



December 15, 2008

Attn: Scope Comments
Bureau of Oil & Gas Regulation
NYSDEC Division Of Mineral Resources
625 Broadway, third floor
Albany, NY 12233-6500

Dear Sir or Madam:

The Sierra Club Atlantic Chapter appreciates the opportunity to address the Draft Scoping document for the SGEIS. We are a volunteer lead environmental advocacy organization with 42,000 members statewide. As you may know, in the weeks leading up to the passage of A10526-A/S8169-A our organization actively campaigned to have the *1992 Generic Environmental Impact Statement (GEIS) On the Oil, Gas and Solution Mining Regulatory Program* updated to address the significantly new environmental impacts associated with the emerging development of the Marcellus Shale Formation.

On June 28, 2008 the Atlantic Chapter approved a resolution that outlined the supplemental study we felt was necessary to ensure that we would not experience the same environmental crisis that we have seen in other parts of the country that have allowed extensive drilling. (Attachment A) The focus of our study calls for an analysis of land use that would necessitate the use of Geographic Information Systems (GIS). We envision that this sophisticated digital program will:

- Create thresholds of activity and help the DEC establish limits to resource depletion.
- Create region wide planning and phased approaches that can concentrate impacts, avoid sensitive areas, while allowing other areas to recover.
- Provide an ongoing interactive tool for the Department of mineral resources to manage changes in the landscape and fine-tune unanticipated problems, long after this SEQRA process has concluded.

In our reading of the draft scope, we appreciate the extra consideration given to required water volumes in excess of GEIS descriptions and to the sensitivity of areas that have experienced little natural gas development to date. We are however are concerned that there is too much reliance placed upon the original 1992 GEIS to adequately address other substantive issues.

The Division of mineral resources states in the draft scope:
...it is not the Department's intent or objective to re-open the 1992 Findings for any activity that was reviewed in the GEIS and which will remain consistent.

But we find that reliance on particularly weak sections of the GEIS will severely impede our ability to assess the true impact of natural gas development in deep shale formations. The DEC should be open to revisiting sections of the 1992 GEIS to avoid awkward inconstancies between the regulatory changes anticipated for Marcellus Shale development and the rest of the oil and gas industry.

Our comments on the Draft Scope will follow the enumerated outline provided by the DEC. In general, we feel that the absence of any discussion of methodology, as required by SEQRA, renders the draft-scoping document substantially incomplete and we would like the opportunity to comment on the DEC's methodological approach before the adoption of the Final Scoping Document. While it is important for the public to know what the DEC proposes to study, knowing how they will study impacts is just as important.

1.4 State Environmental Quality Review Act

While the Sierra Club Atlantic Chapter acknowledges that a GEIS can be a valuable tool in addressing broad issues, cumulative impacts, or impacts that can be mitigated in a standardized fashion, we believe that it can only be effective if it is timely, comprehensive and allows for additional review when applied to unique local situations.

The 1992 GEIS had its successes in standardizing industrial practices that saw increased environmental protection. But the lack of public participation in the individual well permit process has exposed the weaknesses in environmental assessment forms that do not speak to regionally unique impacts. We would like to see draft scope include strategies to better engage the public in the permitting process of individual permits, and ways of addressing multiple permits as a collective entity in a separate EIS process.

1.4.2 SEQRA and Leasing of State Land for Oil and Gas Development

The Sierra Club Atlantic Chapter finds that a separate threshold of responsibility must be established for the State of NY when looking at leasing public land for Natural Gas exploration. The 2005 NYS comptroller's audit of *Lease of State land for gas and oil exploration and production* suggests that not enough attention has been given to oversight and inspection of sites as NYS seeks to extract profits off of public land. We believe that the current technology for natural gas extraction is not protective enough of water, air and soil and that the state should adopt the precautionary principal in its pursuit of leasing more public land. If left in the ground natural gas will only get more valuable with time. We ask that that the state prohibits natural gas drilling on public land until there are absolute guarantees that all of natural resources will be protected and that the methane extracted will contribute to the greatest public benefit.

1.5 Pipeline Regulation

The Sierra Club Atlantic Chapter takes issue with the exclusion of pipelines, transmission lines, and compressor stations from consideration in the SGEIS. The impacts of pipelines on the landscape, especially with a uniformly broadsheet formation like the Marcellus will be significant. The vast grid work transmission lines, pipelines and compressor

stations will directly contribute to air quality issues through leakage, despoil rural character, lead to habitat fragmentation, and become conduits for invasive species.

While it is true that pipelines fall under the jurisdiction of the PSC, it is improper to segment their obvious environmental impact from review in the SGEIS. You cannot have a profitable natural gas industry without pipelines, transmission lines or compressor stations. They are inherent components to this process. Jurisdiction is irrelevant when assessing direct or indirect consequences of an action under SEQRA, and that while the DEC may have little say over how pipes lines are regulated they certainly control the means by which this secondary infrastructure is required. We ask that the DEC review the environmental impacts associated with Marcellus associated pipelines, transmission lines, and compressor stations especially as they affect cumulative air quality, habitat fragmentation and community character.

2.1 Natural Gas Drilling and Production

In the scoping comments the DEC states “The Department does not expect the rate of Marcellus drilling in any single county to match the peak of Chautauqua County rate...” The DEC should not make any such assumptions. In fact, if the DEC were to make any assumptions it should assume that it will receive more permit applications than it has in the past. The Barnett Shale, which is only 5,500 square miles, had 5,000 active wells in 2005. The Marcellus Shale in New York is more than double that size and industry experts expect drilling to be much more active in the Marcellus Shale than what is occurring in the Barnett Shale. In fact, New York could see an exponential growth in well activity, as the close proximity to major metropolitan areas will see increase consumption as other energy sources dwindle.

2.1.1 Horizontal Drilling

According to Independent Gas & Oil Association of New York, a horizontal drill can bore 3,000 feet from the drill pad. This statement must be examined and the 3,000 feet must be considered in issuance of permits. Currently, it’s the DEC’s position that drilling within 1,000 feet of a municipal water supply well is considered “always significant,” however based upon the 3,000 feet reach the DEC must fully assess whether more than 1,000 feet would be required because of horizontal drilling practices.

