as a result of the movement of the brine along a strike-slip fault. The strike-slip fault was mapped by Stone & Webber (1978a, 1978b, and 1979) and by Murphy (1981). Incidentally, this fault is not shown in dSGEIS fault map, Fig. 4.13 The fault (strike of N50 W) can be projected southward along the west shore of Seneca Lake and extending from the Himrod mine in the north to Watkins Glen brine field (and continuing southward, the fault trace coincides with a landsat lineament mapped by Isachsen and McKendree (1977).

4.6 NATURALLY OCCURRING RADIOACTIVE MATERIALS (NORM)

- According to Jame's W. Ring, Professor Emeritus of nuclear physics from Hamilton College, the draft sGEIS does not include adequate study of radon in its review of issues. This is a subject which deserves further study before this, or any other supplies of Marcellus gas, are delivered to households where it may endanger the health of citizens. (http://saneenergyproject.org/2011/10/09/special-delivery-spectra-pipeline-could-bring-radon-to-nyc-stoves/).

Chapter 5 - NATURAL GAS DEVELOPMENT ACTIVITIES AND HIGH-VOLUME HYDRAULIC FRACTURING

5.13.3 Flowback Water

- Although high volume hydro-fracturing (HVHF) used in the extraction of natural gas is exempt from the federal Safe Drinking Water Act, the DEC must **require** adherence to this law in its sGEIS regulations.

- In light of the recent announcement that the EPA will regulate the disposal of wastewater derived from shale gas drilling, starting in 2014, the NY DEC should wait until these standards are in place before permitting drilling within NYS.

- In October 2011, the EPA reviewed data from states and other sources that show "elevated levels of pollutants entering surface waters as a result of inadequate treatment at facilities." Those

materials can include naturally occurring radium, bromide, and other toxic or radioactive substances that can be pulled out of the ground when water is produced at natural gas wells. Typically with other sectors, industrial wastewater is pre-treated before it is sent to municipal treatment facilities, lest contaminants damage the facilities (risking the release of raw sewage) or remain in the fluid even when it is ultimately discharged into waterways. Cynthia Dougherty, director of the EPA's Office of Ground Water and Drinking Water, said during a Senate Energy and Natural Resources subcommittee hearing that there "isn't good treatment available for some of the things that are in wastewater" from natural gas drilling. Given that no Publicly Owned Treatment Works (POWTs) in NYS are currently able to treat chemicals and soluble solids contained in waste water from shale gas drilling, and the liquid is not required to be pre-treated, DEC must prohibit drilling until this situation is resolved. Simply sending wastewater to other states or relying on injection wells for disposal is inadequate and unacceptable.

5.13.3.1 Injection Wells

- **When siting a proposed injection well in New York State, the NYSDEC must require a site specific review.**
  Local geology (faults and seismicity), hydrogeology, nearby well bores, or other potential conduits for fluid migration must be identified and analyzed for suitability as a site for safe disposal. There are thousands of orphan wells that must be located and appropriately abandoned.

- **Underground injection wells must be prohibited adjacent to a Finger Lake.**
  Due to glaciation and ice retreat these areas have been scoured and covered by unconsolidated deposits. Therefore these areas of complex geological formations have not been adequately characterized. Also the mapping of faults in these areas is incomplete and some maps indicate that there are more than those depicted in Fig. 4.13.

5.13.3.4 Road Spreading

- The DEC has already failed to protect NY drinking water by allowing produced water from PA to be spread on roads in New York State within Tompkins County, without SEQR review. The DEC should not allow flowback or produced water to be spread on roadways.

Chapter 6 - POTENTIAL ENVIRONMENTAL IMPACTS

6.1.4 Groundwater Impacts Associated With Well Drilling and Construction

- After 4 years of intense drilling in PA, there is no data from PA about groundwater contamination or other actual impacts there in the SGEIS as a form of assessment.

6.1.4.3 Natural Gas Migration

- **Regional Areas of Special Geological Risk Not Protected.** The DEC has not addressed fracking in areas of special geological risk, such as those with fault lines that are potential pathways for the upward gradient of contaminants into aquifers because they claim that contaminants can't rise into aquifers. However, independent scientific studies have proven that upward migration of

contaminants is not only possible, but also likely. The DEC based their assertion on industry studies that looked at just 5 days in the fracking process.

6.1.5 Unfiltered Surface Drinking Water Supplies: New York City and Syracuse

- ***NYSDEC should prohibit HVHF in all watersheds where surface water is the source of a public drinking water system, not just unfiltered surface water drinking sources.*** Filtration avoidance requires a watershed control program - which in turn requires characterizing the watershed and the ability to identify, monitor and control manmade and naturally occurring activities detrimental to water quality. This is far more powerful than simply treating what shows up at the intake pipe of a conventional drinking water facility.

In section 6.1.5.1, p. 6-46, the dSGEIS states that Increases in phosphorus are expected to create algal blooms, possibly leading to production of neurotoxins, fish kills, taste and odor problems and increases in disinfection byproducts in unfiltered drinking waters or their source waters. Conventional drinking water filtration plants are not designed to remove neurotoxins. Fish kills in a filtration plant's source water will be the same as that in the source water for unfiltered drinking water. Taste and odor problems are not necessarily treatable at filtration plants. Finally, any increase in disinfection byproducts that is tied to increases in soluble organic matter will not be abated by going through a filtration plant6.1.5.1, page 6-46

On page 6-48, toxic compounds are listed as a pollutant (group) of key concern when managing an unfiltered drinking water system. It is stated that unfiltered drinking water supplies have a heightened sensitivity to chemical discharges as there is no immediately available method to remove contaminants from the drinking water source waters. Tompkins County too, uses surface water for drinking. And while our filtration plants can remove particulate matter, that will not solve the problem of contamination by toxic compounds. It is just as true for the residents of Tompkins County as it is for New Yorkers, that there is no immediately available method to remove contaminants of the nature of the toxic compounds contained within frac water.

