

Attn: dSGEIS Comments
Bureau of Oil & Gas Regulation
NYSDEC Division of Mineral Resources
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***Comments on the Draft Supplemental Generic Environmental Impact Statement
On The Oil, Gas and Solution Mining Regulatory Program (dSGEIS)***

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Background

I am a resident of New York State. My family lives in the southeast corner of Tompkins County, right on top of the Marcellus Shale fairway. We own over 100 acres of land and could make a substantial amount of money by leasing our land for gas extraction. We have chosen not to do so because we strongly feel that gas extraction as currently proposed is not safe or appropriate for ourselves, our community, and the creatures around us. The more we have learned about high volume hydrofracking, the more certain we are that that is the case.

With that in mind, I am extremely dismayed by the weaknesses of the draft Supplemental Generic Environmental Impact Statement (dSGEIS). The document is clearly incomplete; in particular, it is missing key data and analyses needed for informed decision-making, in most areas it makes no specific requirements and sets no concrete standards, and it has an over-reliance on industry data sources and extreme-case scenarios which leads to erroneous conclusions. Below I give some specific examples of these flaws in the areas of economic analyses, greenhouse gas emissions, cumulative impacts, wastewater treatment, social impacts and green alternatives.

Given the extent of problems in the dSGEIS, my strong recommendation is that the document be withdrawn and thoroughly reworked, this time including critical perspectives from experts from outside the oil and gas industry. In my opinion, the dSGEIS is a document suffering from a one-sided perspective. Bad decisions are made by groups that do not include strong dissenting voices. Yes, the public comments provide the opportunity for alternate voices to be heard, but it should not be solely up to the public to find the gaping holes in the draft. This document should have received a more thorough and critical internal review before being made public; the fact that it did not is extremely concerning.

A re-analysis and reworking of the SGEIS must include a thorough consideration of a “non-extraction” option and evaluate under what conditions (for what resource size, field development rate, and economic assumptions, incorporating full cost/benefit analysis and true life-cycle costs) is extracting the reserve more beneficial than not extracting the reserve. What is the hurry to extract the resource today? The fact that the gas companies’ bottom lines make this the right time to extract the gas does not necessarily make it the right time for New York. Though hydrofracking has been used for decades [dSGEIS p. 5-32], the mix of chemicals used in slick water hydrofracking was only developed in the late 1990s and is therefore not a mature technology; long-term repercussions are clearly unknown. What is the cost of waiting until a scientific consensus about the safety of slick water hydrofracking has been achieved, compared to the costs of going ahead now if it turns out not to be safe? Where will today’s regulators be 20 years from now when we finally know the impact of this industry on the health of the people and wildlife of the Southern Tier? Prudence dictates caution.

There may be conditions under which it is appropriate to develop the Marcellus Shale, but there certainly are some conditions under which it is not. In Section 9-1 the dSGEIS rejects out of hand the option of prohibiting Marcellus Shale development as being inconsistent with the Department of Environmental Conservation's mission as defined in ECL Article 23-0301. However, in so doing the Department is subjugating its role of steward of the State's natural resources to its role of developer. The dSGEIS must include a much more thorough examination of environmental and societal consequences of Marcellus Shale development. Why not wait until safer alternatives, such as non-toxic, biodegradable formulations or liquid propane have been developed? Why not wait for more advanced extraction technologies to be developed that can extract a larger fraction of the gas? Would not that also be consistent with the mission "to regulate the development, production and utilization of natural resources of oil and gas in this state in such a manner as will prevent waste; to authorize and to provide for the operation and development of oil and gas properties in such a manner that a greater ultimate recovery of oil and gas may be had...." [ECL Article 23-0301].

Public Need and the Energy Supply

Section 2.2 of the draft SGEIS discusses the public need and benefit of developing the Marcellus Shale gas field. The section contains considerable discussion of the energy supplied by natural gas and has some discussion about the size of the Marcellus Shale gas resource. The size of the Marcellus Shale gas resource, and in particular the amount that lies within New York, is crucial for determining whether or not the net costs (both direct and indirect) of extraction outweigh the benefits (also, both direct and indirect). Yet no serious analysis of the size of the resource is presented. Section 2.2 mentions the initial estimate of 50 trillion cubic feet (tcf) of recoverable gas by Engelder and Lash and also the possibility that the extractable resource is as large as 490 tcf. The citation in the dSGEIS for the larger number is a report by Considine and co-workers at Penn State [Considine, *et. al.* 2009; full reference is given in bibliography of dSGEIS]; checking that document the source is actually Terry Engelder, published in the Fort Worth Basin Oil and Gas Magazine, which is a gas booster magazine, not a peer-reviewed scientific journal. The 490 tcf estimate is based on early results from just one gas company (Chesapeake). The dSGEIS does not include any references to sources that critically examine estimates based on early production data (see for example, Arthur Berman's article in ASPO-USA's journal: <http://www.aspousa.org/index.php/2009/08/lessons-from-the-barnett-shale-suggest-caution-in-other-shale-plays/>). Note that in the more detailed and scientifically-based Section 4.4.3 in the dSGEIS the estimate of recoverable gas returns to 50 tcf.