Also, there needs to be a full assessment the amount of water used in the fracturing process. Independent studies have shown that more water is used than stated in the two permits mentioned in this section by the DEC.

- According to the Railroad Commission of Texas, slick water fracturing of a Barnett shale vertical well can use more than 1.2 million gallons (28,000 barrels) of water, while the fracturing of a horizontal well can use more than 3.5 million gallons (over 83,000 barrels) of water.
- Devon Energy reports that its Barnett Shale horizontal wells in the Fort Worth Basin require approximately 3.5 million gallons of fresh water.
- Researchers at Texas A&M University estimate that horizontal wells, undergoing multi-stage fracs, can use between 5 and 6 million gallons of water.
- The Susquehanna River Basin Commission estimates the use of 3-9 million gallons

per well

Horizontal drilling, however, can present an opportunity to reduce surface impacts by reaching more of the resources from a central location. The DSGIS should explore the outer limits of what is possible in terms of length of the horizontal bore and multiple wells starting from one pad to maximize the greatest environmental benefit. (Fewer drilling pads, road cuts, connector pipelines, vertical bores through aquifers)

This may include an analysis of:

- Maximum distances for horizontal bores and the subsequently larger spacing units that can be created.
- Mandated cooperation between different companies to share leases in the context of larger spacing units, less surface disturbance, centralized water distribution and longer horizontal bores. (Similar to how communications companies are forced to share a singular cell tower)

2.1.2 Hydraulic Fracturing

On Page 10 of the Draft Scoping document the DEC concludes:

Well stimulation, including hydraulic fracturing, was expressly identified and discussed in the GEIS as part of the action of drilling a well, and the GEIS does not recommend any additional regulatory controls or find a significant environmental impact associated with this technology, which has been in use in New York State for at least 50 years.

While the DEC has touted this record of safety involving hydraulic fracturing, including the apparent presence of 13,000 active wells without an incident of ground water contamination, we find that the finding is largely anecdotal and not based upon scientific back ground testing or inquiry. For one, the DEC began asking for the exact chemical make up of fracturing fluids for the first time in June of 2008. This requests, while welcome, is an admission that for the past 50 years the State of New York has not known what chemicals it has been permitting in subsurface injections and subsequently not known what to test for if complaints of contamination arose. The 1992 GEIS speaks generically of fluid classifications including drilling muds, surfactants, bactericides, scale inhibitors, and acids but it is clear that beyond vague chemical properties the DEC has been unaware of the specific contamination threats these fluids present.

Secondly, it is clear that the DEC has in fact received many complaints about groundwater contamination over the years. Section 9-14 reads:

“Over two million people in upstate New York are served by private water wells and many of these wells are in small isolated or bedrock aquifers (NYS DEC Division of Water, 1985). Because of numerous complaints involving oil and gas in water wells in these areas, the Department has made an extensive review of existing cementing and casing practices for both oil and gas wells”

The Sierra Club Atlantic Chapter is concerned that this anecdotal and unexamined record of safety will be taken as fact moving forward. If there have been ground water contamination issues in the past they may not have been realized because:

- 1) There has been no requirement to test water quality before, during, or after gas well development.
- 2) Contamination is difficult to qualify and test for if the chemical constituents in the fracturing fluids have been unknown.
- 3) Much of natural gas development in NYS has occurred in rural districts where contamination issues may not be immediately obvious.
- 4) When hydraulic fracturing and other forms of stimulation have disrupted the flow or quality of private water wells the responsible driller has responded with monetary compensation and treatment equipment before the DEC is notified or even involved.

In order to assess the true impact of hydraulic fracturing:

A) We urge the DEC to go back and test ground water quality in areas that have experienced significant natural gas development to confirm it's apparently impressive safety record. To start with we suggest a random sampling of drinking water wells in areas that have had significant natural gas development. Such as:

Aurelius/Springport, Cayuga County
Geneva/MacDougall, Seneca County
Chautauqua County
Darien Center Genesee/Wyoming Counties

As an example, the Chautauqua County Department of Health Division of Environmental Services received 120 complaints of well water contamination between 1986 and 1988 directly linked to an increase in drilling activity. Because there was no testing of well water before drilling began, absolute correlation between the events could not be confirmed. The DEC did not treat one complaint as a violation, even if the drilling company came forward with monetary compensation for affected properties. These records are still on file, and with the DEC's renewed interest in fracturing fluid constituents; more comprehensive testing can be done to assess impact and liability.

It should be noted that according to the Chautauqua County Department of Health, (see Attached letter) complaints of contamination ceased with the subsidence of drilling activities in the mid 1990's. As drilling activities have increased in the past few years, the county has once again seen resurgence in claims of sudden methane intrusion, briny contamination, muddy water, foul odors, or supply problems.

B) The SGEIS must analyze and obtain full disclosure of the fracturing chemicals to be used and perform a full and complete analysis of those chemicals on air, soil and water quality and their impacts on human health. Any application seeking a permit that will

hydraulically fracture must include full disclosure of all chemicals to be used in the process.

C) Baseline testing of all water supplies and watersheds must be conducted in each county in which an application is processed before the permit is approved. If an application is granted then regular testing (every two months) must occur thereafter. In addition, if any of the neighboring properties have private wells then testing of the drinking water on each of the adjacent properties must occur on the day following a fracture and every two weeks after fracing for a period of three months, then once a month for the following nine months. Alternatively the DEC must come up with an adequate testing schedule. Regardless of the testing schedule the results must be publicly available on the DEC's website and posted in local county newspapers.

D) The DEC must assess the impacts of hydraulic fracturing in other states, as a comparative model of impact. While the DEC has stated publicly that there is no connection between the severe environmental impacts associated with hydraulic fracturing in Wyoming, Colorado, New Mexico, and Texas and what will occur in New York State, the Department should demonstrate the regulatory, geological and technological differences that could justify such a dismissal through comparative analysis.