New York City's investment in their watershed (and drinking water system) is listed at $1.6 billion (section 6.1.5, p. 6-50) - presumably this is to show that they have too much invested to risk. While water quality degradation (virtually guaranteed via storm water inputs per section 6.1.5) in source waters with existing filtration facilities will not require the kind of investment that building a new facility would, the costs are not insignificant. Sediment load increases would result in increased electricity costs, decreased equipment life span - and possibly increased chemical costs. If water quality degradation included increases in soluble organic matter leading to violations of disinfection byproduct limits, new treatment technologies would have to be added - which could cost millions. None of this is addressed in the SGEIS. Storm water impacts on water quality are discussed throughout section 6.1.5. DEC acknowledges that aggressive erosion control work resulted in de-listing of the Cannonsville Reservoir as an impaired water body. It is further stated several times that despite current regulations, storm water impacts will be significant. As it is certainly not the intent of DEC to put at risk all the environmental work that has targeted non-point source pollution or to degrade the quality of NY waters, DEC should

prohibit HVHF in the watersheds of all water bodies that are currently listed as stressed, threatened or impaired.

- The DEC has banned drilling near the New York City and Syracuse drinking water supplies since those waters are not filtered. Within the Finger Lakes Region, water is pulled from lakes and treated for public consumption and filtered but not for the chemicals, heavy metals, potential radioactivity, and salt content that could be expected if waste water from hydraulic fracturing is allowed to be treated and released into public water supplies. The DEC must ensure flowback and/or produced water is not released into any public drinking water supplies whether they are filtered or not, since filtering is ineffective for contaminants from the HVHF process.

- By giving the **NYC and Syracuse Watersheds** special protections, the NY DEC is implicitly admitting this process is inherently unsafe, and denies many New Yorkers Equal Protection of the Law. Both the United States Constitution (14th Amendment) and the NY Constitution (Art. I, § 11) demand that all persons deserve Equal Protection of the Law. The sGEIS fails this.

6.1.7 Waste Transport

- Flowback and production brine waste water should be classified as hazardous industrial-commercial waste as several studies indicate the presence of toxic materials. Allowing non-hazardous waste classification appears to be an extension of the exemption provided by Congress in 2005 but should not apply to waste under DEC regulations.
- The sGEIS must require all fracturing fluids, drill cuttings, flowback and production brine to be tracked through a requirement for a chain-of-custody for each load of waste. NYS must collect these manifests and create a publicly accessible electronic database of this information even for waste leaving New York State. The DEC must work with other states to ensure disposal of wastes outside of New York meets the same standards as those within New York.
- Shipments of drilling and fracturing fluids, mud drilling cuttings, flowback and production brine must be regulated by the hazardous waste management system.

  The Pennsylvania experience demonstrated that some such wastes were diverted from appropriate treatment and disposal facilities and discharged improperly onto the ground or into surface waters. (Ian Urbina, NY Times Feb. 26, 2011) Therefore, manifesting of such wastes must be required to track and verify proper handling on a per-load basis. The proposed mitigation set forth in Chapter 7, the application of a system similar to that of medical waste is not sufficient. NYS must collect the manifests and create a publicly accessible electronic data base.

  NYS must collaborate with adjacent states on a robust tracking system by entering into interstate compacts or other arrangements. As both Ohio and Pennsylvania are sites of natural gas exploration and production, it is in their self-interest to achieve such agreements.

6.1.8 Fluid Discharges

- The DEC has sidestepped banning open waste pits, because they assert they are unlikely to use open pits for the storage of wastewater. The DEC must prohibit open pits and not allow DEC employees to grant approval without doing an individual environmental impact study.

- **Permits should not be issued without a certification that the applicant has identified a facility with adequate capacity.**
  New York State currently has no capacity to safely treat and dispose of flowback and production brine waste waters. The dSGEIS refers to this deficiency in several places in the document. "There is questionable available capacity for POTWs in New York State to accept high volume hydraulic fracturing waste water" (SGEIS, p.6-62). The natural gas industry has the primary responsibility for identifying or constructing the required capacity. However, the NYSDEC, with its dual mission of promoting economic development and protecting the environment, must participate in the development of substantial capacity. Once the SGEIS and the regulatory review process have been completed, there will be considerable political pressure to issue permits. We fear that in order to avoid the accusation that the Department is responsible for further delays in the initiation of natural gas exploration and production, it may approve treatment and disposal options that are not fully protective of the environment.
- **Flowback and production brine waste waters are not treatable at NYS POTWs.**
  The U.S. House of Representatives Energy and Commerce Committee identified 2500 hydraulic fracturing products utilized by 14 exploration and production natural gas companies. These products contained 750 different chemicals, 29 of which are suspected human carcinogens or hazardous air pollutants. No NYS POTW has the capital-intensive pretreatment systems required to treat these wastes. Due to the wide variety of chemical constituents, some pretreatment systems may not be designed to adequately remove them, resulting in pass through to the receiving body of water. All waste waters must be fully characterized to identify their constituents prior to shipment to treatment facilities. To accept such wastes for treatment creates a risk of interference with the plant's ability to adequately treat municipal sewage, which is their primary responsibility. When the NYSDEC surveyed the POTWs with industrial pretreatment systems in December of 2008, none indicated an interest in receiving such wastes except the City of Niagara Falls.

6.1.8.2 Private Off-Site Wastewater Treatment and/or Reuse Facilities

Specifically designed industrial treatment facilities may be the best long-term option to expand treatment capacity.

Flowback and production brine waste waters present a significant challenge as they have a wide variety of toxic chemical constituents requiring a multiplicity of technologies. Prior to permitting these facilities, a very rigorous Maximum Allowable Head Works analysis must be conducted. Given the expense of such a facility, it is likely that only a few will be constructed, and they will receive very large volumes of HVHF waste. They must operate under very strict effluent limitations and be intensely monitored. The test results must be easily accessible to the public. A robust compliance program must be established to prevent violations of the facilities' SPDES permits. Otherwise the community in which this regional facility is located will believe itself to be victimized by being the recipient of a disproportionate share of the wastes.

