

**Testimony of Acting Commissioner
Steven W. Lawitts
New York City Department of Environmental Protection
(DEP)
before the Council of the City of New York
Committee on Environmental Protection
concerning Oversight - Natural Gas Drilling Within the New York City
Watershed: Part 2
Hearing Room, 250 Broadway**

December 12, 2008

Good morning Chairman Gennaro and Members of the Committee. Thank you for the opportunity to present testimony this morning.

We are all here today because we believe there is nothing more important than protecting New York City's drinking water, an irreplaceable resource for half the citizens of New York State.

The Bloomberg Administration has consistently stated that protection of the watershed and water supply infrastructure is our highest priority. Former Commissioner Emily Lloyd's July 18 letter to New York State Department of Environmental Conservation Commissioner Pete Grannis made the following preliminary recommendations: a drilling exclusion zone around infrastructure and reservoirs; a formal structure for DEP involvement in well-permit reviews and inspections in the watershed; and a technical working group to develop regional conditions for the New York City watershed.

In turn, Commissioner Grannis has made clear on numerous occasions that he understands the importance of protecting New York City's water supply. DEP looks forward to working closely with Commissioner Grannis and his staff to ensure that the Supplemental Generic Environmental Impact Statement (SGEIS), now in the scoping phase, fully discloses any potential environmental risks to our water supply system posed by natural gas exploration and extraction in the Catskill and Delaware Watersheds.

We have reviewed the draft Scope for the SGEIS and generated comments, which we have submitted to the New York State Department of Environmental Conservation (DEC) this morning. We are making our comments available to the Council as an attachment to my testimony. I think you will find that they are quite detailed and very protective of our water supply system, including potential impacts of natural gas drilling on both water quality and on the City's water supply infrastructure. As you know, DEP operates and maintains tunnels, aqueducts and shafts within and outside the watershed. These tunnels often operate under high pressure which reduces the likelihood of contamination from operations such as natural gas drilling. However, inadvertent penetration or contamination resulting from drilling operations could significantly affect the City's ability to provide high quality drinking water.

As set forth in our comments, our primary water quality concern stems from the use of drilling chemicals. The Scope indicates that approximately 99% of the estimated two million gallons needed to develop one well is pure water. However, that equates to approximately 20,000 gallons of unknown chemicals per well site. One of the common chemicals associated with

contamination from natural gas drilling is benzene, for which the ambient groundwater standard is one part per billion. We are therefore calling for full identification of the chemicals used in drilling and an assessment of their potential impacts.

While we are unwavering in our mission to protect drinking water, we are sympathetic both to the need to continue the search for cleaner fuels as stated in PlaNYC 2030, the Bloomberg Administration's plan for a sustainable New York City, and to the very real needs for economic development upstate. Our need to be cautious, while not being unnecessarily restrictive, has led us to seek detailed, specific information about the application of current natural gas drilling technology in the watershed.

To that end we have engaged a consultant with specific expertise in the field of natural gas drilling to assist us in evaluating the potential impacts that natural gas well development may have on the City's Catskill and Delaware Watersheds. The consultant is a joint venture of Hazen & Sawyer/Leggette Brashears & Graham. The contract is expected to be for one year with an option to renew. The consultant will perform a Rapid Impact Assessment to identify issues DEP may need to act on quickly and to guide further work. The Rapid Impact Assessment will be based on readily available information and will inventory potential impacts associated with natural gas extraction and production. The assessment will include case studies from other states, identify circumstances common to contamination issues in other locales and evaluate the potential chemicals involved in the drilling process. The Final Impact Assessment will include a more thorough analysis of the issues,

provide a conceptual model of the hydrogeologic interaction between the Marcellus shale and water resources in the watershed, evaluate regulatory protections and identify high-risk areas for the watershed.

As most of us are aware, the watershed that provides 90% of New York City's drinking water supply, located in the Catskill Mountains, sits atop a portion of a geological formation known as the Marcellus Shale, which lies several thousand feet below portions of Ohio, Pennsylvania, Virginia, West Virginia and New York. Because of its depth and because of the expected yields from Marcellus wells, the natural gas industry did not regard the Marcellus deposits as a promising area for exploration until recently. That situation appears to have shifted over the last five years, probably because of the change in energy prices and new developments in hydraulic fracturing and horizontal drilling, technologies that involve using jets of sand-laden high-pressure water to fracture the rock containing natural gas deposits.

Other factors that encourage exploration include proximity to pipelines, including the Millennium Pipeline under construction, and the high quality of the extracted gas, which allows it to be piped without refinement. There are no applications for well drilling within the watershed right now, but there are 835 active applications State-wide to date in 2008 as opposed to 652 in 2007. Five of the applications for drilling in the Marcellus shale are in the Town of Hancock, a town outside of the New York City Watershed but through which a portion of the City's West Delaware Tunnel passes. DEC has shared the locations of the proposed wells with us and the nearest one is roughly seven miles away from the tunnel - a distance that we currently believe does not pose a threat to our water supply. However, we intend to

closely collaborate with DEC on those applications and ensure, with support of our consulting engineer, that any risks that these proposed wells may pose are identified before the permitting process goes forward.

Natural gas extraction via hydraulic fracturing involves a complicated set of activities that may pose great risks to the ecology of the surrounding area and to the water supply system operated by DEP, which provides high-quality drinking water to approximately half of New York State's population, including eight million residents of New York City. For example, to create the wellhead and access roads the surface of the land has to be disturbed, which creates a risk of soil runoff into the streams that feed our reservoirs. The vehicles and equipment used to extract or transport natural gas have to be fueled, possibly through on-site storage, which also creates a risk of leaks or spills. The fracturing fluid itself is composed of hazardous compounds that, if released into the environment, could pose a very grave threat to water quality. The waste fluid pumped out of the wells after fracturing is often stored on site in open waste pits that are also subject to leaks and spills.

To some extent the threats from these types of activities are known and can be controlled. DEP and/or DEC actively regulates such activities as road building, soil disturbance, waste handling and the use and storage of fuel and other potentially hazardous materials in the watershed to ensure that they will not impair the quality of the water obtained from the Catskill and Delaware Watersheds. As many of you know, the water from these watersheds, both located in the Catskill Mountains, is of quality so high that DEP has been granted a 10-year Filtration Avoidance Determination from

the United States Environmental Protection Agency. However, if the economic incentive to extract natural gas from the Catskill and Delaware Watersheds is very great, the scale of road building, fuel storage and waste handling could dramatically increase to the point that the long term sustainability of a high-quality water supply to the City of New York from the Catskills may be jeopardized. These impacts must be analyzed in the SGEIS.

In granting New York City an unprecedented ten-year Filtration Avoidance Determination (FAD) for the Catskill and Delaware Watersheds, the US Environmental Protection Agency recognized the robustness of our Watershed Protection Program, the cornerstone of which is land acquisition. Aside from the environmental impacts from natural gas drilling, newly available mineral resources could make it more difficult to acquire watershed land. Land owners may be less likely to sell if they can sell natural gas leases with the potential for future royalties; potential for natural gas could drive up appraisals and the cost of obtaining land from owners who are willing to sell; and New York City may want to avoid buying land or conservation easements on properties that have a natural gas lease, further limiting the real estate market.

For these reasons, the draft SGEIS should include evaluation of the potential for natural gas drilling to disrupt the programs, controls, protections and institutional relationships that are required by the FAD and embodied in the 1997 Watershed Memorandum of Agreement, to which DEC is a signatory. The draft Scope states that the draft SGEIS will evaluate impacts in the New

York City watershed “with consideration of the fact that New York City controls a substantial amount of the acreage surrounding the reservoirs through fee ownership or conservation easements so that drilling would not occur on such acreage without the City’s permission.” This misleadingly implies that the City can control natural gas drilling in the watershed through its land ownership or conservation easements. In fact, most land in the watershed is privately owned, and controls for watershed protection are achieved through a combination of regulation, land acquisition, infrastructure investments, and partnership programs with watershed communities. Moreover, State enforcement is an important element of natural gas drilling outside of the watershed, and the same should be true within the City’s watershed. The nature of property ownership should not alter the mandate of the State to vigorously protect the State’s natural resources, including its water resources. The final SGEIS must clarify these relationships and constraints.

As this process moves forward, we reiterate that, in concert with the Bloomberg Administration, Commissioner Grannis has affirmed that protection of our watershed is paramount. We note his commitment not to issue a permit to drill, “...if a proposed well threatened the City’s or any other watershed, and we will not issue a drilling permit in the future if the proposed well threatens the City’s or any other watershed.” We are grateful for that commitment, which is essential to the long-term viability of one of New York State’s essential, irreplaceable resources.

DEP also appreciates that Commissioner Grannis has stated that the authority of the New York State Department of Environmental Conservation is sufficient to protect water resources during oil and gas extraction activities. By making that assertion, DEC is making clear that exemptions from certain federal oversight provided for in the Safe Drinking Water Act do not impair New York State's authority over oil and gas well development in New York. DEC is also taking the position that similar exemptions for oil and gas drilling in other federal statutes do not prohibit New York State from requiring disclosure of information on the composition of the hydraulic fracturing fluid or requiring appropriate erosion and sedimentation controls at well sites. Similarly, DEP can regulate many of the activities associated with natural gas extraction under the "Watershed Rules and Regulations," promulgated pursuant to the State Sanitary Code and the New York City Administrative Code.

In closing, thank you for the opportunity to testify on natural gas extraction in New York City's Watersheds in the Catskill Mountains, an activity that DEP views with great concern. That completes my prepared statement. I would be happy to answer any questions.



December 12, 2008

**DEPARTMENT OF
ENVIRONMENTAL
PROTECTION**

59-17 Junction Boulevard
Flushing, New York 11373

**Steven W. Lawitts
Acting Commissioner**

**Tel: (718) 595-6576
Fax: (718) 595-3557**

Attn: Scope Comments
Bureau of Oil & Gas Regulation
NYSDEC, Division of Mineral Resources
625 Broadway, 3rd Floor
Albany, NY 12233-6500

Re: Draft Scope for Draft Supplemental Generic Environmental Impact
Statement (dSGEIS) on the Oil, Gas and Solution Mining
Regulatory Program (dated 10/6/08)

To Whom It May Concern:

The City of New York submits the following comments on the draft scope for the Draft Supplemental Generic Environmental Impact Statement (dSGEIS) on the Oil, Gas and Solution Mining Regulatory Program – Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs.

The New York City (NYC) water supply provides high quality drinking water to nearly half the population of the State of New York – over eight million people in New York City and one million people in upstate counties. The New York City Department of Environmental Protection (DEP) is the City agency with primary responsibility for overseeing the operation, maintenance and management of the water supply infrastructure and the protection of the 1,969 square mile watershed. The Marcellus Shale underlies the entire West-of-Hudson portion of the New York City water supply which typically supplies 90% of the City's drinking water, a source of such high quality that the water does not require filtration. One specific concern of DEP is the potential consequences this activity could have on our watershed protection program and our ability to maintain filtration avoidance.

Natural gas drilling has the potential for both acute and chronic potential impacts to the water supply infrastructure, water quality and water quantity from natural gas extraction. In the West-of-Hudson area alone, DEP operates and maintains over 167 miles of tunnels and aqueducts and 45 shafts both within and outside of the watershed's boundaries. These tunnels, aqueducts and shafts often operate under high pressure and inadvertent penetration could significantly impact the City's ability to provide sufficient supplies of high quality drinking water to millions of consumers.