D) The DEC must review its protocol for cement casing, which is the cornerstone of its ground water pollution prevention program. Before we permit the next wave of horizontal hydraulic fractured wells we must be certain that the current protocol is acceptable. We are particularly concerned that non- "flex-stone" cement pours will crack under the intense pressure of Hydro-fracing and lead to gas and production water migration.

2.1.2.1 Fluid Handling at the Well Site

The harmful effects of waste pit storage on the environment, and potential damage from open-air evaporation of poisonous waste, leakage and possible of overflow during storm events, should remove waste pits from consideration entirely in future well permitting decisions.

The Sierra Club Atlantic Chapter sees no reason to continue permitting lined waste pits at drill sites when steel tanks are a superior alternative and generally supported by the industry. The Draft scope proposes to continue an evaluation of the merits of lined pits including pit liner specifications. We would ask the DEC to additionally evaluate:

- Differences in soil disturbance between steel tanks and lined earthen waste pits
- Impact on migratory water fowl and transient amphibians that may mistakenly take refuge in the waste pits
- Performance standards of steel tanks vs. lined waste pits in terms of accidental leakage.
- Performance standards of steel tanks vs. lined waste pits in flood prone areas

- Performance standards of steel tanks vs. lined waste pits as they contribute to the off gassing of volatile organic compounds and other contaminants.

To this last point we take issue with the DEC's assertion in the draft scope:

“Concerns regarding evaporation of pit contents do not arise in New York because precipitation exceeds evaporation and because long-term production pits common in some western states have not been allowed in New York since 1984. Lined pits used during the drilling and stimulation phases must be reclaimed within 45 days after operations end.”

Sierra Club Atlantic Chapter is primarily concerned with the VOC's from the natural gas condensate that unnecessarily compromises air quality. These chemicals will evaporate regardless of the evaporation/precipitation rate. Sealed metal tanks can make a significant contribution in curtailing fugitive voc and methane emissions but even then there are venting issues that need to be addressed.

2.1.2.2 Fluid Removal from Well Site and Ultimate Disposition of Returned Fluids

Responsible disposal of production water is clearly one of the biggest challenges to Marcellus Shale development. The amount of fluid waste generated is over 100 times what the DEC anticipated in the 1992 GEIS for vertical wells in shallower formations.

Sierra Club Atlantic Chapter believes that closed loop recycling of fracturing flowback is not only feasible but should be mandated. Since the technology is already used widely in Barnett shale development the DEC should have no problems in implementing this process. Closed loop recycling will help reduce the consumptive use of water and the volume of fracturing fluids that need treatment or disposal. But there still will be considerable amounts of wastewater that will require remediation. In regards to the three options presented by the DEC for analysis:

Injection wells

As we understand the intentions of the natural gas industry, a permitted injection well would be drilled at the apex of a sizable cluster of planned natural gas wells. Millions of gallons of waste fluids would be pumped, preferably by pipeline, down 10,000 feet or more into deep geological fissures or voids. While this would eliminate TDS loading and other forms of contamination associated with sewage treatment plants (and reduce the many truck trips), there are remaining questions about fluid migration and long-term groundwater purity.

There is speculation that injection wells used in Barnett shale development (Texas) have been the source of ground water contamination. The city of Ft. Worth recently issued a moratorium against their use. While there is speculation that there may be some fluid migration between geological fractures, there is also clear evidence of negligence with fluid handling at the injection point. Accidental spills, even if it is a few gallons per truck, add up and may be the source of contamination at many sites. At the very least,

injection wells should have impervious surface liners around the well head so that accidental leaks can be captured and cleaned up as trucks discharge fluid.

Beyond this reasonable fix, the Sierra Club Atlantic Chapter remains unconvinced that the science supporting the safety of injection wells in New York State has been exhaustive enough to preclude the possibility of fluid and gas migration between geological formations and between the cement casing and the outer wall of the borehole.

It was once thought that the toxic chemical TCE was safely captured under the ground in Endicott, Broome County, NY. 24 years after TCE was first known to be in concentration underground, it was discovered that it had moved to the surface through vapor intrusion. This toxic gas entered homes and buildings at levels that were in many cases several orders above the state's guidelines. Today, over 500 homes and buildings in Endicott require a ventilation system to keep the levels within the structures safe. Just as we know that we are not safe from TCE underground, we can't assume that spent fracturing fluid will not find its way to the surface or into drinking water supplies.

Out of state treatment

Currently there are only two out of state treatment facilities accessible to NY drillers in Warren and Franklin, Pennsylvania. The Sierra Club Atlantic Chapter does not see this method as a long term solution for waste disposal as the prolonged truck trips will lead to degraded air quality and greater likelihood of accidents and spills.

Local sewage treatment

In late September 2008, the City of Norwich, NY's wastewater treatment plant turned away a load of fluids hauled in from a natural gas drilling operation near by because the hauler did not have the proper permits. It is unknown where the fluid was eventually discharged. We fear that this refusal on the part of the treatment facility is a function of the added scrutiny given to natural gas development in recent months, not as a standard action. We are reasonably certain that wastewater treatment facilities in rural NY counties have been taking production water in recent years without many questions.

In Pennsylvania, the state Department of Environmental Protection (DEP) is investigating the source of contaminants (Total Dissolved Solids) in a 70-mile stretch of the Monongahela River that supplies water for customers of 11 public water suppliers including 850,000 residents in the Pittsburgh metropolitan region. The DEP has stated that approximately 40 percent of the problem appears to be due to high volumes of water from deep gas well drilling that have been released by sewage treatment facilities along the river.

In New York, we fear that brine and produced fluids will overwhelm our treatment facilities, and ultimately our waterways as well, if we do not enforce better disposal practices.