6.1.8.3 Private On-Site Wastewater Treatment and/or Reuse Facilities

Due to the risk of localized contamination near the well pad, such operations should only be conducted at sophisticated regional industrial treatment plants.

Recycling/reuse will further concentrate the toxic chemicals and radionuclides in the waste. The risk of accidents increases as there is increased handling of the wastes in the vicinity of the well pad. Observers have noted a lack of vegetative regeneration near well pads, which indicates chronic contamination of the soil by work at the pads. The equipment used and the level of

training of well-site personnel will be less adequate than that at a fully equipped industrial waste water treatment facility.

6.1.8.4 Disposal Wells

Little research has been conducted by the U.S. Geological Survey or other researchers that would indicate there is much, if any, capacity for geological formations within New York State to absorb liquid wastes from drilling. Abandoned Trenton-Black River wells have small cavities and the surrounding formations have low permeability and thus offer little potential for ultimate disposal. In addition, these disposal wells could conceivably be conduits for contamination of nearby water sources.

6.1.8.5 Other Means of Wastewater Disposal

We oppose shipment of waste waters to out-of-state waste water treatment plants.

If there are indeed benefits to NYS residents from the production of natural gas, we must accept the responsibility to safely treat and dispose of the associated wastes. The Waste Water Treatment Facilities listed in this document in Pennsylvania are small and most unlikely to satisfy our intention to address our criteria for environmentally sound treatment and disposal.

6.1.9 Disposal of Solid Wastes

Cuttings must be managed in a closed loop tank system and ultimately removed to be disposed in a Part 360 solid waste facility or a Part 380 (Prevention and Control of Environmental Pollution by Radioactive Materials) radioactive materials management facility.

Cuttings will be contaminated with oil-based or polymer-based mud. Water- based mud will be contaminated with brine and/or chemical fracturing additives. Where pyrites are recovered from the formation, they should be collected and shipped off-site for treatment and disposal. These materials may also be contaminated with sulfuric acid, heavy metals, and NORMs. In conclusion, all fluids and solids produced during the exploration and production process (chemicals, drill mud, cuttings, produced water, or radionuclides) must be removed from the well site for appropriate treatment and disposal. There will be minimal post-closure monitoring of these sites to ascertain their long-term environmental impacts from any contaminated material spilled or buried there. With our unhappy, ongoing experience in funding and adequately cleaning up contaminated (Super Fund) sites in NYS, we must avoid creating future such sites on every abandoned well pad.

6.7 NATURALLY OCCURING RADIOACTIVE MATERIALSIN THE MARCELLUS SHALE

The sGEIS must indicate that the NYS DEC must require, by regulation, that radiation surveys be conducted at frequent intervals at Marcellus and Utica Shale well pads, piping, feeder lines, and condensate tanks that concentrate NORM scale residues.

Chapter 7 – EXISTING AND RECOMMENDED MITIGATION MEASURES

7.1.2 Stormwater

Because of the possibility of surface water contamination from storm water runoff and/or surface spills associated with gas drilling activities, a program to monitor surface water quality in areas affected by HVHF should be established by the NYSDEC. The NYSDEC should establish a fund to be used for surface water monitoring using a funding mechanism similar to FL-LOWPA whereby the NYSDEC allocates funds to Soil and Water Conservation Districts (SWDC) and SWCD staff request and review proposals from local agencies and organizations to monitor surface water quality.

Each local program should select monitoring locations in anticipated high activity areas in such a way as to better understand the general characteristics of the watershed as well as to characterize, to the extent they are known pre-drilling, the smaller catchment areas where gas wells will be drilled. The following minimum monitoring frequencies and water quality indicators are recommended:

1. Chemical monitoring

Frequency: Pre-drilling and at least quarterly during drilling and fracking;
General method: Water samples collected and analyzed by a certified lab;
Indicators of pollution: Soluble reactive phosphorus, total phosphorus, count of either E. coli or fecal coliform, total suspended solids, turbidity, and a set of "signature chemicals" to screen for contamination by toxic compounds in gas well waste: pH, alkalinity, total dissolved solids, conductivity, potassium, chloride, bromide, sulfate, total hardness, barium, strontium, dissolved oxygen, chemical oxygen demand, gross alpha radioactivity, gross beta radioactivity.

2. Biological monitoring

Frequency: Pre-drilling and at least once a year
General method: Benthic macroinvertebrate (BMI) sampling and analysis. Two replicate samples are collected at each of a subset of chemical monitoring locations. Adhere to Tier 2 or Tier 3 protocol in Hudson Basin River Watch Guidance Document, which are based on NYSDEC monitoring protocols.

3. Follow-up

Monitoring should continue for at least five years after the last gas well on a multi-well pad has been plugged. If monitoring results indicate degradation of the designated use of a stream, lake or reservoir in the vicinity of the well pad, the NYSDEC should investigate, as mandated under the Clean Water Act.

All water sampling results should be made available to the public.

In order to minimize impacts from spills and other incidents, NYSDEC representatives should be monitoring drilling activities on-site at least three times per week.

7.1.3 Surface Spills and Releases at the Well Pad

7.1.3.2 Drilling Fluids

- The DEC must prohibit any open pit storage of any produced or flowback liquid due to the fact that open pit liners are not secure enough to ensure any leakage into groundwater or nearby surface waters.

7.1.3.3 Hydraulic Fracturing Additives

- The DEC must require full disclosure of all components used in the hydraulic fracturing process regardless of whether the industry insists disclosing trade-secrets would be to their disadvantage. Treatment facilities, water monitoring networks, residents using well water and emergency response teams need to know what products are being used in the HVHF process.

- The DEC should not permit any drilling until greener alternative additives used in the HVHF process can be found.