DEP is also very concerned about the chemicals used in hydraulic fracturing which have the potential to cause significant harm to the watershed and the water supply. We recognize that New York State has a regulatory program for oil and gas activities and that procedures are already in place which seek to prevent surface or groundwater contamination. However, as DEC recognizes, when this program was put into place, no specialized review of the potential impact of these activities on this activity in NYC's unique watershed was undertaken. In addition, even a well-designed permitting program cannot prevent unanticipated releases which may result in environmental and public health impacts. As such, the risks associated with these activities in an unfiltered water supply, with particular focus on fracking chemicals, must be closely examined in the dSGEIS.

The scope indicates that approximately 99% of the estimated 2 million gallons needed to develop a well is pure water. However, that equates to approximately 20,000 gallons of unknown chemicals *per well site*. Some of these chemicals are toxic even at very low concentrations. For example, one of the common chemicals associated with contamination from natural gas drilling, benzene, has an ambient groundwater standard of 1 ug/l – or one part per billion (6 NYCRR 703.6). Before allowing such large quantities of chemicals to be stored and pumped into the ground, it is critical that these chemicals be fully identified and their potential impacts be assessed in the environmental review.

Finally, the dSGEIS must thoroughly evaluate the potential cumulative impacts from all aspects of natural gas exploration and drilling. This evaluation should use conservative assumptions and look at the magnitude and extent of natural gas development, the subsequent abandonment and restoration of sites, the total amounts of chemicals released over time (intentionally and accidentally), and the total land disturbance not only from well pads but the network of gas collection pipelines, access roads and compressor stations. The assumptions and methodologies utilized for cumulative impacts must be clearly identified in the final scope for the dSGEIS.

Attached are specific comments on the scope for the dSGEIS for your consideration. If you have any questions or would like to discuss these comments further, please do not hesitate to contact me. It is important that our two agencies coordinate closely to protect such a vital resource.

Sincerely,



Steven W. Lawitts

Enc.

xc: Commissioner Grannis

Executive Deputy Commissioner Gruskin

Assistant Commissioner Tierney

Deputy Commissioner Canty

Deputy Commissioner Rush

Specific Comments on the Draft Scope for the SGEIS

Section 1.0 Introduction

- 1.1 In addition to the Marcellus and Utica Shales, the dSGEIS should acknowledge the existence of additional shale plays in New York State that have may have natural gas development potential.
- 1.2 The Introduction should indicate that the DEC is charged with regulating the Development of oil and natural gas wells (in addition to their plugging, drilling & operation).
- 1.4 The GEIS language referenced in this portion of the draft scope of the dSGEIS should specifically reference Water Supply Reservoirs in addition to supply wells, Parkland, Agricultural Districts, etc.
- 1.4 The GEIS considered issuance of an oil and gas drilling permit above an aquifer as a non-significant action. The dSGEIS should re-evaluate this in the case of high-volume hydraulic fracturing and horizontal drilling.
- 1.5 Long-term development of the Marcellus Shale will involve construction of a large network of gas collection pipelines and compressor stations. Construction of this network may have cumulative impacts (e.g. land disturbance, disturbance of buried infrastructure) that are not adequately addressed through case-by-case pipeline construction permits. While it is understood that pipeline regulation is excluded from the draft scope, the cumulative impacts of pipeline network construction and other ancillary gas development activities should be considered among the impacts addressed in the dSGEIS.

Section 2.0 Description of Proposed Action

- 2.0 The dSGEIS should be more clearly focused on evaluating the long-term cumulative impacts of the proposed action. The dSGEIS should also consider critically the relevance of assumptions and methods used in development of the 1992 GEIS.
- 2.1.1 More information needs to be provided on how the environmental and structural impacts associated with horizontal drilling will be examined and reviewed. This analysis should include a review of case studies outside of New York State where this type of drilling has been used in similar shale formations.
- 2.1.1 The draft scope states that *“horizontal drilling is performed using the same equipment and technology as vertical drilling, with the same protocols in place for aquifer protection, fluid containment and waste handling.”* This statement is not entirely accurate, since the horizontal drilling proposed for the region, including NYC watershed lands, would inherently use different techniques and could use different chemicals than those used in vertical drilling. The dSGEIS should include a robust evaluation of actual current and expected horizontal drilling practices and should establish protocols for aquifer protection, fluid containment and wastes handling that are based on these practices, not on past vertical drilling experience.
- 2.1.1 Drilling associated with the Marcellus and other geologic formations deposited in “anoxic” environments (e.g., Utica shale) will produce cuttings and waste fluids that

contain radiological contaminants (such as radon and uranium), low pH (acidic) water and dissolved metals (e.g., iron), and dissolved “salts”. The dSGEIS should evaluate requirements for testing, treatment, handling and disposal procedures for drill cuttings in order to protect the quality of water in the respective watersheds (as well as the health of those who live in proximity to the potential drill sites).

- 2.1.2 The draft scope states that *“The Department has no record of any documented instance of groundwater contamination caused by hydraulic fracturing for gas well development in New York, despite the use of this technology in thousands of wells across the state during the past 50 or more years. Division of Mineral Resources staff responsible for permitting and oversight of gas well drilling since 1980 also do not recall any such instance.”* Though this experience is encouraging, the dSGEIS should not be guided by DEC’s experience alone, and should consider the numerous reported instances of improper waste handling and subsequent surface water and groundwater contamination that have occurred in other states with extensive natural gas development. Specifically, the dSGEIS should identify the lapses in regulations, monitoring, or enforcement that allowed these contaminations to occur, and should detail how the dSGEIS will prevent similar occurrences in New York.

It is important to also look at this technique and instances of groundwater contamination in other states. According to a November 11, 2008 article in Business Week entitled “Does Natural-Gas Drilling Endanger Water Supplies?” for example, there have been cases of groundwater contamination. The article states:

“Serious episodes of water contamination near drilling sites have been documented in seven states: Alabama, Colorado, Montana, New Mexico, Ohio, Texas, and Wyoming, according to public records and interviews with state and federal officials. Numerous incidents of contamination have occurred in western Colorado, where drilling has expanded swiftly. In 2004 a well casing shattered beneath a rig at Divide Creek, a tributary of the Colorado River, which supplies water to seven states. Dangerous levels of benzene turned up in groundwater and stream samples, state records show. Benzene is a carcinogen, according to the EPA, and has been linked to aplastic anemia and leukemia.”

- 2.1.2 The Draft scope states that the dSGEIS will review *“information about fracturing fluid additives collected from service companies and chemical suppliers.”* This language is imprecise and insufficiently protective of water quality. Given the toxic character of many of the additives used in hydrofracturing, the instances of contamination that have occurred in other states, and the potential impact of such contamination on the water supply for nine million people, the dSGEIS should require complete and transparent identification of all chemicals used in the well development process, as well as the amount of each chemical that is expected to be used and recovered from each well.
- 2.1.2 The dSGEIS should also address casing “perforating” and related yield stimulation practices which involve the use of explosive compounds and processes. Specific disclosure of the explosives and amounts to be employed for this stage of well development should be required. The DEC should also develop guidelines for the handling, transport and disposition of any explosives to be used in well perforating.

- 2.1.2.1 Water and chemical handling at the well sites needs to be thoroughly examined. How many trucks will be required to deliver the water and chemicals per well sites? How long is the average drilling process? How much land disturbance is required for storage tanks or pits per well? How frequently will these sites be inspected and specifically how will DEC field inspectors monitor proper liner performance for lined pits? How will the information collected during these inspections be shared with localities and water suppliers?
- 2.1.2.1 The commitment to examine the need for pit liner specifications is appropriate. Specification of liner or tank materials may be warranted to ensure materials are compatible with all chemicals used in the process. The dSGEIS should require that all liner or tank materials are compatible with all the materials that they will contain, regardless of concentration. Given the huge volume of water used, reuse of injected fluids should be encouraged.
- 2.1.2.1 The 1992 GEIS references open pit sizing based on drilling operations that use approximately 80,000 gallons per well. The hydraulic fracturing process can use millions of gallons of water per well. The dSGEIS should examine whether the current open pit specifications are applicable or whether new specifications need to be developed to handle the higher volumes of development and fracturing fluids.
- 2.1.2.1 The dSGEIS should ensure that applicable stormwater management requirements are sufficient to ensure that open pits containing contaminated water will not overflow during severe storm events.
- 2.1.2.1 The dSGEIS should examine whether a requirement for closed-loop delivery systems of hydraulic fracturing fluid is appropriate within the NYC watershed and within proximity to public water supply wells in order to mitigate impacts to drinking water.
- 2.1.2.1 Requirements for control of flowback fluids from high-volume hydraulic fracturing should consider realistic DEC enforcement capability. For example, the GEIS concluded that *“regulations detailing pit liner specifications are unnecessary because adequate maintenance is more critical to halting pollution than the initial specifications. Emphasis instead is on a general performance standard and on proper liner maintenance, which are monitored by Department field inspectors.”* In its establishment of on-site fluid handling practices and erosion and sediment control measures, the dSGEIS should not assume that all sites will be adequately monitored and inspected, and should require practices that are sufficiently protective even at realistic DEC monitoring/staffing levels. This comment applies to all activities covered under Section 2.1.
- 2.1.2.1 The spent drilling fluids must be disposed of safely. The dSGEIS should identify the possible out of state industrial treatment plants that can handle the volume and content of the spent fluids, and the impact on these facilities. Additionally, the dSGEIS should identify the New York State sewage treatment facilities that can handle the volume and content of the spent fluids and examine the impact on capacity and treatment of these facilities. The dSGEIS should discuss how New York State regulations govern this activity.
- 2.1.2.1 The dSGEIS should examine the recovery rates of injected fluids and evaluate the fate and potential environmental impact of the unrecovered fluids.

- 2.1.2.2 Recent exceedences of total dissolved solid limits in surface waters in Pennsylvania have halted disposal of spent fracturing fluid /brine at Pennsylvania wastewater treatment plants from in-state and out-of-state. This underscores the need for a regional evaluation of brine disposal options for states expecting to exploit the Marcellus Shale formation and the river basins that they share, particularly New York, West Virginia and Pennsylvania and Ohio. The dSGEIS should examine regional brine disposal options.
- 2.1.2.2 The technical justification for permitted use of injection wells for the disposal of drilling fluids in a public water supply watershed and areas where private water supplies occur needs to be provided relative to the specific hydrogeologic conditions of the region. Similarly, the effects of “recycling” of fluids through the use of closed loop systems and local sewage treatment facilities needs to be evaluated relative to the chemical composition of the disposed fluids and impacts on the receiving groundwater and surface water resources. The influence of water-supply well pumpage and low-flow surface-water conditions need to also be addressed on these potential disposal options, with the denial of any such activity within the watershed of a water-supply reservoir or well as an acceptable option.
- 2.1.2.2 Both federal law {40 CFR Part 144.6(b)} and state law {6 NYCRR 371.1(e)(2)(v)} exempt oil and gas drilling waste from being considered a hazardous waste, which exempts the waste from the accounting procedures that track the wastes to their ultimate disposal location. The Draft scope states that there is potential for creating millions of gallons of contaminated fluid per well. Additionally, Chapter 9, Section H.8 of the 1992 GEIS states “*Should oil and gas development continue in New York State, more local brine disposal wells and industrial waste treatment plants will be necessary because of high transportation costs to out-of-state disposal facilities.*” Given the high cost and difficulty of disposing of drilling waste, the dSGEIS should examine a program to track the ultimate disposal of the contaminated fluids to prevent illegal dumping of the waste in remote areas and the potential risks to drinking water supplies.
- 2.1.2.3 The draft scope states that DEC has the authority to require operators to provide details on chemicals that are cited as trade secret. The dSGEIS should state that DEC would *require* operators to provide all details on chemicals regardless of trade secret status. Further, the dSGEIS should include provisions that require DEC to share this information with drinking water suppliers that may be affected by a proposed fracturing operation. This information is critical for establishing background conditions for any ambient water quality monitoring program that may be implemented to assess impacts of gas development activities.
- 2.1.3 The dSGEIS should address how well tests are to be conducted with respect to substantiating a lack of hydraulic interference between existing water supply wells, surface-water bodies, and overlying geologic formations. The dSGEIS should also address how the disposition of fluids produced during testing will be dealt with relative to the constituents being used for gas well development.
- 2.1.4 The dSGEIS should discuss the overall amount of land disturbance and particularly the amount of impervious surface that is anticipated for each well.
- 2.1.5 The dSGEIS should reconsider the requirement for bonds to remedy damage caused by drilling including contamination of water supplies (surface or otherwise) to ensure there is sufficient funding in the event damage is sustained.