Nailing down this number is important for determining whether or not to proceed with Marcellus development, as can be shown by the following calculation. Using 50 trillion cubic feet for the amount of recoverable gas in the entire Marcellus Shale, and 15% to 19% of the gas residing in New York, the amount of recoverable gas in New York is between 7.5 and 9.5 tcf [dSGEIS, p. 4-24]. Using the middle value of 8.5 tcf and assuming that the gas is extracted over a period of 30 years (in line with many estimates) then annual New York production would be roughly 280 billion cubic feet per year. In terms of energy, this is 0.29 quadrillion BTU per year (using 1020 BTU per cubic foot of natural gas). In 2007, the United States consumed 101.5 quadrillion BTUs of energy [2007 EIA data: www.eia.doe.gov]. Thus, at the current rate of US energy consumption, developing the entire Marcellus Shale in New York adds less than 0.3% to the annual US energy supply. Is that tiny amount of energy gain worth the risks of spills and aquifer contamination, road damage, air pollution, health and social impacts? Not developing the shale does not require some Spartan lifestyle but a mere 0.3% improvement in energy efficiency to avoid jeopardizing New York or causing more damage elsewhere through extraction of other fossil fuels.

The Marcellus Shale reserve may well be larger than 50 tcf, but it may also be smaller. It will have to be substantially larger to affect the above analysis. Good decisions cannot be made unless the SGEIS contains a credible, scientifically-based analysis of the resource potential of the Marcellus Shale.

Economics

Section 2.2 also summarizes some rosy economic analyses by Considine and co-workers at Penn State [Considine, *et. al.* 2009] and a study commissioned Broome County [*Potential Economic and Fiscal Impacts from Natural Gas Production in Broome County, New York.* July, 2009]. Both these studies are seriously flawed in that they only look at the positive side of the balance sheet; no attempt is made to account for any negative economic impacts that may be associated with gas drilling. The net economic impact of gas drilling may be positive or it may be negative; we simply don't know because the dSGEIS has made no attempt to provide a balanced economic evaluation. For example, the Broome County report ignores what the future economic benefit would be of current land use or other future alternative uses instead of gas development; it does not include the costs of any externalities (gas companies are not paying the full price for what they are doing to land, air and water so Broome County residents will have to pay those costs in the future); and it grossly overestimates benefits and grossly underestimates costs. Balanced analyses that look at pluses and minuses must be made.

Other analyses more critical of gas development have not been incorporated into the DEC's review. Jacquet [Jacquet, Jeffrey. *Energy Boomtowns & Natural Gas* (2009).] has an important paper that reports on both positive and negative economic impacts in some western US counties. Jacquet's paper is included in the dSGEIS bibliography, but no footnote or citation to it occurs in the dSGEIS. Headwaters Economics [Headwaters Economics. *Fossil Fuel Extraction as a County Economic Development Strategy: Are Energy-focusing Counties Benefiting?* (2009)] performed a study that compared otherwise similar counties in the western US that differed in how much emphasis they placed on gas extraction in their economic development plans. The study found that gas-reliant counties, over the long term, had (1) less economic diversity and resilience, (2) lower levels of education in the workforce, (3) a greater gap between high and low income households, (4) a growing wage disparity between energy-related workers and all other workers, (5) less ability to attract investment and retirement dollars, and (6) economies that grew more slowly. The DEC should seek out resources such as these to ensure that they are getting a balanced view of the impacts of Marcellus Shale development. The dSGEIS must explain why results such as these are either not relevant to New York, will be mitigated in New York, or should cause the state to postpone Marcellus Shale development.

Economic analyses must come from sources independent of the oil and gas industry. The Penn State study [Considine, *et. al.* 2009] was funded by the Marcellus Shale Committee. According to the press release published at its formation, "The Marcellus Shale Committee represents the oil and gas industry in Pennsylvania on matters pertaining to the acquisition, exploration, drilling, and development of the Marcellus Shale natural gas resource and provides a unified voice before all state, county, and local government or regulatory bodies." The two co-chairs of the Marcellus Shale Committee are Ray Walker, Vice President of Appalachia Shale for Range Resources and Rich Weber, President of Atlas Energy Resources [http://www.sungazette.com/pdf/news/520487_1.pdf].