Just Six weeks ago, the Town of Livingston Manor, in Sullivan County NY, (Within the Delaware basin) was approached by an energy company to see if their sewage treatment

plant would take fracturing fluids. This small wastewater facility discharges into The Willowemoc, which flows into the Beaverkill, two internationally recognized trout streams. Even if the load of spent fracturing fluid was thousands of daily gallons rather than millions, it would be difficult to imagine that brine, heavy metals, gas condensate, and other constituents could be remediated enough to protect this legacy stream, with standard treatment technology. **Sierra Club Atlantic Chapter does not see Local Sewage Treatment as a viable option for production water remediation.**

2.1.2.3 Trade Secret or Confidential Commercial Status of Additive Formulas or Constituents

Additive formulas in hydraulic fracturing fluids do not need trade secret status. A company can simply protect the value of a formula by obtaining a patent. If a company feels that its patented formula has been unlawfully duplicated it may seek redress for patent infringement.

It is urged that full public disclosure of the chemicals is the only way to allow full and proper protection to air, water and soil quality and to protect human health. The SGEIS must assess the impact of both disclosure and nondisclosure on efforts to protect air, water, soil and human health.

2.1.3 Well Testing

Green completion technology that recaptures methane and safely isolates pollutants should be mandated by the DEC. The 1992 GEIS did not conduct a quantitative analysis of flaring emissions, and the SGEIS should report, by weight, the typical chemical components released during completion and outline the best industry practices to reduce those emissions.

2.1.5 Well Plugging

Currently, the DEC estimates that there are 45,000 abandoned unmapped wells in NYS, most of which are unplugged. The DEC must establish:

1. A protocol in the dSGEIS to identify orphaned wells in each individual permit application so that unanticipated communication between an abandoned unplugged well and a horizontal hydraulic fracturing operation will not lead to groundwater contamination or other avoidable accidents.
2. Hold drillers liable for any accident stemming from an unidentified orphan well impacted by hydro-fracing to ensure that pre drilling investigations are thorough.
3. The DEC should require a drilling company to secure every unplugged well within its spacing unit before drilling can commence. In addition, each new well should provide enough bonding upfront to cover the eventual plugging costs.

3.0 GEOLOGY

The DEC needs to provide a definitive and current map of Marcellus, Utica, and other relevant shale formations to accompany the final scoping document. This map should include the identification of geological faults and anomalies that may allow fluid and gas migration from the deepest layers to the surface, or contribute uniquely to flow back contamination in terms of N.O.R.M.S, condensate, or brine.

4.1.3 Air Quality Impacts

The draft-scoping document states that:

- ***The dSGEIS will examine whether any anticipated activity at Marcellus or other shale well sites could result in an air quality impact that is not discussed in the GEIS.***

This appears to be a reasonable approach to the study until one realizes that the 1992 GEIS considered very little by way of air quality impacts but made broad conclusions as to the insignificance of the industry's emissions. The summary conclusion of the document was:

Like most other small construction sites, the associated dust and exhaust fumes are short term and limited in a real extent. (See 8.A and 8.D.1)

While there is mention of:

- (1) Airborne dust from construction activities, including air drilling operations, or traffic on unstabilized access roads,
- (2) Diesel fumes from equipment operation and
- (3) Uncommon accidental uncontrolled flows of methane and hydrogen sulfide.

There is no qualitative or quantitative analysis of emissions and releases or the compounding effect of multiple well projects that would justify this dismissal of this impact. To the contrary there are no significant differences between the technological infrastructure required for Marcellus Shale development and that of Barnett shale. The air quality of Fort Worth, Texas has been significantly degraded by gas drilling activity and suggests that New York reasonably could face the same issues.

The problem is of course cumulative, and while the DEC has seen individual emissions as "short term and limited" the collective impact can have long-term and far-reaching effects. The 1992 conclusions of air quality are speculative and unsubstantiated and a scientific study of emissions should have been conducted.

A proper Air quality impact analysis would consist of:

Estimates, by weight, of all anticipated emissions of all potential pollutants involved in the complete production of a gas well, including:

- All emissions from truck traffic, machinery, equipment, flaring, and completion
- All emissions evaporating or leaking from pits, tanks, wellheads and pipelines. If there are additional air quality impacts from natural gas compressor stations they must be factored in as well.
- All emissions from accidental or illegal discharges based on a probability based risk assessment.

Emissions would include but not be limited to methane, sulfur dioxide, nitrogen dioxide, carbon monoxide, carbon dioxide, volatile organic compounds (VOC's), particulate mater, toxic metals, hydrogen sulfide, and ground level ozone.

As part of the cumulative analysis component of the SGEIS, the DEC must look at the current air quality and clean air standards of the Southern Tier and Catskills and using the likely impacts of one well, begin to assess the impact of multiple well development and the overall effect on regional air quality.

4.1.3.1 Greenhouse Gas Emissions

In the 1992 GEIS there is not a single reference to global warming or global climate change. This issue is the primary focus of the NYSDEC and currently guides most of the department's actions and programs. The oil and gas industry plays a sizable role in the proliferation of green house gases (perhaps as much as 12 percent of the state's anthropocentric methane emissions) and the DEC is responsible for the mitigation of the cumulative impacts of the gas and oil wells throughout its permitting process. In spite of the fact that methane produces less carbon dioxide than other fossil fuels when burned, the gas itself is at least twenty-three times a more potent a green house gas than CO₂. Vast quantities of methane and deposited CO₂ are released during the gas extraction process without any regulatory consideration by the DEC for avoidance or mitigation. The only discussion of methane in the 1992 GEIS (10-5) dismissed the industry's methane releases as a fraction of biological sources, and offered no further commentary on the state's obligation to mitigate. Sierra Club Atlantic Chapter believes that a complete GEIS would have included:

- a. A comprehensive analysis of natural gas leakage from the completion process, wellheads, storage tanks, and pipelines. This would result in a quantitative assessment of the industry's contribution to Green house gases. Detection strategies and mitigation options would then be devised.
- b. A comprehensive analysis of best available technologies such as flareless "green" completions and zero emissions dehydrators that not only reduce emissions but also conserve the resource that would otherwise be burned off or emitted into the atmosphere.
- c. A comprehensive analysis of green house gas emissions from trucks, drilling equipment, and the removal of vegetation.