- 2.1.5 The dSGEIS should examine the extent to which the well plugging and bonding requirements in the GEIS are sufficiently protective when applied to large scale development of the Marcellus Shale.
- 2.1.6 Given the high resource requirements for these high volume hydraulic fracturing wells, the well density specified in the GEIS should be re-examined.
- 2.1.6 The dSGEIS should identify protocols for addressing the cumulative effect of multiple wells on a site-specific basis, particularly with respect to groundwater contamination, surface impacts, supply well yield, and surface water flows.

Section 3.0 Geology

- 3.0 The estimates for the amount of natural gas in the Shale formations vary widely. How will these estimates be determined in the dSGEIS?
- 3.0 The dSGEIS evaluation of Naturally Occurring Radioactive Materials in cuttings and spent fluids should include a discussion of how other states are handling the wastes from these operations. Besides addressing the potential existence of Naturally Occurring Radioactive Materials (NORM) the draft scope should also address the potential impacts of other mineralogical constituents on the quality of drilling cuttings and fluids, and the possible impacts on local water quality due to runoff generated in the area where these materials are accumulated in the well site vicinity. Any available monitoring data related to this issue should also be compiled and presented in the dSGEIS.
- 3.0 The draft scope should acknowledge the existence of additional potential gas plays beyond the Marcellus Shale that are anticipated to become viable targets for development in the foreseeable future (these may include the Utica and Rochester Shales, Trenton Black River Group, Oriskany Sandstone and others) and that as such these formations may also need to be addressed in a similar fashion. In addition, the role of existing local and regional fracture systems and other geologic “structures” in the Marcellus and overlying bedrock formations should be addressed relative to pre-drilling groundwater flow and contributions to local supply wells, stream baseflow, and wetlands hydrology. The dSGEIS should require that geologic and related hydrogeologic conditions at each proposed well site be addressed on a site-specific basis, since geologic formations are formed under natural and not engineered conditions, thus “one-size does not fit all”.

Section 4.0 Potential Environmental Impacts

- All Many of the impacts discussed in this section depend on how “temporary” is defined and the duration of specific aspects of the drilling. In particular, a thorough evaluation of the duration of site preparation, drilling and production periods is necessary.
- All The dSGEIS should examine the environmental impacts of drill pad preparation. Will trees be cleared to create drilling pads? Will they be restored? The impact of tree clearings on stormwater management should be evaluated. How will DEC regulate stormwater and erosion control plans at drilling sites?
- All The dSGEIS should thoroughly examine traffic impacts for transport of fluids to and from sites and also the impact of traffic on erosion of roads.
- All For informational purposes the dSGEIS should also include photographs of a variety of well sites outside New York State, to illustrate the appearance of high volume hydro

fracturing wells in shale formations during each stage of operation. Areal views of existing densely drilled areas in other states should also be included to assess cumulative long-term visual impacts in areas that have similarly been developed for natural gas production using high volume hydraulic fracturing in shale formations.

- 4.1.3 The Draft scope states “*concerns regarding evaporation of pit contents do not arise in New York because precipitation exceeds evaporation*”. This may be true on a long-term basis, but substantial seasonal and annual variations may occur, and volatile constituents may evaporate regardless of the amount of precipitation. The dSGEIS should review the applicability of all assumptions made in developing the GEIS.
- 4.2.1 The draft scope addresses the potential for transferring invasive species between water bodies. The dSGEIS should specifically examine the requirement that all unused surface water be returned to its source to prevent spreading invasive species.
- 4.2.1 Withdrawals of millions of gallons of water for hydrofracturing from surface or groundwater in the NYC watershed may have negative impacts on NYC water supply reliability, particularly under drought or infrastructure outage conditions. The dSGEIS should address this issue. When evaluating the potential cumulative impact of numerous water withdrawals on the volume of water available for other needs, including public water supply and in-stream habitat, the dSGEIS should not rely on long-term average withdrawal assumptions and typical hydrologic conditions. The dSGEIS should examine impacts under realistic worst-case hydrologic and withdrawal scenarios. Further, the dSGEIS should require examination of such impacts in a spatially distributed manner that identifies what ground or surface water sources are likely to be accessed, and what the potential water quantity, water quality, thermal, and habitat impacts are at these locations.
- 4.2.2 The dSGEIS should examine case histories in other states where groundwater contamination has occurred from these practices.
- 4.2.3 Federal law exempts produced water from gas production from the Spill Prevention, Control, and Countermeasure Rule of the Safe Drinking Water Act {69 FR 29728}, therefore no spill control plans are required at drilling sites. The dSGEIS should ensure that spill control plans are required for each hydraulic fracturing operation, including provisions for proper equipment and training to address accidental spills on the part of well drilling personnel. The dSGEIS should also ensure through the permitting process that local emergency personnel have sufficient training and equipment to respond to spills.
- 4.2.3 In its evaluation of the potential of Marcellus Shale development to create any surface water impact that is not examined by the GEIS or addressed by existing authorities, requirements and practices, the dSGEIS should consider the DEC’s capacity to enforce applicable regulations. Though regulatory/environmental controls on development activities (including drilling, fracturing, fluid handling, and waste treatment) may in principle be sufficient to prevent impacts, these controls must be enforced to be effective. Thus in establishing specific controls/requirements, the dSGEIS should realistically consider the actual staffing/manpower constraints on DEC’s enforcement program. Environmental controls should be sufficiently robust that water resources are protected even when State monitoring and enforcement capacity is less than ideal.

- 4.2.3 GEIS regulations require that wells be sited at least 50 feet away from any public stream, river or other body of water. The dSGEIS should explain why this distance is acceptable for streams or water bodies in the NYC watershed, and why it is less than the distance of 2000 feet required for a municipal well supply.
- 4.2.3 The dSGEIS should evaluate whether current spill notification requirements are sufficient to allow agencies to implement timely preventive response measures.
- 4.2.3 The dSGEIS should address the potential negative impacts to water quality that may arise as a result of the accidental or intentional introduction of sediment to the surface water bodies that comprise the NYC watershed. Excess sediment may be released to the rivers, streams, reservoirs, etc. through site clearing, drill pad construction, improper handling and disposition of drill cuttings and mud, the discharge of other fluids (such as fresh and saline groundwater), as well as site access and off-road vehicular traffic. A policy on the specific regulations in regard to sediment control in relation to drilling activities and the protection of drinking water (reservoir) quality needs to be outlined as part of the dSGEIS process.
- 4.2.4 DEP acknowledges, and agrees with, DEC's commitment in the scope of the dSGEIS to a focused review of potential impacts on the NYC watershed in light of the fact that this watershed supplies unfiltered drinking water to more than half of the State's population. Some specific considerations based on items in the draft scope are:
- The dSGEIS should identify and examine potential water sources and quantities for high volume hydraulic fracturing, specifically including cumulative impacts, within the NYC watershed.
 - On-site storage of fluids needs to be carefully analyzed. DEP has significant concerns about the use of open pits and disposal wells in the NYC watershed due to the potential risk of contamination.
 - Impacts do not need to be within close proximity to a reservoir or water supply infrastructure to negatively impact the water supply and the entire watershed needs to be included in the assessment.
- 4.2.4 The scope states that the dSGEIS will evaluate impacts in the NYC watershed "*with consideration of the fact that New York City controls a substantial amount of the acreage surrounding the reservoirs through fee ownership or conservation easements so that drilling would not occur on such acreage without the City's permission.*" This misleadingly implies that the City can control natural gas drilling in the watershed through its land ownership or conservation easements. In fact, most land in the watershed is privately owned, and controls are achieved through a combination of regulation, land acquisition, infrastructure investments, and partnership programs with watershed communities. The dSGEIS should evaluate the potential for natural gas drilling to negatively impact the programs, controls, protections and institutional relationships that are required by the Filtration Avoidance Determination (FAD) and embodied in the 1997 Watershed MOA, of which DEC is a signatory. Moreover, State enforcement is an important element of natural gas drilling outside of the watershed, and the same should be true within the City's watershed. The nature of property ownership should not alter the mandate of the State to vigorously protect the State's natural resources, including its water resources.

- 4.2.4 In addition to gas well drilling and hydraulic fracturing, the DEC should consider potential damage that may be imparted to DEP infrastructure via seismic testing and other related exploration and reconnaissance techniques.
- 4.4 In its examination of additional protections or environmental reviews for drilling sites in floodplains, the dSGEIS should ensure that under no circumstances would open pits holding returned fluids be constructed within the 100-yr flood zone. Requirements for siting wells and drilling fluid storage facilities outside of 100-yr flood zones should also be evaluated.
- 4.5 For mitigation of well site impacts to wetlands, the scope simply refers to chapter 8 of the original GEIS. However, knowledge of the importance of wetlands and wetland protection has changed dramatically since the original GEIS. Assessment and mitigation of on site wetland impacts should be addressed in full in the dSGEIS. In particular, the dSGEIS should evaluate erosion and sediment control measures to minimize direct and indirect impacts to wetlands.
- 4.5 The original GEIS allows for the placement of mud and reserve pits within wetlands. The dSGEIS should reevaluate this practice and assess restricting the placement of pits within 100 feet of wetlands to avoid potential disturbance and contamination.
- 4.6 The draft scope states that the dSGEIS will “*address potential mitigation measures to ameliorate the impacts of short-term, high volume truck traffic*”, but that the control is still with the local governments. Further Section 1.2 states that ECL supersedes all local laws “*concerning imposition of a fee on activities regulated under Article 23,*” but also states that jurisdiction over local roads remains with the local government. Given the spatial extent of the Marcellus Shale formation (all or part of approximately 27 counties, including 5 counties encompassing the NYC West-of-Hudson watershed), the dSGEIS should recommend that a comprehensive regional planning approach is taken to address the long-term cumulative impacts of high volumes of truck traffic on transportation infrastructure at state, county, and local levels. Further, regional planning should be recommended to coordinate inter-jurisdictional controls on the transport of equipment, chemicals, water, and fracking fluid.