7.1.4 Potential Ground Water Impacts Associated With Well Drilling and Construction

7.1.4.1 Private Water Well Testing

- The testing distance should be increased to 2,000 feet, in order to be more protective of property owners. The DEC should make it clear that the burden of proof is on the driller to prove that they did not contaminate a private water well. In addition to private water well testing, a network of groundwater monitoring wells should be created in the vicinity of drilling activities, the monitoring should be conducted prior to site development and throughout site development and during the production phase.

- The water quality monitoring program should **not** be complaint-based. ***NYSDEC should establish a groundwater monitoring and reporting procedure*** that requires the applicant to submit electronic versions of the analytical results to the repository agency and local health department within a specified time period and requires the applicant to determine if there have been any significant increases in chemical or physical concentrations. As in groundwater monitoring around landfills, the groundwater monitoring program around gas drilling sites should establish procedures for follow-up testing if results indicate there may be contamination in the monitoring wells. If the program is complaint-based, the burden of proving there is a problem will fall on the property owner, and he or she may not have the knowledge to understand the analytical results and know if there is a problem until the contaminant levels are very high. Moreover, with a complaint based program the property owner may have to pay for further tests to confirm the contamination. The burden for determining if there has been contamination of groundwater and any follow up actions required should be on the applicant, not the property owner.

- Page 7-44 states that *"…the results of each test must be provided to the property owner within 30 days of the operator's receipt of the laboratory results. The Department would further require that the data be available to the Department and local health department upon request for complaint investigation purposes."* Results should be required to be provided to the local health department and the NYSDOH. The NYSDOH should be the official data repository. *The data collected should be entered into a state-wide database that is available to the public.*

- Before drilling the operator must be required to identify any abandoned gas or oil wells along the length of the horizontal bore hole as well as any mapped faults. The fault map in the dSGEIS (Fig. 4.13) is based on outdated information and does not contain many mapped faults. If any of these features have been identified along the horizontal length of the proposed bore hole the horizontal extent of monitoring should be increased to include these features. Drinking water

wells within 1,000 feet of the well pad, or if there are none identified, drinking water wells within 2,000 feet of the horizontal well pad, should be included in the monitoring program.

- "*Testing before drilling is recommended as a mitigation measure related to the potential for groundwater contamination….*" This contradicts Appendix 10 which states that before site disturbance, the operator must sample and test residential wells. Section 7.4.1 should be changed to clarify that well testing is required before drilling in order to establish a baseline for comparison in the event groundwater contamination is suspected.

- Sampling and analysis only continue until one year after the last well on the pad is hydraulically fractured. Part 360 requires at least five years of post-closure monitoring. To detect longer-term cumulative impacts to the groundwater resources such as a gradual regional increase of chlorides and methane in the groundwater, *the permit should require that sampling continue at a minimum number of selected wells at least annually until the gas well is decommissioned.*

- *Water quality monitoring programs should focus on monitoring the groundwater resource, not just existing drinking water wells.* Water-supply wells should not be the sole means of determining if groundwater contamination has occurred near a Marcellus Shale gas well due to the unknown or varying construction, operation, and availability of these wells, and the possibility that there may be no private wells or springs within 2,000 feet of the proposed well pad. Natural groundwater quality in the aquifers overlying the Marcellus and Utica play areas is highly variable. Concentrations of parameters such as chlorides and radioisotopes vary by two orders of magnitude in water sampled from water wells. With such natural variability, documentation of water-quality impacts from gas drilling and hydraulic fracturing would be extremely difficult if baseline data do not exist. As in environmental regulations relating to landfills (360-2.11), the permit should require the applicant to install and monitor groundwater wells to detect groundwater contamination before it reaches individual or public supply wells. The results of the recent Duke study (Osborn, et. al., 2011) found evidence that methane concentrations increased in proximity to the nearest gas wells and detailed analysis of the methane indicated it came from deep earth deposits rather than shallow biogenic deposits. Thus, the risk of methane migration is a real potential threat to wells near gas drilling sites, and migration of methane should be detected using monitoring wells before it reaches a private water supply well. *At least three monitoring wells should be installed around each well pad (two downgradient and one upgradient) and these wells should be used to determine the direction of groundwater flow in the vicinity of the well pad and sampled and analyzed at the same frequency as the private water supply wells*.

- Review of the water-well testing results by local health departments as proposed in the draft SGEIS following a complaint cannot be accomplished without additional resources. The Department proposes that county health departments have responsibility for initial response to most water well complaints, referring them to the Department when causes other than those related to drilling have been ruled out. *Funds for implementing this program should be provided to local health departments.* Fees cannot be raised directly by the local health departments since the NYSDEC has sole regulatory authority over gas wells.

- *Enforcement and mitigation procedures for non-compliance with well-testing requirements and parameters should be in place before drilling permits are issued by NYSDEC.* The well testing procedures outlined in the dSGEIS do not specify what enforcement actions will be taken if well testing requirements are not adhered to by the operator. Enforcement procedures for non-compliance with well testing procedures must be in place before permits are issued for drilling.

- Table 7.2 Test parameters: There are several parameters that are important in evaluating potential contamination from HVHF. Arsenic, strontium and turbidity have important health concerns associated with them and should be included in table 7.2. Sodium, which is included in Table 7.2, is redundant and can be eliminated. It is generally not possible to take static water level in a private well and this parameter also should be eliminated. Also, the VOC analysis is vague; VOCs should be analyzed using EPA Method 524.2.

- Sampling protocol: The sampling protocol described on page 7-49 is mostly reasonable. However, a blanket requirement that the well pump be run for five minutes before taking samples is misleading and should be changed. If the well is being used, the water in the pressure tank can be assumed to be representative of water in the formation. Therefore, if the water is run to evacuate half the volume of the pressure tank, or 5 minutes, whichever is less, before sample collection, the water sampled should be representative of water in the formation. It is not necessary to disinfect the faucet before sampling because biological samples are not being analyzed.

- The burden of proof of well water contamination should rest on the gas companies themselves, not landowners. Such a requirement would encourage drilling companies to be more proactive in water well protection.