The scoping Document of the Supplemental GEIS has stated that:

The Department is currently developing guidance for how greenhouse gas emissions associated with permits the Department issues should be addressed in Environmental Impact Statements. That guidance will be subject to its own public review process before it is finalized, and its implementation with respect to shale gas development will be based on the form and applicability of the final guidance. Therefore, evaluation of greenhouse gas emissions related to shale gas development using horizontal drilling and high-volume hydraulic fracturing is not included in this draft scope but will be addressed as necessary after the Department's guidance is finalized.

The oil and Gas industry plays a major and **direct** role in the proliferation of green house gases and should be considered separate from the GHG potential of general projects and actions. This is clearly something that should be studied in the SGEIS, especially as the natural gas industry expects to grow with the Marcellus play.

4.2.1 Water Withdrawals

With average increases of one hundred times the water requirements of vertical wells, horizontal hydraulic fracturing in Marcellus Shale will necessitate careful examination. It is unfortunate that the Draft Scope fails to identify the methodology by which the DEC intends to identify issues and impacts of this most critical subject.

- How will the DEC assess potential impacts to downstream wetlands and users?
- Will the DEC be conducting indexes of biological integrity on every potentially effected waterway?
- Will all wildlife be accounted for in these studies?
- Can restrictions on water withdrawals be enforced by the DEC without a legislative mandate?
- By what standards will the DEC establish acceptable draw-downs of streams and rivers?
- Is there enough monitoring of drought conditions to coordinate

This section is potentially the most important study in the SGEIS and the Draft Scope fails to provide enough information to understand how the DEC will undertake this investigation.

4.2.2 Groundwater Quality

The Sierra Club Atlantic Chapter is concerned about the contamination of aquifers during the primary stages of well development before protective casing is installed. In North Brookfield, Madison County, NY a driller attempted to dislodge an impacted drill bit by blasting compressed air down the 400 foot well bore. This resulted in geyser like formations coming from 14 private water wells, and subsequent out-of-tap discharges of mud, methane or nothing at all. This happened in February 2007 and today some of these residences do not have water restored or cannot use their well water without expensive filtration equipment.

Sadly, we do not know how commonly this practice is used or how frequently aquifers are agitated like this, as most wells are developed in rural districts away from drinking water infrastructure. This is not to say that significant damage is not done to ground water, especially as it feeds trout streams and wetlands. Though we know this kind of violation is difficult to identify and then quantify in terms of gallons impacted, we see this as the responsibility of the DEC to investigate. What is the frequency of air drilling intrusion into ground water resources and can we assess the potential impacts as part of our review of Marcellus shale development?

Again, we refer the DEC to our comments in section 2.1.2 that outlines our concern that the Department has not done enough to confirm that ground water resources have been protected.

We suggest that the DEC explore a pre-testing requirement funded by individual Oil and gas companies to establish baseline water quality in adjacent private water wells prior any drilling activity. Sierra Club Atlantic Chapter recommends that drinking water wells be tested for the Following parameters when an oil or gas well is being developed/re-developed close to water wells:

Sodium (Na), Sulfate (SO₄), Calcium (Ca), Alkalinity, Potassium (K), Total Dissolved Solids Chlorides (Cl⁻), Lead (Pb), Iron (Fe), Strontium (Sr), Magnesium (Mg), Barium (Ba), Manganese (Mn), Methane/Ethane, pH, and bacteria.

Pennsylvania regulations require that all water wells within 1,000 feet of proposed oil/gas well development be tested. New York State has no such requirement yet, but we would like this concept explored in the SGEIS.

The Sierra Club Atlantic Chapter takes the position that with the use of Hydraulic fracturing in horizontally drilled wells with a reach of 3,000 horizontal feet should change the 1992 findings statement in terms of what should be considered significant. (i.e. The issuance of a permit to drill less then 3,500 feet from a municipal water supply should be considered “always significant” and require a site specific EIS)

In light of the 3,000 foot reach of horizontal drilling the setbacks established by the DEC are now woefully inadequate (100ft. to a house and private well, 150 ft. to a public building, 75ft. to a road, 50ft. to a stream), and the DSGEIS must fully assess these numbers and compare the effects of using larger set backs included in its comments.

4.2.3 Surface Water Quality

The Sierra Club Atlantic Chapter takes the position that the current 1000 feet drilling set back from public water bodies is insufficient when horizontal drilling with hydraulic fracturing occurs. As mentioned previously these wells have a 3,000-foot reach. Other states such as Colorado have a larger set back and the DSGEIS must assess the impacts of all setbacks to determine if greater distances would minimize the potential threat of contamination to public water bodies.

4.2.3.1 Surface Municipal Water Supplies

The Sierra Club Atlantic Chapter is opposed to drilling in watersheds that provide ecological filtration for municipal drinking water. While we have appeared to be partial to the reservoirs of the New York City Watershed, it is clear that all reservoirs and watersheds require additional reviews or special mitigations in the context of their own SEQRA reviews. In addition, the DEC cannot assume that each municipality controls the appropriate amount of land surrounding a reservoir to “effectively preclude oil and gas development” and must make ever effort to protect water quality.

4.2.3.2 Stream Disturbance

The DEC should reevaluate all its setback requirements in terms of horizontal hydraulic fracturing. A 50ft setback for any riparian area is insufficient and the dSGEIS should establish ecologically based methodology to appropriately reestablish protective boundaries.

4.2.4 New York City Watershed

The DSGEIS must assess the potential impacts that water usage will have on water flowing into the New York City drinking water supply from rivers, tributaries and other sources. On October 28, 2008 the Sierra Club Atlantic Chapter's Executive Committee passed the following resolution:

“BE IT RESOLVED that the Atlantic Chapter of the Sierra Club supports a permanent ban on natural gas drilling in areas where the risks to public health, agricultural resources, or ecological features will result in the unacceptable degradation of these irreplaceable resources, such as flood-plains, wetlands, parklands, critical animal habitats, and of greatest importance, areas that provide drinking water such as the New York City 1400-square-mile Catskill watershed.

A Supplemental GEIS *On the Oil, Gas, and Solution Mining Regulatory Program for Horizontal Natural Gas Drilling Activities in the Marcellus Shale Formation* must contain:

1. A full scientific inventory of these ecologically sensitive areas and a commitment to their permanent protection.
2. A strong framework of environmental standards for the regions, which are deemed appropriate and safe for drilling.”