Prepared Statement from Langhorne Smith, New York State Museum, on Marcellus Shale Gas Drilling (Address: 3140 CEC, Albany, NY 12230; Phone: 518-473-6262; Email: Lsmith@mail.nysed.gov)

My name is Langhorne Smith and I work for the New York State Museum as a research geologist, primarily on subsurface geology which includes oil and gas, carbon sequestration, compressed air energy storage and more. First, I will start with a short statement on the basic geology of the Marcellus Shale natural gas reservoir. Natural gas is a naturally occurring substance that is the cleanest burning of all of the hydrocarbons (gas, oil and coal). Natural gas produces about 40% less CO₂ per BTU than coal. The US consumes about 23 trillion cubic feet of gas per year and until recently was producing about 19 or 20 TCF (trillion cubic feet) per year and importing the rest, mainly from Canada. New York consumes over 1.2 TCF per year and currently produces less than 5% of that in State. Much of that consumption occurs here in New York City. New production from organic-rich shales such as the Marcellus may eventually help the United States produce as much gas as it consumes and also help New York produce more of its energy locally. If more natural gas were burned instead of coal we could cut our CO₂ emissions significantly.

Shale is the most common sedimentary rock on Earth. Not all shale has potential to produce hydrocarbons, only organic-rich shale. Organic-rich shale has preserved organic matter that was originally algae, plant matter or some other living organism prior to being deposited in a low oxygen environment where it would not decay. After it is heated during burial the organic matter first turns into oil and then to gas. New York has an organic-rich shale layer in the Ordovician called the Utica Shale and several more in the younger Devonian-aged strata including the Marcellus which has the greatest potential for gas production. These organic shales occur right on the surface in some parts of New York and are deeply buried in other areas.

Shale gas reservoirs are different than conventional reservoirs in that the source rock is also considered to be the reservoir. Many thousands of wells have been drilled through these shales and small amounts of gas came out but they were not thought to be economically viable because the rates of gas flow out of them were so low. This has all changed recently with the advent of two technological breakthroughs. The first was horizontal drilling and the second was large volume (>1,000,000 gallon) "slick-water" and other types of frac jobs. The wells are drilled down vertically to the target shale and then turned to a horizontal orientation where they drill out laterally for about 4000 feet. The wells are cased with pipe which is cemented in to the hole so that no gas or water can escape up the outside of the pipe. The pipe is then gets holes punched into it where it penetrates the shale layer and the frac fluid is pumped in several stages at a high enough pressure to induce fractures in the shale. These fractures are necessary to get the gas to flow out of the shale at a high enough rate for the wells to make money. The fractures do not come anywhere near the surface – there will always be thousands of feet of rock between the fractures and the surface.

The Marcellus Shale layer blankets the area from the Catskills to Lake Erie and from the Helderberg escarpment south to the PA border. It is on the surface at the escarpment and is more deeply buried to the south along the PA border. It reaches its maximum burial depth in Sullivan County where it is buried to up to 7000 feet. The pressure and rate of gas production increases with increasing depth so deeper is generally better for gas production. The Marcellus is very thin in the far western part of the State where it is only about 10 feet thick and it thickens gradually to the east where it reaches a maximum thickness of about 300 feet. Thicker sections of organic-rich shale can hold more gas in place so all other things being equal, thicker is better. There is likely to be a thickness cutoff where the wells are no longer worth drilling. For these reasons, the more desirable acreage will probably be in Tioga, Broome, Sullivan and Delaware Counties near the PA border, where the organic-rich shale is thickest and deepest. It will be progressively less desirable moving to the east, north and west from that area and away from existing infrastructure.

There are many who are concerned about the frac jobs. This is a very common practice in the oil and gas industry. To my knowledge, 30 – 70% of the frac fluid that is pumped into the formation flows back out of the formation, is captured at the well site, loaded into trucks and carried away to treatment facilities. The rest stays deep underground. Frac jobs have been done, albeit on a smaller scale, for many decades in New York. In the western part of the state, many thousands of wells have been fraced. I would suggest that representatives from far western counties be consulted on any problems that have arisen from the frac jobs in those areas. To my knowledge, there have not been any significant problems. From what I understand, the frac fluids are more than 99.4% water with the rest being surfactants (soap) and other proprietary chemicals.

On July 22, an article was published on the front page of the Albany Times-Union that was written by an organization called ProPublica. A slightly longer version of the article was posted on ProPublica's website. This article, subsequent reporting from ProPublica and associated reporting in other news outlets have generated a lot of concern about the drilling. It is my opinion as a scientist that while the article did touch on a few points that needed to be addressed, some of the reporting left readers less than fully informed.

It was not mentioned that New York has some of the most stringent oil and gas regulations in the country or that the NYS DEC has done a very good job since its inception of keeping our environment clean. It is their job to make regulations for the development of New York's shale gas resources that protect our environment. Companies are required to follow the DEC's regulations. The DEC has a lot of power over companies because they can refuse to issue permits to companies that don't follow the rules. Companies will need to drill many wells in the shale in order to make money so they know it is in their best interest to follow the regulations so they can get all of the wells they want to drill permitted. It is in the interest of both the personnel at the DEC and industry that the drilling be done in a clean, environmentally sensitive manner.

New York already has stricter regulations than most other States for oil and gas drilling. In one of the articles, there were stories of groundwater contamination from the drilling

fluids in New Mexico and Colorado. Most or all of this contamination occurred because those states inexplicably do not require liners to be installed in the pits that are dug to hold the drilling fluids. New York has required liners to be placed in the pits since the 1980s. These liners prevent the drilling fluids from seeping into the ground. The pits can then be drained and little or no drilling fluid will contact the ground. As far as I can tell, that would have prevented most or all of the problems that occurred in New Mexico and Colorado. The fact that New York does require liners is a key difference that makes those problems extremely unlikely to occur here in New York.

The fifth paragraph of the July 22 ProPublica article states:

“The gas in the Marcellus is held like bubbles in a brick of Swiss cheese. To extract it, a mixture of water, sand and chemicals is shot into the earth with such a force that it fractures the rock, releasing the bubbles to the surface. When the gas surfaces, so does the water – laden with natural toxins from the shale, including suspected cancer-causing compounds.”

One might get the impression reading this passage that the gas and water will be seeping out on to the ground. This is not the case. The operators are doing this work to produce gas and make money. The only way they can do that is to capture all of the gas in a pipe. The gas and associated water enter the pipe deep underground where the pipe is in the shale formation and remain in the pipe until they get to the well head. At that point, the water that comes up with the gas is separated and trucked from the site to a treatment plant.

Another paragraph is here quoted from the extended version on the ProPublica website:

“In most states the tainted water produced by gas drilling is injected back into the ground in areas where solid rock layers keep it isolated from people or their drinking water. But the geology in New York and Pennsylvania is different, and the water will be discharged into an ecosystem where it might wind up coming out of New York City's taps.”

The reader might be excused for thinking that the statement “the water will be discharged into an ecosystem” sounds a lot like it is going to be taken from the well and directly dumped into a local stream. The DEC regulations do not allow anything like this. The regulations require the drillers to capture the water and take it to water treatment facilities. The DEC has stated from the beginning that the used frac water and the produced water would be taken to industrial waste treatment facilities in Pennsylvania or possibly to municipal wastewater treatment plants. Plant operators should be given guidelines on how to test the water to make sure that any potentially harmful substances are removed. An important side point to make here is that the danger posed by human sewage in the watershed likely dwarfs any danger from the drilling fluids.

The second half of this sentence, which suggests that the drilling related fluids will end up flowing out of New York City's taps, is probably one of the main reasons we are all

here today. It is hard for me to see how frac fluids will end up flowing out of New York City's taps. As stated above, the regulations dictate that the frac fluids and produced water will be disposed of in treatment plants. Accidents might occur, but there are cleanup and remediation regulations that should prevent significant amounts of any spilled fluid from entering the water supply. It might help to increase the comfort level if someone modeled a spill some short distance from a reservoir and what its impact on the water quality might be. It is my guess that the volumes of the reservoirs are so great that even if some frac fluid were accidentally spilled and found its way into the water supply, it would probably be so diluted that it would be impossible to detect its presence in New York City's tap water. This hypothesis could be confirmed or rejected with computer modeling of a spill.

There are some other legitimate issues with the drilling and completion of these wells. The water withdrawals will need to be regulated in such a way that natural ecosystems and human needs are protected. Increased truck traffic and noise will be issues that local communities will need to address. Companies are already working to mitigate the effects of some of these issues. For instance, there is research underway to find a way to cost-effectively recycle the frac fluids and use them over again on multiple wells which would help solve both the acquisition and disposal issues.

New York State will benefit from the drilling through increased tax revenues and job creation. Landowners get a leasing fee from the company plus roughly 1/8th of the gross revenue on the gas produced. The drilling will help to keep some money in-State that currently flows out-of-State for natural gas purchases. Natural gas is a cleaner burning fuel that this city relies on for heating, cooking and power generation. All of these factors should be considered when making a decision on the gas drilling.

If any members or their staff would like further discussion on this issue or other subsurface geological issues in New York, please do not hesitate to contact me.

Statement of Dusty Horwitt, JD*Senior Analyst for Public Lands, Environmental Working Group*

Oversight Hearing on Natural Gas Drilling in the New York City Watershed, Part II
Before the New York City Council Committee on Environmental Protection
Friday, December 12, 2008 at 10:00 a.m.

Submitted for the Record

Introduction

Mr. Chairman, distinguished Members of the Committee: My name is Dusty Horwitt, and I am a Senior Analyst for Public Lands at Environmental Working Group (EWG), a nonprofit research and advocacy organization based in Washington, DC, and Oakland, California. I thank the members of the Committee for this opportunity to testify.

For the last several years, Environmental Working Group has used government and industry records to track a virtually unprecedented increase in oil and gas drilling in the Western United States. As part of our work, we have investigated the practice pioneered by Halliburton known as hydraulic fracturing that is the subject of today's hearing.

Earlier this year, we worked with Theo Colborn, a distinguished scientist in Colorado who has identified dozens of chemicals used by the natural gas industry. We found that at least 65 chemicals used by the natural gas industry in Colorado – many of them used in hydraulic fracturing – were listed or regulated as hazardous substances under six federal statutes including the Clean Air Act, Clean Water Act and Superfund. Natural gas companies, as you know, are not required to disclose what chemicals they use.

I'd like to add to the testimony I presented to the committee in September by making a few comments about New York State's Department of Environmental Conservation's Draft Scope for the Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program, Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and other Low-Permeability Gas Reservoirs.

We have reviewed the document and believe that the state is not taking seriously the threat that hydraulic fracturing and natural gas drilling poses to New York City's drinking water. Nor is the state taking seriously the risk of water contamination in other parts of New York.

The state echoes claims made by the natural gas industry when it says that there is "no record of any documented instance of groundwater contamination caused by

hydraulic fracturing for gas well development in New York, despite the use of this technology in thousands of wells across the state during the past 50 or more years."

The state may have no record, but that does not mean that contamination has not occurred. For example, the state fails to mention how diligently it has looked for contamination or whether it has even tried. Speaker Quinn noted at September's hearing that the state has 19 inspectors for 14,000 oil and gas wells, figures that state officials did not dispute. Those numbers do not inspire confidence that the state has the staff to perform a thorough investigation. Nor is it clear how the state could be so confident about the safety of hydraulic fracturing when companies are not required to reveal what chemicals they are using and are exempt from federal disclosure requirements under the Environmental Protection Agency's Toxics Release Inventory. Under these circumstances, how would state officials know what contaminants to look for?

The state should disclose to this committee the results of all the tests it has performed over the past 50 years or more to determine whether hydraulic fracturing chemicals or other chemicals used in natural gas drilling in New York State have contaminated the state's water supplies. We will be requesting this information from the state ourselves.

Even the EPA does not know what is in hydraulic fracturing fluids. According to a recent story by ProPublica, a New York-based nonprofit news outlet, EPA scientists say the lack of knowledge makes it impossible to assure the public that the drilling process is safe or to accurately track its effects.