7.1.5 Setback from FAD Watersheds

By giving the NYC and Syracuse Watersheds special protections, the NY DEC is implicitly admitting this process is inherently unsafe, and denies many New Yorkers Equal Protection of the Law.

7.1.6 Hydraulic Fracturing Process

Section 7.1.6 outlines procedures for abandoning an out-of-production well. It is important this section remain in the sGEIS to ensure all abandoned gas wells are identified and properly plugged prior to any drilling since there are numerous wells that have not yet been adequately plugged. New York State needs to secure funding for the DEC to oversee this process and the financial responsibility of landowners mitigated since they may not have the funds to safely and thoroughly have this process performed.

7.1.7 Waste Transport

7.1.7.2 Road Spreading

- The NYS DEC should forbit the use of flowback water upon roads for dust control and de-icing. Flowback waste waters must be transported to an appropriate treatment and disposal facility.

  IF the DEC does allow brine road spreading more than one sample of the brine must be analyzed by an approved laboratory and determined to be safe. Determinations of how this sampling will be done and what determines a representative sample are still too vague to allow any brine disposal on roadways. The DEC must be clear about how samples will be taken, how often, whether there is a chain of custody required and who will pay for this testing. The DEC must disclose to municipalities that brine is being spread on their roadways.

7.1.8 State Pollutant Discharge Elimination System (SPDES) Discharge Permits

7.1.8.1 Treatment Facilities

- The SGEIS indicates that POTWs proposing to accept flowback water and/or production water for treatment must have an approved pretreatment and/or mini-pretreatment programs, including

headworks analyses pursuant to 40 CFR Part 403 and DOW's TOGS 1.3.8 (New Discharges To Publicly Owned Treatment Works) . However, such programs are only required of POTWs. While industrial or commercial wastewater treatment plants likely should need NYSDEC approval before they accept flowback and/or production water for treatment, the framework for this approval cannot be 40 CFR Part 403 and DOW's TOGS 1.3.8. Instead it should be through a SPDES permit modification request to add wastewater from a new source.

- **Permits should not be issued without a certification that the applicant has identified a facility with adequate capacity.**
  New York State currently has no capacity to safely treat and dispose of flowback and production brine waste waters. The dSGEIS refers to this deficiency in several places in the document. "There is questionable available capacity for POTWs in New York State to accept high volume hydraulic fracturing waste water" (SGEIS, p.6-62). The natural gas industry has the primary responsibility for identifying or constructing the required capacity. However, the NYSDEC, with its dual mission of promoting economic development and protecting the environment, must participate in the development of substantial capacity. Once the SGEIS and the regulatory review process have been completed, there will be considerable political pressure to issue permits. We fear that in order to avoid the accusation that the Department is responsible for further delays in the initiation of natural gas exploration and production, it may approve treatment and disposal options that are not fully protective of the environment.

- A thorough analysis of the cumulative impact on the receiving water should be conducted if multiple wastewater treatment plants will be used to dispose of wastewater into the same surface water body.

7.1.9 Solids Disposal

- This section allows for drill cuttings to be directed to an open pit and then buried on site when air or water is used during drilling. Even with an acid mine drainage mitigation plan requirement, there remain uncertainties about the NORM levels. DEC should require that all drill cuttings be contained in closed loop systems and disposed of properly at a landfill that is regulated to accept materials with NORM.

7.1.11 Setbacks

- **Prohibition on well pads in 2,000 foot buffer around public drinking water supplies**
  Protecting public drinking water supplies is essential to protect public health in the State, so increasing the buffer to 2,000 feet is a critical element of protection these valuable resources. However, the location of zones with significant vertical permeability such as faults and fracture intensification domains (FIDs) (which have been identified by Jacoby, 2002, as often being associated with known faults and suspected faults) in the vicinity of public water supplies also has to be taken into account. Jacoby and Dellwig, 1968, found that fracturing induced brine flow 0.5 miles from the well being fractured. If there are faults or FIDs shown on published maps within 1000 feet of a public water supply well, well pads should also be prohibited within 2,500 feet of the fault or FIDs (Jacoby and Dellwig, 1968).

- **Prohibition on well pads in 500 foot buffer around private well supplies**
  Protecting private drinking water supplies is as essential as protecting public water supplies. We appreciate the increase in buffer to 500 feet, however, the buffer distance should be 1,000 feet to adequately protect these vital resources.

- **Prohibition on well pads in primary aquifers and 500 foot buffer**
  Protecting primary aquifers is essential to protect public health in the State. Although we appreciate the prohibition of well pads within primary aquifers and within a 500 foot buffer, the buffer should be increased to 2,000 feet from the aquifer **boundary** to adequately protect these vital resources. In many cases, the maps on which the aquifer boundaries are based are at a scale of 1:250,000, thus a large buffer from the aquifer boundary is needed to adequately protect groundwater.

- **Requirement for site specific SEQRA determination for well pads in principal aquifer and 500 foot buffer**
  Protecting New York State's public water supplies is essential to protect public health in the State. Requiring a site specific SEQRA determination for well pads in principal aquifers and within a 500 foot buffer is not adequate to protect these vital resources. Well pads should be prohibited in principal aquifers and within a buffer that includes either the surface water divide for the aquifer or 2,000 feet from the aquifer boundary, whichever is less, to adequately protect these vital resources.

- **All setbacks and buffers must be set to provide maximum protections that cannot be altered.**
  The preliminary draft increases buffers and setbacks from aquifers and wells. However the protections are inconsistent and can be waived in some instances.

7.1.12.2 Setbacks from Other Surface Water Resources

- In the July version (Preliminary) revised SGEIS, a site specific SEQRA review was required where the closest edge of a well pad was within 500 feet of a tributary to a public water supply. This requirement was removed from the September version but should be included in the Final SGEIS or preferably be strengthened to prohibit well pads within these areas.