In addition, if drilling is to be allowed it should be considered that New York City is currently afforded a Filtration Avoidance Determination and the fact that contamination from drilling could lead to removal of this status resulting in the need for New York City to build a filtration plant that would cost at least \$10 billion dollars. If the DEC does allow drilling within the NYC watershed it must require a bond of at least twice the cost of the plant, in the event that a contamination leads then removal of the FAD. (The excess amount would of course be returned when the plant is completed. Alternatively, insurance could be required to insure against the need to build the plant.)

4.3 Significant Habitats and Endangered, Rare or Threatened Species

The draft-scoping document suggests that issues pertaining to wildlife and significant habitats, as they would relate to Marcellus Shale development, were adequately addressed in the 1992 GEIS. The Sierra Club Atlantic Chapter finds that these issues were not sufficiently examined and we hope that the final scoping document will include the following concerns:

- A. The summary of the conflict between habitats and gas drilling (GEIS 6-14) offered that other divisions and agencies may play a role in charting species and critical environmental areas but there is no direct indication of coordination

between the Div. Mineral resources and these agencies. The scoping document claims that the division of mineral resources checks the data bases with every application to make sure that there is no conflict between the individual well and a critical habitat area. This is a good first step, but we believe that:

- a. Well development occurs on private land where there is less information on sensitive species in the natural heritage program database than there is on public land where drilling will most likely not occur.
- b. On site investigation should be required for every well project, complete with biological inventories.
- c. The DEC's current approach does not address region wide biodiversity issues that take into account a pattern of cumulative impacts that may not be apparent on the individual permit level.
- d. There is no substantive discussion of mitigation strategies for the habitat impacts of the oil and gas industry beyond well relocation and potential seasonal restrictions.
- e. Natural gas development should be driving information for the Natural Heritage database so that at the very least, the destruction of habitat through well development will generate information helpful in planning the protection of the larger ecosystem.

B. As outlined in our comments on cumulative impacts, the Division of mineral resources should have coordinated with involved agencies to overlay maps of critical habitat, flyways, and endangered species information over potential gas an oil fields to identify areas of conflict and devise region wide mitigation and planning.

C. While the listing of potentially impacted habitats (GEIS8-38) is an appropriate action, the GEIS stated that, " *The Majority of the Significant Habitats in or near existing oil and gas fields fall into one of the following categories:*" and then lists: 1) Heronries, 2) deer wintering areas, and 3) uncommon, rare and endangered plants. This sparse selection of non-threatened species and a general plants category does not constitute a "hard look" at issues of biodiversity. Again, the listing, mapping, and analyzing of all affected habitats is the recommended method to ensure we protect biodiversity and avoid unnecessary conflict.

D. One of the biggest threats to biodiversity is invasive species for which there was no discussion or analysis in the 1992 GEIS. The vast grid work of roadways, pipelines, and staging areas that is requisite for the gas industry especially in sheet formations like the Marcellus or the Utica provides long conduits of disturbance for exotic plants to take root and invasive invertebrates to travel. Truck tires are effective vectors for spreading seeds. The DEC must conduct this important analysis to protect the biological integrity of the Catskill's and Southern Tier's more sensitive ecological communities.

E. The Dept. has no clear guidelines for habitat restoration of drilling pads. While typically grade is restored and replanted with grasses, consideration must be given to native vegetation and the context of the preexisting ground cover. While these

concerns may not be as significant in agricultural areas, much of the recent leases targeting Marcellus shale in the southern Catskills and parts of the Southern Tier are on forested land. The grid pattern of pipelines, well pads and roadways consistent with the development of a geological sheet formation will fragment forest ecosystems and harm their collective integrity. Replanting these areas with grasses may not be suitable to maintain wildlife corridors and ecological continuity. The DEC must establish a land reclamation protocol that is sensitive to the preexisting habitat or community type.

4.4 Floodplains

The Sierra Club Atlantic Chapter is firm in its belief that no natural gas development should occur in flood plains, period. The risks are simply too great for mass contamination during a flooding event. dSGEIS should outline the unavoidable risks of flood plain development to justify such a ban.

4.5 Freshwater Wetlands

As with flood plains, wetlands are inappropriate development areas for natural gas wells and should be off limits. The DEC should consult with the Army Corps of Engineers and NYSDEC freshwater wetlands program to better coordinate wetland protection, as it would relate to Marcellus shale development. The DEC should also prohibit the extraction of surface water from wetlands, unless individual comprehensive biological studies are conducted that demonstrate no harm could come from mass withdrawal.

4.7 Cumulative Impacts

The 1992 GEIS fails to live up to its obligations under SEQRA to analyze **cumulative impacts** by concluding that:

...cumulative review is impractical and unnecessary when considering most oil and gas drilling because of the independent nature of each of the wells, i.e., no compounding of environmental significance, and the fact that the economics generally dictate a more cautioned approach of obtaining permits sequentially because of the high costs involved. (3-10)

In keeping with this approach, the Scoping document asserts:

The number of wells which will ultimately be drilled cannot be known in advance, in large part because the productivity of any particular formation at any given location and depth is not known until drilling begins. Changes in the market and other economic conditions also have an impact on whether and how quickly individual wells are drilled. “ (Pg.34)

Sierra Club Atlantic Chapter finds that these statements are an unjustified dismissal of responsibility. Cumulative impact analysis is required by ELC §617.9(b)(5)(iii) (a):
An EIS must contain:

Reasonably related short-term and long-term impacts, cumulative impacts and other associated environmental impacts.

Their 1992 statement does not adequately explain why the DEC cannot look at collective environmental impacts, especially ones that cannot be gleaned in an individual permit. A proper cumulative impact analysis would have looked at collective impact issues through full build out models of the potential gas and oil wells including temporary roadways, pipelines, well pads and staging areas based upon spacing requirements and geographical constraints.