Joyel Dhieux, a drilling field inspector who handles environmental review at the EPA's regional offices in Denver told ProPublica in a story that ran on the front page of the Denver Post that "I am looking more and more at water quality issues...because of a growing concern...But if you don't know what's in it I don't think it's possible."

What we do know is that hydraulic fracturing is used in 90 percent of all oil and gas wells drilled in the U.S. and that in spite of assurance from the state, drilling for natural gas and hydraulic fracturing chemicals themselves have recently been linked to water contamination and serious illness.

This summer, the Bureau of Land Management found that groundwater in Sublette County, Wyoming is contaminated with benzene, a toxic substance linked to cancer and nervous system disorders. Sublette County is the site of one of the nation's largest natural gas fields. We found that under the Bush Administration, energy companies have drilled more than 2,300 wells in the county. The total number of wells in Sublette County is around 6,000. Thousands of wells may be drilled in New York State.

Benzene is found in hydraulic fracturing fluids and is also found in condensate, a liquid that is produced along with natural gas. The maximum safe amount of benzene in drinking water is just 5 parts per billion, and the EPA has recommended

that the goal for benzene in drinking water is zero. What makes the Sublette County case so alarming is that the county is rural, and there are no likely sources of benzene contamination other than natural gas drilling.

This spring, the Durango (Colorado) Herald reported that a nurse became gravely ill after being exposed to fracturing fluids that had spilled on a natural gas worker she was treating. As the nurse suffered from liver failure, heart failure and respiratory failure, the company that manufactured the fracturing fluid refused to tell her doctor what was in it, citing the need to protect trade secrets. The doctor had to guess how to treat his patient who later recovered.

In March and April 2004, Denver's Rocky Mountain News reported that natural gas seeping from a well drilled in Garfield County, Colorado contaminated drinking water 3,500 feet away, forcing local residents to drink bottled water. The Colorado Oil and Gas Conservation Commission (COGCC) determined that the contamination came from an improperly cemented well drilled by Canadian company, Encana. Encana had drilled four wells within a mile of the gas leak.

Inspectors found high levels of benzene in the water the day after residents noticed unusual bubbles in a nearby creek. A report prepared for Garfield County found that the contamination also included methane gas and toxic toluene, ethylbenzene and xyleneithin. In August 2004, the COGCC fined Encana a record \$371,200 and imposed a moratorium on drilling within a two-mile radius of the seep. It was not clear if the well had been fractured, but hydraulic fracturing is common in the area.

It is also important to note that hydraulic fracturing can require a staggering amount of water and equipment and that operations have increased in size in recent years, especially in shale formations. The industry publication Oilfield Review reported in 1995 that a fracturing operation could involve as many as 40 vehicles, a million gallons of fluid and three million pounds of sand. A photo of a fracturing operation in the Barnett Shale near Fort Worth, Texas, indicates that even more equipment can be used. The photo is from a PowerPoint presentation given this year by a representative of Texas-based Dale Resources and is available on the website of Barnett Shale News. You can see the scale of the operation with more than 50 vehicles pictured as well as a close-up of the same operation. The Dale Resources presentation suggested that in the Barnett shale, companies may use up to four million gallons of fluid for hydraulic fracturing.

Recommendations

- Because of these examples and the record of toxic spills and leaks in the natural gas industry that has been documented by Colorado, New Mexico and other authorities, we continue to recommend that there be no drilling in New York City's watershed.

- We urge the state to hold at least one hearing in New York City so that city residents can comment on the draft scope. Due to the risk to New York City's drinking water, it would be unconscionable to exclude the city from this process.
- We urge the state to require disclosure of chemicals used in natural gas drilling – not just to state officials as the draft scope suggests – but to the general public as well.
- After disclosure of chemicals, the state should conduct its own tests of surface and groundwater near any wells where these chemicals have been used and should carefully analyze incidents of contamination associated with natural gas drilling that have occurred elsewhere including those that I have mentioned. Natural gas companies should pay for the testing.

Several other recommendations are included with my previous testimony. I thank you for this opportunity to testify and look forward to your questions.



NATURAL RESOURCES DEFENSE COUNCIL

**STATEMENT OF THE NATURAL RESOURCES DEFENSE COUNCIL
BEFORE THE NEW YORK CITY COUNCIL
ENVIRONMENTAL PROTECTION COMMITTEE
RE: INDUSTRIAL GAS DRILLING WITHIN THE NYC WATERSHED
DECEMBER 12, 2008**

Good afternoon, Chairman Gennaro and members of the Committee. My name is Eric A. Goldstein, and I am an attorney with the Natural Resources Defense Council, Inc. ("NRDC"). As you know, NRDC is a national, non-profit legal and scientific organization that has been active on a wide range of environmental issues including water quality protection since shortly after the organization was founded in 1970. We have a team of lawyers, scientists and other specialists devoted exclusively to safeguarding New York's environment and to improving the quality of city life. In recent years, this team has focused considerable attention on protecting the quality and cost of the downstate drinking water supply.

My colleague, Kate Sinding, who is leading NRDC's statewide response to the wide-ranging environmental issues associated with industrial gas drilling in New York, was unable to join me here today. At this hearing, NRDC reaffirms its grave concerns over the prospect of widespread industrial gas drilling in the New York City watershed.

To be sure, NRDC recognizes the benefits of natural gas as a transition fuel in the national effort to decrease America's reliance on foreign oil, and believes it is possible to adopt a new and sufficiently stringent regulatory structure that could allow gas drilling to move forward in some portions of the state. But before a new industrial gas drilling initiative advances in New York, it must be accompanied by enhanced environmental safeguards, careful oversight and vigorous enforcement of laws and rules designed to protect our state's natural resources.

Most importantly, because of the special role they play in supplying public drinking water, there are certain areas of the state that must be placed off limits to industrial gas drilling. The Catskill/Delaware watershed -- which provides drinking water to 9 million downstate New Yorkers -- is one such area of exceptional ecological significance where the risks inherent in industrial activities like gas drilling are simply too great and the consequences of pollution would be far too high.

New York's Catskill/Delaware watershed is a priceless and irreplaceable resource that is the source of 90% of the drinking water for roughly half the state's population. Because of the rural nature of this watershed and the generally high quality of the source waters, New York's Catskill/Delaware supply is one of only five major water supply systems in the United States that has received waivers from the federal Safe Drinking Water Act requirement that all surface drinking water supplies be filtered prior to delivery to the tap as a necessary measure to protect the public from waterborne disease. Building filtration facilities for the Catskill/Delaware system would likely cost more than 6 to 10 billion dollars, which would trigger dramatic increases in water rates for City ratepayers. Accordingly, there are compelling economic reasons for the City to do everything within its power to safeguard its unfiltered Catskill/Delaware water supply from the pollution threats posed by industrial gas drilling.

In this statement, we emphasize three points. First, industrial gas drilling is an inherently pollution-generating activity. In the gas drilling process known as hydraulic fracturing (or "fracking"), several million gallons of water, mixed with chemicals and at high pressure, are injected at each individual well deep into underground rock, so as to separate gas from the shale. This process requires huge volumes of water and produces large amounts of contaminated fluids at the end of the drilling process, presenting both water supply problems and wastewater disposal challenges. (These problems are in addition to other, non-water quality concerns such as air pollution generated locally, vastly increased truck traffic, visual impacts etc).

In Pennsylvania, where gas drilling operations have been rapidly advancing, water quality concerns have already been identified. Earlier this year, the State's Department of Environmental Protection ordered two natural gas drilling companies to suspend a portion of their operations for violating Pennsylvania's Clean Streams Law. (See "Commonwealth of Pennsylvania, News Release: DEP Orders Partial Shutdown of Two Natural Gas Drilling Operations In Lycoming County," dated 5/30/08.) And in New Mexico, Governor Bill Richardson has recently issued an executive order that extends by six months an existing moratorium on new oil and gas drilling in Santa Fe County and the Galisteo Basin to allow more time for fact-gathering and rule-making to safeguard water aquifers and other resources in this ecologically fragile area. (See Governor Bill Richardson Executive Order 2008-038, dated July 14, 2008.)

Second, there is not a single large unfiltered water supply in the United State that allows industrial gas drilling within its watershed. In addition to New York City, there are four other major unfiltered water supply systems in the United States -- San Francisco, Portland (OR), Seattle and Boston. NRDC has recently checked with water providers for all four cities and has confirmed that none allow gas drilling activities to take place within watershed boundaries. San Francisco, Portland and Seattle own or control virtually their entire watershed lands and do not engage or allow industrial activities to take place on them. And as for Boston's water provider, which like New York, owns only a portion of its watersheds and has residential population living within its watershed region, state laws, regulations and policies effectively prohibit industrial gas drilling operations. This is no coincidence. Municipal water providers around the

nation recognize the inherent risk that widespread industrial activity presents for unfiltered drinking water supplies and have affirmatively chosen to prohibit such conduct.

Third, while New York City has authority under state law to prohibit industrial gas drilling within watershed boundaries, we believe that the ultimate responsibility to safeguard the state's drinking water supplies from the dangers and risks of industrial gas drilling falls upon Governor David Paterson. To its credit, the City's Department of Environmental Protection has written to Governor Paterson, in response to the Governor's signing of the "Oil and Gas Spacing Bill," and has urged that the State recognize the Catskill/Delaware watershed as "a unique resource requiring special protection...." And Governor Paterson, in signing the new law, committed the state to undertake the preparation of a new Generic Environmental Impact Statement to assess gas drilling in the near future. But more, much more, is needed. Mayor Bloomberg and the City's Department of Environmental Protection should make clear in no uncertain terms that industrial gas drilling poses an unacceptable risk to the downstate water supply and that they will use all of their authority to protect the Catskill/Delaware watershed from such short-sighted development. And Governor Paterson and his Departments of Environmental Conservation and Health should use their ongoing environmental review to create a protective shield around sensitive drinking water supply areas around the state, which safeguards these special resources from all industrial gas drilling activities.

New York City's public water supply is probably its single greatest capital asset. And industrial gas drilling has quickly become the single largest pollution threat to this drinking water supply. It is inconceivable that state and city officials would want to jeopardize the long-term safety of this priceless and irreplaceable system for the short-term gains associated with industrial gas drilling on watershed lands. Now is the time for all elected officials to stand up on behalf of the common good and the region's long-range best interests and say "no" to industrial gas drilling on lands that provide to millions of state residents the drinking water that they can not live without.

December 11, 2008 TESTIMONY Natural Gas Drilling the NYC Watersheds

My name is Ramsay Adams; I am the Executive Director of Catskill Mountainkeeper. Our mission is to protect the ecological integrity of the Catskill Mountain range and the quality of life of all those who live there. Through a network of concerned citizens, we work to promote sustainable economic growth and the protection of natural resources essential to healthy communities.

I'm very pleased to be here today and to start the process of working closely with this committee on this immensely important issue to help us all make choices that WILL HAVE PROFOUND IMPACTS FOR MANY YEARS INTO OUR FUTURE.

As an advocate for the Catskills we are greatly concerned with the prospect of a major shale gas play occurring here that has the potential to turn this region into an industrial landscape.

Catskill Mountainkeeper was alerted to this issue almost a year ago when the "land men" started working through Wayne County, PA and then Delaware and Sullivan Counties of NY. While we recognize the need for energy exploration and domestic energy development there are some fundamental problems with how that development has been occurring across the country in recent years and the problems that rural communities are left with.

As an organization, the first thing we did was research the issue of natural gas drilling and subsequently provided three educational forums for the public. We looked to other parts of the country that have had similar gas plays which are well underway in order to get out in front of the development. Our forums included experts who have been dealing with major gas developments for years.