Careful attention to the full Marcellus Shale balance sheet is critical because in actuality, very few New York residents will directly benefit from shale gas development. For the past year I have been involved in a careful review of all the recent gas leases in Tompkins County. A set of volunteers read every lease recorded in the Tompkins County Clerk's office between January 1, 2005 and October 15, 2009. There were 2515 different gas leases recorded during that time period, for a total of approximately 117,000 acres, or roughly 40% of the land area of Tompkins County. Excluding businesses, there are 2,330 different individuals holding leases. Based on a random sampling of leases, each lease has on average 1.6 adults on the lease. Not all lease holders will become part of a spacing unit, and some landowners will be incorporated into spacing units who are not leaseholders. Assuming those two factors roughly cancel and that *every single spacing unit produces gas*, the number of adult residents who will directly benefit (receive royalties) from gas drilling is approximately $2,330 \times 1.6 = 3,728$. There are an unknown number of leases from before 2005 that are still active; most leases that could be still active are from 2000 to 2004. Based on the number of leases recorded from 2000 to 2004 and accounting for the

fact that some may have expired and some may be held by individuals already in our database, the number of individuals directly benefitting could be 10% to 15% higher than 3,728 figure calculated above. Using Cornell University and Ithaca College enrollment data in conjunction with US Census Bureau data, the adult, non-college population of Tompkins County is 59,598. So, the fraction of the adult, non-college population that will directly benefit from gas drilling is $3,728/59,498 = 6\%$ (if the number of individuals directly benefitting is 10% to 15% higher, this fraction rises to 7%).

Thus, only 6% to 7% of Tompkins County residents directly benefit by receiving cash payments, while the vast majority must rely on the secondary (indirect and induced economic benefits as described by Considine, *et. al.* 2009) for any benefit. It is therefore extremely important that these secondary benefits be carefully counted to see if they offset the costs of gas drilling to all residents (higher taxes for social services and emergency services, increased health costs, lost revenues due to impacts on tourism, agriculture, and recreational use of the out-of-doors, etc.). The small fraction of the adult population in Tompkins County holding leases is a reflection of the fact that urban areas such as the City of Ithaca and the surrounding villages have little or no leasing. For this reason, the fraction directly benefitting will likely be just as small or smaller in any county, such as Broome, Tioga, or Chemung, for which there is a significant urban population. The dSGEIS must contain independent, scientifically-valid analyses of the indirect and externalized costs of gas production as well as the indirect and induced benefits in conjunction with a realistic model of leasing patterns before New York residents can know how many benefit and how many do not benefit from gas exploration.

Greenhouse Gases

Section 6.6 of the dSGEIS presents an accounting of greenhouse gas emissions generated by the extraction of natural gas through slick water hydrofracturing. Though required to do so by law, the DEC should still be complimented for including estimates of the total CO₂ and CO_{2e} (carbon dioxide equivalent) because this is extremely critical information for deciding whether or not, and to what extent, to exploit the Marcellus Shale. Those who look only at the end point and state that burning natural gas reduces CO₂ emissions compared to coal or oil (see, for example, Considine, *et. al.* 2009 as quoted in dSGEIS, p. 2-7) are looking at only part of the picture. To know if increased natural gas production actually will help reduce global warming requires a life-cycle analysis of all these fuels.

Unfortunately, the data presented in Section 6.6 do not go far enough. Estimates are made for the CO₂ and CO_{2e} per well pad. What is needed is an estimate of the CO₂ and CO_{2e} per BTU (or cubic foot) of gas produced. This requires an estimate of how much gas is likely to be produced per well pad, underscoring the point made above about how important it is to have a credible estimate of the ultimately recoverable reserve in order to make wise decisions.

Furthermore, the dSGEIS absolutely drops the ball when it comes to specifying mitigation procedures for greenhouse gas emissions. Section 7.6 contains absolutely no requirements for mitigating emissions. Instead, the draft states that industry *could* do this, or *could* do that. Control of greenhouse gas emissions is critical if exploitation of natural gas is to be a net global-warming winner. This is particularly true for fugitive emissions (natural gas leaks). Based on EPA data presented in a recent New York Times article [<http://www.nytimes.com/2009/10/15/business/energy-environment/15degrees.html>] the rate of natural gas leakage is between 1.5% and 2.0%. The article states that government scientists and industry officials feel the figure is “almost certainly higher.” Even though natural gas has a shorter residence time in the atmosphere than CO₂, because it also is a much more potent greenhouse gas, this leak rate has an extremely strong effect on global warming. If 2% of the natural gas leaks before burning, it causes, over a period of 20 years, a peak global warming equal to coal burning. If 4% leaks, natural gas causes *three times* more warming than coal burning, over a 20 year period [Lovelock, James *Revenge of Gaia*, 2007. See pp. 74-76].