Using mapping overlays over this potential development the DEC would insert ground water resources, aquifers, wetlands, critical habitats, air quality attainment areas as well as wastewater infrastructure, transportation infrastructure, community infrastructure and cultural resources.

An analysis based on these maps and overlays of how collective natural and community resources would be affected by the entirety of the full oil, gas, And solution mining build out, including the impact of increased water withdrawals, waste water disposal, habitat fragmentation, increased truck traffic, accidental spills or releases, air and green house gas emissions, noise and secondary growth would allow the department to identify critical environmental areas, potential areas of conflict and opportunities for mitigation.

The DEC has reargued the point that this kind of analysis is impractical because no one can predict the future and modeling extremes serves little purpose. The point of build out modeling, especially in the context of Geographic Information Systems (GIS) is to identify resource constraints, thresholds, and possible phased approaches to reducing impacts. It should not only be the cornerstone of a guidance document but a continuing resource for the regulator to use as management tool. Again, the omission of this required analysis should invalidate the GEIS as a substitute for the requisite “hard look”.

Ultimately, cumulative impacts should not be a subsection of the SGEIS but the central thread that connects the entire study.

4.8 Community Character

Community Impacts were largely ignored in the 1992 GEIS save a brief discussion of noise and aesthetic considerations. Since oil and gas development is largely exempt from local zoning laws it would have been especially important for the Division of Mineral Resources to include an analysis of how this heavy industrial feature will affect communities.

ECL 23-303 (2) The provisions of this article shall supersede all local laws or ordinances relating to the regulation of the oil, gas and solution mining industries; but shall not supersede local government jurisdiction over local roads or the rights of local governments under the real property tax law.

The NYSDEC division of Mineral resources in the SGEIS should prepared host communities of Marcellus gas development with an analysis of:

- Truck traffic
- Road infrastructure/ degradation
- Local and regional air impacts (under evaluated by GEIS)
- Emergency resources related to the O&G industry (both medical and accident response)
- Law enforcement / correctional infrastructure
- Social Impacts: Housing shortage / prostitution / methamphetamine use increases
- Waste water treatment infrastructure
- Sprawl/ secondary growth impacts

5.1 Public and Local Government Participation

Sierra Club Atlantic Chapter believes that a GEIS is suitable mechanism to standardize technological aspects of the natural gas industry or to take into account statewide collective impacts, but cannot substitute for a comprehensive SEQRA Review at the local level. We would like to see the following concepts explored in the dSGEIS:

- 1) Separate GEIS for regional gas development that would incorporate multiple individual permits, to assess cumulative impacts within a watershed, a county, or some other regionally defined area. This would allow for full SEQRA public participation, and allow for adaptations to permits that conform to a locality's unique ecological and infrastructure needs.
- 2) An analysis of the implications of repealing *ECL 23-303 (2)*; an option we believe would bring the most positive local government participation to the process.
- 3) Notification of the host community within 5 days of the filing of a well application with the DEC

7.0 Alternative Actions

Through An Analysis of Alternatives The SGEIS Must Thoroughly Address Energy Conservation and Efficiency, the Use of Alternative Sources of Energy, Especially the Use of Renewable Sources of Energy, and Combinations of Alternatives in the No-Action Alternative.

1) Sierra Club Atlantic Chapter strongly suggests that the DEC consider the no action alternative as stated in the Draft Scope *“the prohibition of development of Marcellus Shale and other low Permeability reservoirs by horizontal drilling and High-volume hydraulic fracturing”*. Out of concern for environmental health and global climate change, Marcellus Shale should not be developed until it has been demonstrated that all other alternative and “greener” options for energy production have been exhausted.

2) Sierra Club Atlantic Chapter finds that the analysis of alternative sources of energy in the 1992 GEIS failed to provide a “hard-look” and to fully and accurately assess New York State's ability to generate its energy from renewable sources of energy such as wind, solar, and biomass, the impact on the environment of generating electricity from

renewable sources, the impact of energy efficiency and conservation, or the impact of a Combination of Alternatives as compared with natural gas and oil. The DEC must conduct a thorough analysis of the current state of renewable energy use as an alternative to natural gas and the comparative environmental impacts associated with each.

3) The dSGEIS should explore alternative permitting methods described in section 5.0 of our comments as a means to improve the effectiveness of impact assessment and engender more public involvement. Again, this may involve such strategies as regional GEIS's, phased approaches to gas field development by mandating collaborative agreements between companies, or the reestablishment of home rule to communities so that oil and gas operations conform to local law.

Other issues to consider, not mentioned in the DEC's Document:

Environmental Justice

Commissioner Policy CP-29 requires that the DEC consider environmental justice issues in the SDGEIS. Specifically, the policy states that it "is specifically intended to ensure that DEC's environmental permit process promotes environmental justice." Environmental Justice is a tool, within the normal environmental impact statement process, to identify communities that might otherwise be overlooked and identify impacts due to their uniqueness as part of the environmental review process. An EJ-related socioeconomic impact analysis is pertinent when there is a nexus to the human or physical environment or if an evaluation is necessary for an accurate cost-benefit analysis. The focus of any EJ review should be on identifying and weighing disproportionately significant and adverse, environmental impacts on minority and low-income populations that may be different from the impacts on the general population. The impacts of a drilling permit on some populations may be different from impacts on the general population due to a community's distinct cultural characteristics or practices. The DEC must consider the impacts of minority and low-income populations. Included in these minority group, but by way of example of groups that will require EJ analysis are the impacts on the 9 Native American Reservation's in New York (Cayuga Nation of Indians, Oneida Indian Nation, Onondaga Nation, St. Regis Band of Mohawk, Seneca Nation, Tonawanda Band of Seneca and Tuscarora Nation)

Staffing and Enforcement issues

The Sierra Club Atlantic Chapter urges the DEC to evaluate staffing and enforcement as it relates to the emerging Marcellus shale play in the SGEIS. As we investigate drilling accidents that have occurred due to mismanagement in other states we see that no agency has the ability to apply the proper oversight to prevent mishaps.