One of the first things we learned through this process was that New York State has been functioning with a Generic Environmental Impact Statement that is an outdated document. Not only is it missing specific regulations for technologies that have been in use by the industry for ten or fifteen years but there were blatantly incorrect statements such as: "cumulative review is impractical and unnecessary when considering most oil and gas drilling because of the independent nature of each of the wells." Now maybe this was true back in 1988 but anyone who has done any research into shale plays now knows this is not the case.

This statement under cumulative impacts sent up a red flag for us given what has happened across Wyoming, Colorado, parts of Montana, Texas, Louisiana, and Michigan. In each of those places communities are reacting and trying to deal with the cumulative impacts. As the gas industry came into the region, their state regulators told the communities they had everything under control and plenty of experience with the industry. Which turned out to not be true because of the nature of the new gas plays targeting sheet formations with new techniques and at a scale no one had foreseen.

Today, because the oil and gas industry is exempt from so many federal protections it is up to the State and other regulatory agencies to protect the community from surface and groundwater pollution, air pollution and the overall implications of a shale play of this magnitude.

As you may know our organization has petitioned the DEC and Governor Paterson for a moratorium on new permits until a comprehensive public review of New York State's regulations is complete. We complement the DEC and Governor Paterson for acknowledging the need for new regulations however; there are issues that are not addressed with only a supplemental on horizontal drilling in the Marcellus.

(For the purposes of this hearing I will restrict my comments to pertaining to four main points).

1. Cumulative Impacts
2. Natural resources inventory
3. Health Impact analysis
4. Production Water disposal
5. DEC staffing
6. Local control

I feel comfortable doing this because of the other organizations community groups and county officials that are here to testify and have or will bring up other issues.

What is happening across the state is that industrial gas drilling has awakened a grassroots movement rarely seen. New groups have formed over this issue and others are becoming active at a level not seen before. Towns are challenging state law with moratoriums over industrial gas drilling. Farmers, environmentalists, County and Town officials, along with others not associated with any group are coming together to sound an alarm.

What is being said over and over again across the state is that the current laws and regulations concerning gas drilling are not adequate to protect our communities.

The new technologies and the scale associated with these developments are different than what New York has dealt with before.

My hope for this hearing is that this is the first step in the process of getting joint legislative hearings to address all the concerns this major industrial gas play will have on our state. And put in place legislative and regulatory controls to make this development happen in a way that uses a precautionary principal. This is one of those times for the New York State Assembly and the Senate to roll up their sleeves with constituents and put the work into creating legislation that will address all the implications of large scale industrial gas drilling.

The first issue that needs attention is we need to undertake a comprehensive inventory of places in New York that should be permanently off limits to gas and oil exploration based on their ecological, cultural, agricultural, and historical value. I do not feel the current scoping document addresses this adequately and if that remains the case over this review process it may be left up to the legislature to fix. Most of us believe there are some places in this state that need special protection because of their immense importance.

As you may know the Catskill Mountain region is an area of national ecological significance. Within the Catskill region are some of the most intact wilderness areas in the eastern half of the United States. The Catskill Park is but one glaring example of an area where a grid work of well pads access roads pipelines and air pollution should not take place. 2004 marked the 100th year anniversary of when "The Language" FOREVER WILD" became part of our state constitution. That year the forest preserve had grown to 287,000 acres from its original 33,894 that is only forty percent of the Park. The Catskills are where there are multiple endangered species, globally Important forest blocks, Important bird areas and some of the most pristine watersheds and sub-watersheds in the U.S.

Your predecessors in 1904 had the foresight to enhance their future, our present, let's continue this tradition.

This hearing however is not just about the Catskills this is about the western and southern third of our state. We are also talking about much more than the Marcellus shale. The industry has identified at least five target formations in my area.

What we do over the next six months must be based on a philosophy of pollution prevention not pollution control or clean-up-after-the-fact.

We cannot sacrifice a multitude of important resources for the purpose of exploiting one resource?

There are many places across central NY and the southern tier that need to be inventoried and protected such as all source waters for public drinking water supplies within the State which should be placed off-limits to industrial gas drilling.

Once toxic fluids get into water sources, it is virtually impossible to get them out. Prevention is the only effective strategy. This means toxics can't be left in the ground and there can be no spills onsite and no leakage from water recycling.

As you read the papers and the Internet hydraulic fracturing makes for great headlines but it is the cumulative impacts that have greatly impacted people. What is needed here in NY as we try and meet our energy needs is a Health Impact Analysis (HIA)

HIA has been used extensively outside the U.S. The World Bank now requires it for large development loans. It has been utilized for large oil and gas projects such as the Chad-Nigeria pipeline. Canada regularly incorporates it into environmental impact assessments. The World Health Organization has recognized its value for protecting human health and encouraging responsible development, and also strongly advocates its use in evaluating any large industrial project. Many large corporations require HIA as part of a code of corporate responsibility.

Health impact assessment (HIA) is a method for assessing the potential impacts of a proposed project on human health. It is similar to the EIS process, relying on available scientific data, public testimony, and modeling to predict potential impacts. HIA looks at health broadly – including social, emotional, and cultural impacts as well as physical. According to the World Health Organization, HIA is based on 4 principles [2].

1. Democracy – allowing people to participate in the development and implementation of policies, or projects that may impact on their lives
2. Equity – HIA assesses the distribution of impacts from a proposal on the whole population, with a particular reference to how the proposal will affect vulnerable people (in terms of age, gender, ethnic background and socio-economic status)
3. Sustainable development – that both short and long term impacts are considered, along with the obvious, and less obvious impacts
4. Ethical use of evidence – the best available quantitative and qualitative evidence must be identified and used in the assessment. A wide variety of evidence should be collected using the best possible methods

If we choose not to do an HIA this means we are clearly not considering the potential impacts on local communities in making permitting decisions.

Air pollution is one of the cumulative impacts that have clear health implications. What is happening in the Barnett shale which is a similar formation can give us insight to potential problems.

"A study by the Texas Commission on Environmental Quality in 2006 estimated that storage tanks alone account for about 38 tons of volatile organic compounds a day, or 7 to 8 percent of the volatile organic compounds in the air in North Texas. Those chemicals are a key ingredient in ground-level ozone, the area's major pollution problem." This is from a recent article Gas well emissions drawing scrutiny"

By MIKE LEE star telegram

All I will say about staffing is this; If just 20% of the 12 million acres of the Marcellus Shale were developed at a density of one well every 100 acres, New York would have to oversee 25,000 wells. When New York City staffed up its Catskill watershed protection program in the nineties, it hired 400 new staff to do a less complicated task in an area only 10% of the size of the Marcellus. Proper oversight of Marcellus drilling will ultimately require far more personnel.

There are a multitude of concerns when it looking at local control. But at the very least we need the legislature to create a requirement that companies sign an infrastructure agreement with municipalities. Also affecting local control is local control at the landowner level our current compulsory integration law creates an extreme advantage to the gas industry over an individual mineral rights owner. We need to rewrite the law. There is no reason a landowner should be paid the minimum royalty when they are forced to sell their gas.

Lastly I would like to focus for a moment on what happens to production water.

Production water is that now famous mix of friction reducers, foaming agents, biocides, surfactants, scale inhibitors, Normally Occurring Radioactive material (norms) along with brine, possible metals like cadmium, arsenic, chromium, lead, mercury, and copper. You may also find hydrocarbons and organic compounds (e.g., methanol, chlorinated phenols, formaldehyde, benzene, toluene, ethyl benzene, xylene and acrylamide)." The risks presented by these toxins are well known.

There is plenty of reason to be concerned with the "fracking process" There are serious questions that need answered through the evaluation of fracking during the supplemental hearings.

The problem to discuss here and not addressed by any supplemental to a GEIS is the fact that in New York these fluids are not classified as hazardous as a part of law. The way fracking fluids are now being "treated" is simply by dilution .My question to this committee is: Has anyone seen a peer reviewed study that documents the impacts of slowly releasing these components into a surface water body? The EPA considers many of the chemicals used as hazardous in any other application. Simply put we cannot fix a community health issue posed by releasing chemicals into the environment by not calling it a hazard
I have serious doubts about the health of any stream or river that will be taking this fluid over time and slowly releasing it into the environment. We have so many examples of toxics that are "safe" turning out to be huge environmental or health disasters. How is PCB cleanup going?

Livingston Manor was recently approached to see if their sewage treatment plant would take fracking fluids. For those of you unfamiliar with this facility it would discharge this fluid into The Willowemoc, which flows into the Beaverkill two internationally known streams. These rivers are not known for the industrial waste they bring to the ocean via the Upper Delaware scenic and recreational river

We thank you, Councilman Gennaro, for your strong efforts to protect New York's environment. We look forward to working with you in coming months.

Statement at the Environmental Committee Hearing of December 12, 2008
By Joy Garland, member of the Environmental Education Advisory Council

Yesterday, I met with a long time college friend who lives in New York City, but who has a second home in the area of the Marcellus Shale which is affected by the potential drilling for new gas wells. He said the local people would like to reap the economic gains that would come from use of what is now fallow and unproductive land but are reluctant to encounter the trials and tribulations that have plagued the western states where gas drilling has poisoned the air and the water and contributed to disputes among neighbors in the community.

Given that New York State has not had to spend billions of dollars on the necessity of filtering our water, and the recognition that water is essential to life and threatened in all parts of the world including parts of our own country, I feel it is incumbent upon us to impose at least a two year moratorium on the drilling of new wells in area that have the potential to adversely affect the quality of New York's water.

Respectfully submitted,

Joy Garland
440 East 20 Street
New York, NY 10009

December 9, 2008

Attn: Scope Comments

Bureau of Oil and Gas Regulation
NYSDEC Division of Mineral Resources
625 Broadway, Third Floor
Albany, NY 12233-6500

Subject: Comments on draft scoping document for Draft Supplemental Generic
Environmental Impact Statement on Oil and Gas Drilling

To Whom it may concern:

I am writing to offer comments and recommendations on the referenced scoping document. While I write as a private citizen, my comments are informed by my professional training and background. I hold a Ph.D. in Biochemical Sciences, and I served for 20 years on the faculty and staff of the University of Medicine and Dentistry of New Jersey and Cornell University, where I conducted research in cell biology and taught courses in Pharmacology and Toxicology. I have served as a consultant for citizens' groups at federal Superfund sites in New York and New Jersey. I am currently employed as the Executive Director of the Community Science Institute, a nonprofit organization in Ithaca, New York, which is supported by local governments and which partners with groups of citizen volunteers to monitor water quality in the southern Cayuga Lake watershed. I also serve as the Technical Director of the Community Science Institute's ELAP-certified water testing laboratory, ELAP ID# 11790.

My main concern with the Draft Scoping Document is the relative lack of attention being paid to the huge volumes of contaminated wastewater that will be generated by hydraulic fracturing of horizontal gas wells in the Marcellus shale. Disposal of contaminated wastewater from thousands if not tens of thousands of gas wells represents an unprecedented challenge, for two reasons. First, the sheer volume of contaminated wastewater could easily overwhelm currently available disposal options such as underground injection wells and specialized treatment facilities, resulting in billions of gallons of contaminated wastewater in search of disposal and setting up potentially dangerous financial incentives for gas companies to get rid of their wastewater in environmentally irresponsible ways, such as contracting with small sewage treatment plants that are unable to process the waste safely or, conceivably, dumping waste fluids in remote stretches of rivers or wetlands. Second, approximately 30% of the contaminated wastewater from hydraulic fracturing is not recovered but remains underground, where it poses a small but real risk of contaminating groundwater and surface water.