It is not enough to hope that natural gas is too valuable for the gas companies to lose 2% or more through fugitive emissions. If it is not cost effective for companies to limit leaks, they will not do it. The

SGEIS must set specific standards for limiting greenhouse gas emissions, including mandating frequent inspections with infrared cameras to monitor fugitive emissions. The SGEIS must also determine what level of green house gas emissions from the entire process of producing gas through slick-water hydrofracking makes natural gas a global warming loser, and mandate efficiencies and mitigation procedures to keep emissions well below that level.

Cumulative impacts

The dSGEIS is woefully incomplete in its evaluation of the cumulative impacts of Marcellus Shale development. Section 6.13 contains a single page on regional cumulative impacts and Section 7.13 less than a page on mitigation. Despite the fact that the dSGEIS acknowledges that the drill rigs are substantially taller, the well pad clearings are significantly larger, the drilling duration is many times longer, and the water use and consequent truck traffic orders of magnitude larger [dSGEIS, p. 6-132] than was the case when cumulative impacts were considered as part of the 1992 GEIS, the dSGEIS maintains that the GEIS conclusions of no cumulative impact still hold. This claim is absolutely untenable.

Part of the dSGEIS claim of negligible cumulative impact rests on the erroneous comparison of a worst-case scenario (intense drilling on a one well-pad per 40-acre spacing) compared to a best case scenario (one multi-well pad per 640 acre spacing). Spacing units for multi-well pads can be *up to* 640 acres [dSGEIS, page 5-19]; they are not mandated to be 640 acres. Due to geological constraints and leasing patterns, it is extremely unlikely that every spacing unit will be the maximum size. Estimates of disturbed acreage must be based on realistic models of the likely distributions of spacing unit sizes and rate of infill wells drilled.

Furthermore, the dSGEIS claims the existing 40-acre spacing in Chautauqua has not had a negative impact on tourism or agriculture, so Marcellus Shale drilling (particularly given its lower well-pad density) also will not. As noted above, the density of Marcellus wells in their analysis is underestimated, and comparing Medina wells to Marcellus wells is comparing apples to oranges. Slick water hydrofracturing is a much more industrialized process than conventional drilling—it is larger, noisier, and more visible. It seems quite likely that the cumulative effect of many thousands of these wells affecting an area much larger than Chautauqua County could have a significant negative impact on tourism and/or agriculture in the Southern Tier, particularly given the notoriety of slick water hydrofracturing. Will the gas companies compensate organic farmers who have difficulty selling their produce because of the fear, either rightly or wrongly, that it is tainted by the chemicals used in hydrofracturing? The DEC must incorporate a thorough examination of other areas in this country where this type of drilling has taken place in its evaluation of cumulative impacts.

Finally, the dSGEIS classifies as “temporary” noise and site disturbances that can last for several years at one location. According to the dSGEIS, the “temporary” nature reduces the need for mitigation. That temporary nature may be of little consolation to a bed and breakfast owner who can’t fill his or her rooms during those years. Though it will be of shorter duration because there will be no drilling, refracturing of wells (and therefore the need to again transport water to and from the well pad again) will create additional temporary disturbances periodically over the lifetime of the well. Despite the experience in other shale plays where refracturing has been used extensively (acknowledged for the Barnett Shale on page 5-96 of the dSGEIS), the DEC lets stand without analysis the surprising statement that refracturing will be a “rare event” in the Marcellus Shale (dSGEIS, p. 5-96). The DEC simply must do a much more thorough job of accounting for and mitigating cumulative impacts of Marcellus Shale development. Such an analysis must allow for a density even less than one well-pad per square mile if that is what it takes to preserve air, water, local economies and the scenic beauty of New York.

Pipelines

The dSGEIS acknowledges the “chicken-and-the-egg” problem of connecting Marcellus wells to gathering pipelines, since the wells must be flowed immediately to help prevent collapse of the fractures.