- Table 11.1, Page 1096: States that Section 7.1.12.1 "*Specifies setback distances from structures, surface waters, public/private water wells, and water supply springs.*" However, there is no section 7.1.12.1. That needs to be added. Setbacks to structures must be set, not only as per the requirements of the mortgage market, but to ensure distances that are truly safe enough to mitigate the effect of placing such activity in residential neighborhoods. Further, communities must be allowed, under home rule authority, to set for themselves the minimum setback distances from structures that will preserve their community character as determined by the local community.

7.2 PROTECTING FLOODPLAINS

We appreciate that well pads will not be permitted in floodplains, however floodplain maps are in need of an update. Until the floodplain maps are updated, there should be 500 foot setback.

7.5 MITIGATING AIR QUALITY IMPACTS

- Although this section suggests ways to minimize sulfur oxides, nitrous oxides, methane, and ozone during gas drilling, there is no discussion of radioactive radon gas mitigation or monitoring. Radon gas dramatically increases the risk of cancer. The sGEIS must require air quality monitoring within close proximity to active drilling sites and compressor stations to ensure air quality will not have an adverse health impact on those working and living near drilling sites.

- **NYSDEC must mitigate and monitor exposure of well pad workers and nearby residents to radon.**
  Although the Air Quality Mitigation section suggests ways to minimize sulfur oxides, nitrous oxides, methane, and ozone during gas drilling operations, there is no discussion at all of radioactive radon gas mitigation or monitoring. Radon can be trapped in the same pockets as natural gas in the Marcellus shale. Any radon released into the atmosphere or entrapped with the natural gas poses a significant health hazard. EPA estimates that more 14% of the annual lung cancer deaths (one of the most lethal cancers) are due to radon exposure. The workers at the drill pads are sure to be exposed to any radon that is generated with the natural gas. All of the drill pad workers should be required to wear radiation badges and records of dosgaes received should be kept. Radon also dramatically increases the cancer risk for those exposed to cigarette smoke. Many of the areas proposed for hydraulic fracturing already suffer from levels of radon in homes on average that require remediation. (Reference: http://www.health.state.ny.us/environmental/radiological/radon) A continuous on-site monitoring system for radon with an alarm system should be present at each well with electronic record keeping to ensure that the radon separation procedure at the site is working and that radon is not entering the pipeline.

- **Proposed mitigation measures are insufficient to adequately address the potentially grave impact of fugitive emissions** (also a comment for section 6.5)
  Misreporting has been a long-term problem in the natural gas industry. There has been an over-reliance on voluntary reporting mechanisms. Often losses from on-site storage and loading/unloading are not reported. Reporting forms are inadequate to reflect accurately emissions during gas processing at the production facility. There is often only one space provided to report a single aggregate value for venting and flaring. Such emissions are not metered, but estimated. The NYSDEC has provided no recommendations for the development of more detailed measurement guidelines. The U.S. Environmental Protection Agency has issued proposed new rules on New Performance Standards and National Standards for Hazardous Air Pollutants for the oil and natural gas sector. The Shale Gas Subcommittee of the Secretary of Energy Advisory Board supported the new rules but stated that these rules fall short because they do not directly control methane emissions and the NSPS rule does not address existing shale gas sources. The Subcommittee has recommended that federal (Greenhouse Gas Reporting Rule) and state governments require companies to measure and disclose air emissions from shale gas source (SEAB Second Ninety Report, Nov. 18, 2011). In addition to flaring and venting, fugitive emissions are released with flowback water returns and drill out, the stage when plugs are removed prior to production. Further losses occur from equipment leaks, processing, transport, storage, and distribution. NYSDEC currently lacks sufficient staff to provide daily oversight of this activity at each well pad.

- **Greater input from the Public Service Commission is required on air pollution. The regulations promulgated by DEC should not take effect until satisfactory recommendations for prevention or mitigation have been received from the PSC.**

It is well known that compressor stations emit carcinogenic and neurotoxic compounds, volatile organic compounds and nitrogen oxides that create ozone (smog) and many more toxins. People who live in areas with compressor stations have reported serious health symptoms such as headaches, dizziness, blackouts, muscle contractions and ruptured ear drums from the constant low frequency roar of the compressors. In parts of rural Texas where gas pipeline compressor stations are located, asthma rates for children have risen from a normal 7% to a very abnormal 25%. (data from the Catskill Mountainkeeper, 10/28/2011) The health effects of such air pollution, obviously, are felt not only by people living or working close to compressor stations but also by people far removed from them in other parts of the state.

7.6. MITIGATING GREENHOUSE GAS EMISSIONS

- Rather than the sGEIS suggesting voluntary measures the gas industry can take to minimize GHG emissions during operations, they should be required to reduce GHG emissions from active drilling operations.

- **The DSGEIS must require operators to meet specific emissions thresholds to bring them into compliance with local and state emissions goals. (also section 6.6)**
  Although the dSGEIS contains numerous suggestions for voluntary measures by which the industry can minimize GHG emissions during its operations, there is no discussion of the impact of High Volume Hydraulic Fracturing on the goals of the New York State Climate Action Plan. Methane gas has a global warming potential 72 times that of carbon dioxide over 20 years (the period of our utmost concern here due the need to drastically reduce our emissions in the short-term) and 25 times over 100 years (IPCC Fourth Assessment Report, Working Group 1, Chapter 2). It presents a substantial threat to the environment and is released in large volumes during the exploration and production, transshipment, and processing of natural gas (R.W. Howarth, R. Santoro, A. Ingraffea (2011) Methane and the greenhouse footprint of natural gas from shale formations, p.679-690). Howarth et al. have calculated the 20 year horizon global warming potential as 105 (p.685). Tompkins County has established a policy to "reduce community greenhouse emissions by at least 2% of the 2008 base year emissions per year to reach a minimum of 80% reduction by 2050 (Tompkins County Comprehensive Plan: Energy and Greenhouse Gas Emissions Element, 2008). Utilizing the most comprehensive data in the SGEIS, over the 30 year well, life time emissions from 100 one-well projects will more than double community emissions making it impossible for Tompkins County to meet it greenhouse emissions goals. This industrial activity will also substantially diminish the likelihood that NYS will achieve its goal of reducing greenhouse gas emissions 80% below 1990 levels by 2050. The dSGEIS mitigation measures are woefully insufficient to prevent large volumes of methane from entering the environment.