In addition to neglecting to factor in risks to human health and the environment resulting from the huge volumes of contaminated waste fluids that will be generated from hydraulically fractured horizontal gas wells, the Draft Scoping Document and GEIS also do not adequately address protection of drill sites from surface erosion.

Below I offer specific recommendations that I hope will help improve the Draft Supplemental GEIS, followed by explanatory comments.

Conclusions and Recommendations

Conclusion 1. The process of hydraulically fracturing horizontal gas wells in the Marcellus shale involves the chemical contamination of roughly 5,000,000 gallons of fresh water per well. Since the allowed well spacing is 40 acres, up to 80,000,000 gallons, or 245 acre-feet, of contaminated water will be generated per square mile of gas wells. (One acre-foot is a volume of liquid that covers one acre of land to a depth of one foot.) Roughly 30% of the contaminated waste fluid cannot be recovered and will remain in the ground, where it presents a risk of contaminating groundwater and, eventually, surface water. The 70% that can be recovered will require environmentally safe disposal. The volumes of recovered wastewater are completely unprecedented and will surely stretch the State's disposal options beyond their current limits. The unprecedented volumes of waste fluids left in the ground will require continuous monitoring to detect whether groundwater and surface water upon which humans and wildlife depend becomes contaminated.

Recommendations for Supplemental GEIS

- 1.. Revise spacing from 40 acres to 640 acres for horizontal, hydraulically fractured gas wells.
- 2.. Require as a condition for issuing a drill permit that an environmentally acceptable disposal facility for recovered waste fluids be identified, operational and available before a drill permit is issued.
- 3.. Drastically increase the number of NYSDEC field inspectors in order to ensure that gas companies drill, cement, hydraulically fracture and ultimately plug their wells according to the highest industry standards.
- 4.. Develop and publicize a framework for monitoring groundwater and surface water by state and local governments in partnership with citizen volunteers in order to detect and address any contamination from waste fluids that is created by drilling and hydraulic fracturing operations, be it due to human error or unknowable features of local hydrogeology.
- 5.. As a condition for issuing a drilling permit, require that companies both provide to the NYSDEC and make available to the general public the following information on the composition of waste fluids from each and every gas well: a) A complete list of each and every chemical present in drilling fluids and hydraulic fracturing fluids, their concentrations, and their known toxicities; b) A complete list of each and every chemical present in wastewater recovered from the well as determined by certified laboratory analyses of at least three wastewater samples collected by a NYSDEC field inspector, their concentrations and their known toxicities, including chemical additives such as biocides and surfactants, naturally occurring heavy metals and radioactive materials, volatile organic compounds (VOCs) such as natural gas, and proppants.
- 6.. Institute a tax on gas companies and use it to create a Gas Well Trust Fund that will pay to clean up groundwater and surface water contaminated by waste fluids from gas wells or, if cleanup is not possible, to compensate landowners and local governments for the loss of water resources due to contamination; to provide medical care for people sickened by drinking or swimming in contaminated water; and to restore fish and wildlife habitat degraded by wastewater from gas wells.

Conclusion 2. While the GEIS requires that drill pits be removed within 45 days of completion of drilling and fracturing operations, it does not require restoration of soil and vegetation. This increases the risk of erosion and sedimentation of streams and lakes.

Recommendation for supplemental GEIS

- 1.. As a condition for issuing a drilling permit, require companies, first, to set aside and reserve topsoil, and second, to use the reserved topsoil to restore a site within 45 days of completing drilling and fracturing operations.

Detailed Comments

Volume of contaminated drilling and hydraulic fracturing fluids: While the volume of fluids required for gas wells in the Marcellus shale is not yet known exactly, credible estimates indicate that a typical well requires approximately 3×10^6 gallons of water. Given the current allowed spacing in New York State of 40 acres, or 16 wells per square mile, the volume of fluids is estimated to be approximately 48×10^6 gallons (48 million gallons) to develop one square mile's worth of gas wells in the Marcellus shale. This assumes that wells are hydraulically fractured only once. However, it appears to be fairly common practice for wells to be fractured two or more times (Sumi, L., Shale Gas: Focus on the Marcellus Shale, Oil and Gas Accountability Project/Earthworks, May 2008, Figure 1, page 9, <http://www.earthworksaction.org/pubs/OGAPMarcellusShaleReport-6-12-08...>). Thus, a reasonable but possibly still conservative estimate would be 5×10^6 gallons per well or 80×10^6 gallons (eighty million gallons) of contaminated fluid generated over the lifetime of the wells on one square mile of land. This volume is equivalent to 245 acre-feet, or 245 acres of fluid to a depth of one foot (1 cubic foot equals 7.49 gallons; one acre equals 43,560 square feet; one acre-foot equals 43,560 cubic feet). Stated differently, recovering gas from one square mile of Marcellus shale will require the creation of roughly four-tenths of a square mile of contaminated fluids to a depth of one foot, or one square mile to a depth of five inches. Such volumes are on the order of 100 (one hundred) times greater than the volumes of liquid that have been needed to fracture vertical wells in the past. They suggest that at a minimum, New York State should require that the State's capacity to dispose of contaminated drilling and fracturing fluids be increased by a factor of one hundred before beginning to issue permits for horizontal drilling and hydraulic fracturing in the Marcellus shale.

Risk of contamination of groundwater and surface water: While the amount of hydraulic fracturing fluid that is recovered appears to vary from gas well to gas well, there seems to be general agreement that recovery ranges from roughly 60% to 80%. Therefore, roughly 30% of the contaminated fluids generated by drilling and hydraulic fracturing is expected to remain in the ground, or something on the order of 30×10^6 gallons (thirty million gallons) over the lifetime of one square mile of gas wells. This is the equivalent of a square shaft of fluid that measures 5,000 feet (roughly one mile) deep and 28 feet on a side. While in the majority of gas wells this enormous volume of contaminated fluid will probably stay thousands of feet underground and not migrate upward and outward to contaminate groundwater and surface water, it seems reasonable to project a risk that in a small but significant fraction of cases, migration will occur and contamination will result. Indeed, the GEIS (Volume II, Section B.4 and 5, pages 16-15 to 16-20, http://www.dec.ny.gov/docs/materials_minerals_pdf/dgeisv2ch16.pdf) describes a variety of groundwater contamination scenarios due to human error such as improper cementing of the well bore and improper plugging of abandoned wells. In addition to the likelihood that drilling operations will not be performed flawlessly 100% of the time, risk of groundwater contamination can also arise from local geologic formations being different, or behaving differently, than anticipated. With all due respect to the state of geological science and the sophistication of computer models used by gas companies to guide their drilling and fracturing operations, it is virtually certain that some tiny but finite percent of wells will not behave as predicted, and that the failure to predict their exact behavior will result in groundwater contamination, even when drilling operations are conducted flawlessly.

Let us assume that drilling technology will work perfectly 97% of the time but that it will fail 3% of the time due to human error. Let us assume further that the geology of horizontal, hydraulically fractured gas wells will be as predicted 98% of the time but that 2% of the time, due to unavoidable limitations of scientific knowledge, the geology will differ in ways that can result in groundwater contamination. The risk of contamination of groundwater from these two types of failures is additive and would add up to 5%. This would mean, on average, that if everything goes perfectly 95% of the time, one well of the 16 wells per square mile will be predicted to fail. A failure frequency of 5% would translate into roughly 2×10^6 gallons (two million gallons) of uncontained hazardous fluid waste in the

ground that could then be available to contaminate groundwater and, eventually, surface water. If it is assumed that a minimum dilution of 1,000-fold (one thousand-fold) were required to render the waste fluid non-toxic to human health and the environment, then 2×10^6 gallons of waste fluid are capable of contaminating 2×10^9 gallons (two billion gallons) of drinking water. Since the City and Town of Ithaca require approximately 10×10^6 gallons (ten million gallons) of drinking water per day, the failure of one gas well has the potential to contaminate the equivalent of 200 days' worth of drinking water in our area.

The contamination scenario described above is a hypothetical; however, it is a reasonable hypothetical. It illustrates the potentially catastrophic magnitude of the risks to groundwater and surface water inherent in the vast quantities of contaminated fluids generated by horizontal drilling and hydraulic fracturing. Because of the huge volumes involved, and because of the toxic composition of waste fluids from drilling and hydraulic fracturing (see below), the failure of a single well can have potentially cataclysmic consequences for drinking water and/or surface water in the local area where the well failure occurs. Numerous cases of groundwater contamination due to gas wells have been reported (Lustgarten, A., Buried Secrets: Is Natural Gas Drilling Endangering U.S. Water Supplies? ProPublica, Nov. 13, 2008, <http://www.propublica.org/feature/buried-secrets-is-natural-gas-drill...>; Ohio Department of Natural Resources, Division of Mineral Resources Management, Report on the Natural Gas Invasion of Aquifers in Bainbridge Township of Geauga County, Ohio, Sept. 1, 2008, http://s3.amazonaws.com/propublica/assets/natural_gas/ohio_methane_re...), providing evidence that the risk of groundwater contamination, however small, is very real.

A useful way to think of risk from contaminated wastewater is that a single well failure or the improper disposal of wastewater from a single well would be potentially equivalent to a State or federal Superfund toxic waste site in which groundwater contamination poses the principal threat to human health and the environment.

Groundwater contamination is notoriously difficult and expensive to remediate. In many if not most cases, groundwater contamination is remediated by "natural attenuation." That is, it is not remediated at all, rather, it is hoped that it will remediate itself. Even assuming that it eventually does remediate itself, it can take years to decades. Unlike urban areas with public drinking water supplies, rural residents with private wells would need to find alternative sources of drinking water if contamination occurred. Moreover, contaminated groundwater will eventually contaminate streams and lakes, which are fed by groundwater.

Composition of waste fluids generated by drilling and hydraulic fracturing: The exact composition of waste fluids varies from company to company and from well to well. However, the general requirements of drilling and hydraulic fracturing technology are likely to result in the following classes of contaminants: a) Extremely high concentrations of salt, or brine; b) High concentrations of organic materials such as guar gum used to increase the viscosity, or thickness, of drilling fluid as a means to help bring drill cuttings to the surface; c) Various concentrations of a wide array of organic chemicals used as surfactants and biocides in hydraulic fracturing fluid; d) High concentrations of small solid particles such as sand or other "proppant" material that functions to prop open fissures created by hydraulic fracturing of shale rock; e) Various concentrations of heavy metals such as aluminum, mercury, cadmium, zinc, lead, chromium and others that are released from underground geologic formations by the drilling and fracturing process; f) Naturally occurring radioactive materials, or NORMs, that are released by the drilling and fracturing process; and g) Natural gas, or methane, released by the drilling and fracturing process. It is important to note that waste fluids contain a mixture, first, of chemicals that are added to enhance the drilling and fracturing processes, and second, chemicals and possibly radioactive materials that are released from underground geologic formations as a result of the drilling and fracturing process. All of the added substances plus many

substances released by the drilling/fracturing process end up in the waste fluid from gas wells. As stated previously, the volume of waste fluid is distributed roughly 30% below ground and 70% above ground.