It is clear that pipelines and wells must be cited simultaneously, yet since pipelines fall under the purview of the PSC, the dSCEIS abandons any attempt to consider them. This omission must be rectified. In order for the dSCEIS to meet both the spirit and the letter of SEQRA, the DEC and the PSC must work together so that the dSCEIS covers wells, gathering lines, compression stations and intermediate transmission line. SEQRA requires that impacts associated with a whole action be evaluated, the determination of “whole action” hinging on the timeframe, goals, geography, common planning/ownership, and functional dependence of an action. The impacts of the required transmission lines are part of the action of permitting Marcellus wells. The DEC must evaluate what new transmissions lines will be required for Marcellus development, and then carefully evaluate the cumulative impacts associated with construction of those transmissions lines.

Social Impacts

Section 6.12 of the dSCEIS contains a brief discussion of community impacts associated with natural gas drilling, and this topic is again treated briefly in Section 6.13 as part of cumulative impacts. The dSCEIS must give much more serious consideration to adverse societal consequences of natural gas development. The dSCEIS complains that there is no way to objectively evaluate subjective opinions (dSCEIS, p. 6-146). Social scientists, however, have developed techniques to do just that. Also, many likely impacts (see next paragraph) are easily quantified. The DEC should consult expert social scientists to help them evaluate likely social impacts of Marcellus Shale development.

As with economic studies and cumulative impacts, not only should sincere efforts be made to quantify likely impacts in New York, the dSCEIS should examine what has happened elsewhere where intense, unconventional gas development has taken place. One example is the previously mentioned study by Jacquet [Jacquet, Jeffrey. *Energy Boomtowns & Natural Gas* (2009).], which reviews research from the 1970s and 1980s on the economic and social effects on small, rural towns of rapid industrialization due to energy extraction and presents a current case study of the negative and positive economic and social effects of natural gas extraction on Sublette County, Wyoming. Among the findings for Sublette are that long-term residents reported lower satisfaction with their community and quality of life, there were high cost-of-living increases (especially in housing and rent), increased demand on ambulance services medical facilities, and rising numbers court cases, arrests, and crime (these later all increased faster than the population). Issues such as these are not mentioned in the summary of potential community character impacts in Section 6.12. The dSCEIS must examine resources that have looked at what has actually happened elsewhere and explain why similar results will not occur here or prescribe mitigation measures.

In the context of discussing minimizing community impacts through restraining development, the dSCEIS, on p. 6-146, makes the following surprising statement: “[A]ny limitation on development, aside from the mitigation measures discussed in the next chapter, is more appropriately considered in the context of policy making, primarily at the local level, outside of the SGEIS.” Local municipal governments in Tompkins County would be very happy to have that ability, but as the dSCEIS notes elsewhere, current Environmental Law prohibits local governments from exerting such controls. The dSCEIS should not make recommendations that the DEC knows are impossible to implement.

Green Alternatives

Section 9.3.1 of the dSCEIS gives cursory consideration of requiring that less toxic chemical formulations be used in hydrofracturing. The section states that such an approach is not possible because there is no U.S.-based metric for evaluating the “greenness” of chemical additives [dSCEIS, p. 9-10]. The section acknowledges, however, that New York could adopt or adapt metrics currently in use in Europe [dSCEIS, p. 9-10].

The dSCEIS should make a serious evaluation of the European standards and explore fully what it would take to adopt or adapt them. The DEC can and should develop the appropriate metrics to evaluate

the long-term safety, biological degradability, and life-cycle costs of chemical constituents to be used in hydrofracturing. Resources for such work should be provided by companies interested in doing business in New York; it is in their best interest to use formulations that are least likely to cause short-term and long-term problems.

Section 9.3 notes the possibility of fracturing with liquefied propane gas (LPG); advantages of such a procedure are mentioned elsewhere in the draft. Beyond mentioning the process, however, no serious discussion is presented. The dSCEIS should evaluate the feasibility of waiting for a less toxic alternative like LPG hydrofracturing to mature before the Marcellus Shale is developed.

Departmental Resources

The DEC noted in the Final Scope for the dSCEIS that it was not within its purview to demand more staff or resources. While that is true, the dSCEIS also acknowledges the critical importance of implementation of and compliance with regulations for avoiding environmental contamination [dSCEIS, p. 5-158]. It is ridiculous to the point of severe negligence for the DEC to ignore this aspect of properly regulating the gas industry. The Department can and should develop several scenarios of staffing requirements as a function of various rates of gas field development. The scenarios should include realistic estimates of the necessary financial support so that the Legislature and gas companies can negotiate a funding formula. The dSCEIS must also include a realistic estimate of what can be adequately regulated with current staffing.