We would like to see an evaluation of a program that would mandate the constant presence of independent environmental inspectors at drill sites paid for by the company. These licensed and trained professionals would oversee the entire process and have to sign off on hundreds of safety procedures and report violations or accidents. While there is still opportunity for bad actors and corruption, this arrangement creates a structure for accountability and liability beyond what we have now.

The dSGEIS should also contain analysis of the Division of Mineral resources staffing structure and inspection /enforcement needs as the development of Marcellus Shale moves forward.

Risk Assessment

The DEC claims in the draft-scoping document that spills and accidental releases will not be included in the cumulative study of the potential impacts of Marcellus shale development claiming that those are enforcement issues and separate from the jurisdiction of the Division of Mineral Resources. We see this as clear segmentation of associated impacts.

Page 34 of the Draft scope the DEC states:

The emission and discharge of pollutants into the atmosphere, or into ground and surface water from shale gas development will only occur as a result of violations or accidents. The regulatory program for oil and gas wells is not a discharge permitting program, but rather contemplates no significant discharges as part of the permitted activity. Accordingly, there is no basis for assessing cumulative impacts of these types of discharges. Should any emissions or discharges occur, they will be subject to enforcement and remediation.

The 1992 Generic Environmental Impact Statement (GEIS) On the Oil, Gas and Solution Mining Regulatory Program was the apparent culmination of a 12 year effort initiated by a need to comply with SEQRA but also as a means to address **anticipated** problems of contamination, chemical discharges and releases. It would be fair to state that the entire document is laced with potentialities for accidents and calculations of mishaps. In direct contradiction to the above scoping statement the GEIS states in section 9-14:

“Over two million people in upstate New York are served by private water wells and many of these wells are in small isolated or bedrock aquifers (NYS DEC Division of Water, 1985). Because of numerous complaints involving oil and gas in water wells in these areas, the Department has made an extensive review of existing cementing and casing practices for both oil and gas wells.”

The GEIS states in section 9-8:

“The Department's regulatory program addresses some safety concerns. These are primarily oriented towards oil wells and operations. The existing regulations require the following:

c. At any time when oil or gas is lost from wells or pipelines, receiving tanks, storage tanks or receiving and storage receptacles and creates a fire or pollution hazard or exceeds 100 barrels of oil in aggregate, or 3 million cubic feet of gas in aggregate, the DEC regional headquarters must be notified within five days after the event. A report of

remedial measures being taken to correct the situation must also be given to DEC 16NYCRR Part 556.4Cd).

...The Division of mineral Resources will retain jurisdiction over spills and leaks at the wellhead.”

The GEIS states in section 9-22

“Prior to penetrating the Onondaga, the local fire department must also be notified of the well's location and the potential hazards involved...

...To help decrease chances for accidents, every effort must be made to penetrate the Onondaga during daylight hours...”

Clearly accidents are anticipated by the DEC, though to the most restricted extent possible. **The SGEIS must perform some form of risk assessment so that the cumulative impacts of “unanticipated” discharges and releases can be determined and accounted for.** A reasonable determination must be made for the occurrence of: Blow outs, truck accidents, pit liner tears, casing failure, impacted drill bits, vandalism, groundwater contamination, fluid spills and fires.

Best industry practices

Sierra Club Atlantic Chapter would like included in the dSEIS, at every level of development of Marcellus shale, a commitment to the adoption of best practices including, but not limited to:

- Banning of earthen waste pits in favor of steel storage tanks.
- Ground water testing before, during, and after the completion of a well.
- “Green” fracing fluids
- Closed loop water recycling systems that remediate wastes on-site.
- Flare-less completions that reduce green house gas emissions and recover usable fuel.
- Emission reducing technology
- Phased approaches to well development that concentrate drilling activity into manageable zones and timeframes. Working in phases allows for the consolidation of resource use and can create scenarios where severe impacts are avoided.
- Bonding of well sites to ensure clean-up.
- Noise control technologies.
- Plasticizes cement casing or use of “flex-stone” materials
- Leakage detection systems for well heads and pipelines

In conclusion, the Sierra Club Atlantic Chapter realizes that this proposed SGEIS is a monumental task and will be difficult to conclude by the Summer 2009 deadline. We encourage the Department of Environmental Conservation to make the SGEIS as comprehensive as possible, as we see this as the fastest conclusion to this particular SEQRA process. We look forward to working with the Department in evaluating the SGEIS and hope that by working together we can arrive at the best economic and environmental out come.

Respectfully submitted,

Scott Lauffer

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Attachment A

June 28, 2008

Sierra Club Atlantic Chapter Resolution on Marcellus Shale

Be It Resolved that the Atlantic Chapter of the Sierra Club urges that the New York State Department of Environmental Conservation:

Prepare a Supplemental Generic Environmental Impact Statement to the 1992 GEIS On the Oil, Gas and Solution Mining Regulatory Program in accordance with the State Environmental Quality Review Act that would include but not be limited to:

- A) A full build out model of the potential Marcellus gas field, including temporary roadways, pipelines, well pads and staging areas based upon spacing requirements and geographical constraints.
- B) Mapping overlays of the potential Marcellus gas field that include: ground water resources, aquifers, wetlands, critical habitats, naturally occurring radioactive deposits, air quality attainment areas as well as waste water infrastructure, transportation infrastructure, community infrastructure and cultural resources.
- C) An analysis based on these maps and overlays of how collective natural and community resources would be affected by the entirety of the full gas well build out, including the impact of increased water withdrawals, waste water disposal, habitat fragmentation, increased truck traffic, accidental spills or releases, air emissions, noise and secondary growth.
- D) An evaluation of all chemicals and materials used in the Hydraulic fracturing process with no exemptions to proprietary privilege as well as an assessment of all possible naturally occurring sources of contamination. In addition, an analysis of best available practices should be conducted for onsite operations to include banning of open waste pits, on site water remediation, independent water testing (pre and post drilling), non-toxic frac fluids, and emissions control including CO₂.
- E) An additional and emphasized analysis of gas well development within the New York City watershed.

In addition, the Atlantic Chapter of the Sierra Club opposes drilling on public lands and environmentally sensitive lands.”