- **Greenhouse gas emissions from exploration and production of natural gas as projected in the dSGEIS are far less than might be expected with the application of the most recent, best scientific information.**
  The NYSDEC must seek out data from independent, peer-reviewed, and more recently published scientific literature. Shale gas has a much larger greenhouse gas footprint than acknowledged by the industry and government regulatory agencies.

7.7 MITIGATING NORM IMPACTS

7.7.2 Regulation of NORM in New York State

- The SGEIS discussion of the state's ability to regulate NORM in discharges and in scale build-up within equipment at a gas well pad is too vague (NORM in FB/P water "may be subject to applicable SPDES permit conditions," NORM scale buildup "may require licensing of a facility".) The final SGEIS must identify when NORM related SPDES conditions will be imposed and when NORM related part 380 permit conditions will be imposed. Further, the sGEIS needs to quantify what levels will activate the different conditions.

- Routine radiation surveys should be required throughout the active life of a facility, including during drilling of all production wells and during decommissioning of any equipment that came into contact with flowback and/or produced water.

- **NYSDEC must prohibit the collection and handling of Radium 226 at the well pad.** Radium 226 has a half-life of more than 1600 years. Contaminated waste water and drill cuttings must be shipped to a specifically designed industrial facility for treatment. Radioactive sludge must be disposed of at a Part 380 radioactive materials handling facility.

- **Radium 226 must be removed from flowback waste water and production brine with specifically designed treatment processes.**
  Since Marcellus Shales may have more than 5000 pCi/L of Radium 226, most treatment processes will leave in their residues a highly radioactive waste product. These levels must be measured and the solids disposed in an appropriate waste facility as referenced above.

7.10 NOISE MITIGATION MEASURES (also section 7.9 and 5.16.8)

- **Greater input from the Public Service Commission is required on light and noise pollution.** Although gathering pipelines and compressor stations will be important features of the total infrastructure needed to implement HVHF, there is no extended discussion of them in the dSGEIS, presumably because they come under the purview of the Public Service Commission (PSC) See Table 8.1. However, they clearly would have huge and damaging effects on the environment. We believe that the noise, the light pollution and especially the air pollution caused by the generators on every well pad need to be considered. Likewise, the construction of gathering lines from each well pad to the major conduits will result in loss of trees and woodlots, great gashes across farm fields or residential properties and the much increased erosion. These damaging effects need to be acknowledged and controlled as much as possible. The regulations promulgated by DEC should not take effect until satisfactory recommendations for prevention or mitigation have been received from the PSC.

7.13 EMERGENCY RESPONSE PLAN

- The DEC must obligate the gas companies to interface with, and provide information to, local first responders and/or County emergency management offices. This section notes that an emergency response plan consistent with the sGEIS must be provided to the DEC 3 days prior to well spud. A 3-day advance notice to local emergency responders is completely insufficient.

- In addition to what is contained in the sGEIS, are the following minimal specifics for an emergency response plan:
  - GIS addressing/mapping
  - Access and egress appropriate to emergency response vehicles
  - MSDS information
  - Functional communications for requests for fire, EMS, law enforcement responses

- Defining roles and responsibilities of gas company personnel as well as first responders
- Development of a collaborative relationship between the gas company and local first responders … a jointly developed plan
- Expectations for when first responders would be needed … and what would be handled directly by the gas company … and what other agencies might be needed in any given emergency
- On-site training for first responders

Chapter 8 - PERMIT PROCESS AND REGULATORY COORDINATION

General Comment

- In order to find reference to the setbacks from private dwellings, one must review the GEIS, Chapter 8 to find that DEC is required to check and ensure the well location is at least 100 feet from a private dwelling. Local lenders find that traditional residential mortgage lending in NYS is in jeopardy if the State's current regulations are not changed to account for the long standing secondary market requirements of Fannie Mae, Freddie Mac, FHA, VA and SONYMA, as they related to setback distances. If traditional residential mortgages are not readily available, the market for buying and selling residential homes will be negatively impacted. At a minimum, in order to satisfy the agencies listed above, a setback of not less than 300 feet (measured on the surface but extending subsurface to preserve the fee simple ownership of all subsurface rights) should be required for all drilling and ancillary activities from the boundary lines of all parcels containing a residential structure, school, or any public building.

8.1 INTERAGENCY COORDINATION

8.1.1 Local Governments

- **Applications that present conflicts with local land use laws, regulations, plans or policies should require SEQRA participation.**
  This section identifies a listing of actions which when present will require all opportunities for public input normally provided under SEQRA. This listing should include the conflicts identified in 8.1.1.5 Local planning documents.

- Local Governments need to be involved and informed in all aspects of the drilling process and a procedure for this needs to be in place before drilling begins. Each municipality must receive copies of gas drilling permit applications, including parcel tax map numbers, before any permits are issued by NYSDEC. The NYSDEC should also be required to provide each local municipality and county government with 1) accurate Environmental Inspector contact information for permit coordination between agencies as well as emergency and spill response coordination, and 2) written notification to each municipality of the location of each well-plugging permit application, including tax map parcel number and mapping coordinates.

- Local governments, health departments and emergency responders and residents must be provided with all the chemical compounds being used for drilling in order to be able to respond to spills and to correlate health problems should they occur.

- Funding must be provided to village, town, city and county governments to offset additional staffing and resources necessary as a result of a rapid increase in services required as a result of active drilling areas. The state government must listen to and work with local governments to understand the community and economic impacts from drilling.

- The State should respect local zoning laws enacted to protect residential areas, water resources, environmentally sensitive areas and other valued local locations from heavy industrial activities, as is the right of local governments under home rule laws.

- NYS should revise the EIS and the regulations to require full disclosure of lease information by gas companies at the appropriate County Clerk's office. Further, NYS should require disclosure of complete lease information within 30 days of signing of gas leases as well as disclosure of gas lease extensions within the same 30 day time period, with signature required by both parties to the extension.

8.1.1.3 Local Government Notification

- **Section 8.1.1.3 states,** "*The Department will notify local governments of all applications for high-volume hydraulic fracturing in the locality, using a continuously updated database of local government officials and an electronic notification system that will both be developed for this purpose*." The database developed and used to notify public officials of applications for drilling permits should be open to all public officials. Local government officials should also be notified when permits are issued. The local health department, County Administrator, and Town Supervisor or Village Mayor should be included in the local officials notified and this section should specify who in local government is to be notified.

8.1.1.4 Road Use Agreements

Many rural towns are already burdened with the high cost of maintaining their road systems. DSGEIS Section 7.11.1.3 says that the owner/operator should attempt to enter into a road use agreement, however, most municipalities feel that the DEC must require, not merely encourage, gas companies to make road use agreements with local municipalities.

8.1.1.5 Local Planning Documents

The dSGEIS does not address local planning in a satisfactory manner. The vague statements in 8.1.1.5 say that the applicant should identify any conflicts with local laws, policies, or plans, but DEC "*would proceed to permit issuance unless it receives notice of an asserted conflict by the potentially impacted local government.*" The DEC should expressly support the right of local municipalities under Home Rule to determine land use within municipal borders, including where or whether natural gas development occurs, consistent with zoning and comprehensive planning. (8.1.1) The DEC should explicitly state that if the applicant for a gas drilling permit encounters local laws, regulations and policies that are inconsistent with their proposal, the DEC will respect the municipality's position and deny the permit. And the DEC must notify local governments of permit applications and their approvals.

8.1.1.6 County Health Departments

The sGEIS currently proposes that county health departments retain responsibility for initial response to most water well complaints, referring them to the DEC "when causes other than those related to drilling have been ruled out". This requirement will put an undue burden of proof on County Health Departments with no additional funding to offset the considerable associated expenses. The sGEIS must require proper water monitoring and assessment strategies to be in funded and in place prior to permitting any wells. Data must be collected, analyzed and available to the public.

Permitting fees must be increased to cover the entire cost to the State of regulatory oversight of high volume hydraulic fracturing including 1) personnel to oversee field operations, 2) health department personnel, 3) personnel to monitor surface water discharges from treatment plants, 4)

personnel to develop and maintain databases of water quality and quantity as well as air quality, 5) more regulatory personnel at the Division of Water and Bureau of Hazardous Waste and Radiation Management to oversee this immense program, 6) local municipalities to cover expanded services caused by drilling activities.

8.2.2.2 Impoundments

Given the recent history of "100 year rains" occurring every few years and the inherent long-term instability of impoundments, only closed-loop systems for all hydrofracking operations must be permitted.

8.1.3.2 Occupational Health and Safety Administration – Material Safety Data Sheets

The sGEIS allows any "proprietary" chemical constituents not to be subject to public disclosure. It appears that the companies can avoid disclosure if they simply claim the additive is a "trade secret." The DEC must require full disclosure of all chemicals and additives, including chemical composition of each, used in the hydro-fracturing process.

Chapter 9 – ALTERNATIVE ACTIONS

9.1 NO-ACTION ALTERNATIVE

Based on the sGEIS analysis the No Action Alternative is the preferred outcome. Given the clear dangers to the environment and public health of high volume hydraulic fracturing using the current technologies, the lack of significant financial gain for the overwhelming majority of the citizens of New York State and the assured decades-long damage to the way of life of those residing in the gas-drilling regions, the No Action Alternative is the logical and proper finding resulting from this SEQRA study. (9.1)

9.2 PHASED PERMITTING APPROACH

9.2.4 Permit Issuance Matched to Department Resources.

The State and DEC must require as part of the permitting process, enough funds to hire adequate DEC staff to oversee the permitting, oversight and enforcement of regulations governing the gas industry. State tax funds should not be used for this purpose, but instead, the gas industry itself should be required to foot the extra financial burden placed on the state and local governments as a result of drilling operations. The DEC must require that adequate staffing is in place before any permitting is allowed.

9.3 "Green" or Non-Chemical Fracturing Technologies and Additives

The NYSDEC must require the use of less hazardous alternative compounds to mitigate the risk of contamination to ground and surface waters.

To reduce the risk of contamination from spills, storage failure, improper disposal, or insufficient treatment, potential carcinogens, mutagens, and endocrine disruptors should be banned from hydraulic fracturing products utilized in New York State. This discouragement of specific chemical additives will promote the development and adoption of more green and non-chemical fracturing technologies and additives. Regulating chemicals at the end of the pipe (not at their introduction into the environment but after treatment) during the SPDES permit issuance and monitoring process, will not reduce the risks of harmful releases to the environment.

Appendix 8
The dGEIS indicates that surface casing should not extend into zones known to contain measurable quantities of shallow gas. Shallow saltwater and (or) gas has been penetrated in the upper Devonian bedrock in some areas. It is not clear from the dSGEIS how casing and cementing requirements will be modified to deal with these conditions, nor how drilling companies will know before they drill in an area if they should suspect gas in the upper Devonian in an area they are drilling. NYSDEC should have a program in place before issuing permits that will require drilling companies to *collect and share water quality data* concerning shallow gas and the depth of the fresh water. A database must also be established for this data.

Appendix 22 Publicly Owned Treatment Works (POTWs) Procedures for Accepting Wastewater from High-Volume Hydraulic Fracturing.
The DEC must require that specific toxicity analysis addressing potential toxicity of HVHF chemicals should be paid for by the driller or supplier of the product or products. Testing must determine the potential harmful effects of chemicals both singularly and in combination with others.

Appendix 26 Instructions for Using the On-Line Searchable Database to Locate Drilling Applications
The public should have access to the actual permit application submitted to DEC.