Many although not necessarily all of the added and naturally occurring waste fluid constituents are classified as toxic chemicals. Each toxic constituent poses risks to human health and the environment when it is present in water, soil and/or air at concentrations that exceed its threshold of toxicity. The GEIS points out, correctly, that there is a long history of gas wells in New York State, and that these general kinds of waste fluids have been dealt with for decades. The difference is that with the advent of horizontal drilling and hydraulic fracturing technology, the volume of hazardous waste fluids has now increased by two orders of magnitude, from roughly 50,000 gallons per well to roughly 5,000,000 gallons per well. This 100-fold increase in the volume of hazardous waste means there is a similar 100-fold increase in the risk of exposure to the toxic chemicals in the waste fluids. A 100-fold increase in the risk of exposure means there is a 100-fold increase in the risk to human health and the environment, because risk is due, not solely to the toxicity of a chemical, but to the combination of toxicity and exposure.

One way to get a handle on the risk presented by the new technology proposed for gas wells in the Marcellus shale is to imagine that instead of one well per 40 acres, the actual spacing, in terms of the kinds of traditional wells addressed in the GEIS, is one well per 0.4 acre. It is as if, from the standpoint of the risk to human health and the environment from drilling and fracturing fluids, 100 traditional gas wells will now be collapsed into a single megawell. From a risk perspective, the currently approved well spacing translates into roughly 1,600 traditional wells per square mile, not 16.

The GEIS addresses environmental risks from salt and thickening agents. High concentrations of salt can kill vegetation and sterilize soil. Organic thickening agents such as guar gum can result in increased biological oxygen demand (BOD) and fish kills when waste fluid gets into streams. The GEIS concludes that these risks are almost invariably short-term, and that they are effectively mitigated by dilution. Given the typical drilling scenario envisioned by the GEIS, i.e., a single isolated well involving 20,000 to 80,000 gallons of waste fluid, the conclusion that much of the environmental risk due to waste fluids can be mitigated by dilution is not unreasonable.

The GEIS does not address mitigation of risks from heavy metals, NORMs, surfactants and biocides explicitly. One possible reason for this omission is that when the GEIS was written in the 1980s, the potential for low concentrations of toxic chemicals to cause cancer and to interfere with normal development, especially sexual development, was less well appreciated than it is today. Since the 1980s, awareness of the risks associated with long-term, low-dose exposure to toxic chemicals has grown considerably. For example, an entire sub-discipline of toxicology has developed around the effects of endocrine disrupting chemicals shown to alter sexual development in wildlife and suspected of having analogous effects on humans (Colborn, T., Dumanoski, D., and Meyers, J.P., *Our Stolen Future: Are We Threatening Our Fertility, Intelligence and Survival? A Scientific Detective Story*, 1996; written testimony by Theo Colborn to Congress on toxicity of chemicals used in natural gas drilling and hydraulic fracturing, Oct. 25, 2007, http://s3.amazonaws.com/propublica/assets/natural_gas/colborn_testimo...; list of chemicals used in drilling and hydraulic fracturing fluids in Western states at <http://www.endocrinedisruption.com/>, click on "Products"; Steingraber, S., *The Falling Age of Puberty in U.S. Girls*, Breast Cancer Fund, August, 2007). The U.S. Environmental Protection Agency (USEPA) bases cancer risk assessments on the default assumption that cancer can be triggered by exposure to as little as one single molecule of a toxic chemical. The European Union recently passed legislation entitled "Registration, Evaluation and Authorization of Chemicals" (REACH) which initiates a toxicological review of all of the approximately 100,000 chemicals in commerce with the goal of requiring that companies doing business in EU countries remove from their products chemicals judged by EU scientists to be too toxic to justify human exposure; this is the first full-scale toxicological review of commercial

chemicals ever undertaken and effectively picks up where the 1976 U.S. Toxic Substances Control Act left off (Schapiro, M., *Exposed: The Toxic Chemistry of Everyday Products and What's At Stake for American Power*, Chelsea Green Publishing Co., 2007, chapter 7).

Drilling companies point out that the concentrations of individual chemical additives in drilling and fracturing fluids, and hence in waste fluids, are low, roughly on the order of 0.01%, or 100 ppm (parts per million), and that these concentrations are similar to those in other industrial and household products containing the same or similar chemicals. This is certainly true, but it is completely beside the point, for several reasons. First, from the standpoint of risk to human health and the environment, the issue is not the concentration of chemical additives in drilling and fracturing fluids, rather it is their concentrations in the environment combined with the probability that biological receptors will be exposed to concentrations that exceed the threshold for triggering a toxic effect such as cancer or abnormal development. For some endocrine disrupting chemicals, thresholds for toxic effects are measured in parts per billion (1 in 10^{-9} or micrograms per liter) or even parts per trillion (1 in 10^{-12} or nanograms per liter), not parts per million. Second, while concentrations are low, the fact that the volumes of waste fluids are about 100 times greater than traditional wells means that the amount, or mass, of toxic chemicals is also about 100 times greater than the mass of toxic chemicals associated with traditional wells, because mass is the product of concentration times volume. Third, in addition to chemicals that are added to drilling and fracturing fluids, chemicals such as heavy metals, naturally occurring radioactive materials and methane gas that are mobilized by drilling and hydraulic fracturing also present risks to human health and the environment. While gas companies cannot be held responsible for creating naturally occurring chemicals, they can and should be held responsible for the risks created by their release into the environment, particularly since companies stand to profit handsomely from those risks. Fourth, the chemicals in waste fluids cannot be viewed individually and in isolation from one another, as if exposure occurred one chemical at a time. In reality, exposure is almost always to multiple chemicals simultaneously (for documentation of multiple chemical exposure supporting the European Union's REACH legislation, see Generations X: Results of World Wildlife Fund's European Family Biomonitoring Survey, October 2005, <http://assets.panda.org/downloads/generationsx.pdf>). The USEPA makes the default assumption that the toxic effect of exposure to multiple chemicals is additive. In other words, exposure to the same concentration of two chemicals with similar carcinogenic potencies tends to carry roughly the same risk as exposure to one of the chemicals at twice that concentration. In some cases, the effect of exposure to multiple chemicals is synergistic rather than additive, e.g., exposure to two chemicals may carry more than a two-fold greater risk of disease than exposure to one chemical. In other cases, the effect of exposure to multiple chemicals is antagonistic, e.g., exposure to two chemicals may carry less than a two-fold greater risk of disease than exposure to one chemical.

The Supplemental GEIS needs to address the dramatically increased risk of exposure to toxic chemicals resulting from the extraordinary increase in the volume of waste fluids from gas wells. The supplemental GEIS needs to be grounded in the best available research on the health effects of low-dose, long-term exposure to multiple chemicals.

Failure to require companies to restore drill sites following well completion: Preparation of a drill site requires stripping vegetation and topsoil from approximately five acres of land. The GEIS points out that while companies are required to remove pit waste within 45 days of completing a well, they are not required to reclaim and restore the drill site until after the well stops producing (GEIS, Volume II, chapter 16, section 1.b). The GEIS acknowledges that failure to restore the drill site can result in serious erosion lasting years or decades. The GEIS notes that the remedy is for a company to be "conscientious" and restore the drill site on its own initiative once the well is completed. The GEIS discusses the importance of setting aside productive top soil and using this top soil to restore the drill site (GEIS, Volume II, chapter 16, section 1.a). Given the size and anticipated density of drill sites in the

Marcellus shale, the supplemental GEIS should require companies to set aside top soil and restore a site within 45 days of completion of drilling and fracturing operations, the same time frame as the removal of pit waste.

In closing, I would like to thank you for considering these comments and recommendations aimed at broadening the scope of the Draft Supplemental GEIS to address the risks to human health and the environment resulting from the unprecedented volumes of hazardous chemical waste fluids that will be generated by gas wells that utilize horizontal drilling and hydraulic fracturing technology in the Marcellus shale.

Sincerely,

Stephen Penningroth, PhD

Joe Levine
561 Broadway, Studio 8D
New York, NY 10012

631 River Road
Milanville, PA 18445

December 12, 2008

James Gennaro, Chairman
Committee on Environmental Protection
NY City Council
New York, NY 10007

Re: NYS SGEIS Scope Comments

Dear Chairman Gennaro and Council Members,

I am an architect practicing in NY, PA, NJ, and MA. I live in NYC and also within the Upper Delaware River Watershed in Milanville, PA. The work of my practice includes urban infrastructure restoration and upgrading, urban planning and environmental subdivision design in critical western landscapes. I am a founding member of Damascus Citizens for Sustainability; a grassroots environmentally concerned nonprofit organization.

I will briefly mention just a few of many issues that must be addressed if the NYS EIS is at least meaningful, and at best might achieve regional or maybe even national recognition for environmental and economic leadership. I see this as possible because in NYS, we are somewhat unique nationally with respect to the Marcellus gas drilling campaign, in that most other regions have not been able to substantially address this issue and develop regulations until after very significant damage has been done.

Now is the time to get our regulatory house in order.

So first and foremost I ask the DEC to engage the best-known independent experts to study the regional macro planning aspects of the Marcellus Shale Drilling Project. Presently it is not apparent that substantial independent scientific review has been engaged. The Marcellus Project is daunting in scale and dangerous in its application and requires the best scientists and planners to confirm its viability. The Draft SGEIS does not ask for any significant studies of the underground hydrology and specific designation of sensitive or off limit areas to mention just a few of the issues that must be included in this study.

Second: It is imperative that a comprehensive investigation is performed in order to measure and evaluate the cumulative impacts that the Marcellus Project will bring. This SGEIS is meaningless if it does not take into account the cumulative impacts aspect of the Marcellus Project. This means that a comprehensive Marcellus macro plan must be submitted by Industry indicating their long-term goals - and the DEC must take the time to adequately review and evaluate the ramifications and totality of the

cumulative impacts. This must be done because it is meaningless to evaluate, approve and permit one or even a hundred wells if there are to be thousands. And based upon Industries models there will be thousands.

Third: The goal of this Environmental Impact Study must be to avoid the kind of environmental damage, pollution and detrimental health effects that have occurred in so many parts of the U.S. as a result of this type of industrial activity. The EIS should be as comprehensive and meaningful as possible in order to protect and best manage our natural resources and more importantly our health, and should include the following:

A county-wide water and air baseline testing survey in order to gauge potential changes in water and air quality. Had this been required in the earlier, outdated GEIS, we would be able to evaluate what impacts existing wells have had. Presently Industry and the DEC claims that there have been no problems related to the existing wells. Without baseline testing it is not possible to prove that degradation of water and air resources and subsequent health impacts were the result of drilling. We however have seen an abundance of information including news articles, reporting on degradation and cessation of water supplies in NYS. I can submit this information to the committee.

Proprietary information regarding gas-drilling practices must be disclosed in order for environmental regulations to be implemented. There must be full disclosure and evaluation of the chemicals, and possible sources of contamination involved in the hydraulic fracking process, including proposed storage and transport of water and materials involved in the process. Industry has enjoyed what is essentially government deregulation over their practices and these exemptions must be rescinded.

Comprehensive engineering plans of the Marcellus gas fields must be available for public review. Plans must include a description and location of all planned construction of roadways, pipelines, well pads, staging areas, compressor stations, spacing requirements and geographical restraints. We must understand the scope and scale of this project so that informed decisions can be made.

The study must report on projected influence on ground and sub-grade resources such as aquifers, wetlands and critical habitats, the impact of increased water withdrawals, waste water disposal and storm water run-off. In terms of aquifers for instance, a great deal of NJ's water is supplied by aquifers that originate in NY and within the boundaries of the NYC watershed. Drilling through these aquifers will have far reaching consequences. Presently there are no plans for such a study in the Draft SGEIS.

The study must report on the projected influence on local and regional infrastructure including roads and increased truck traffic, community infrastructure and emergency resources related to public health and safety, because fires, explosions, and hazardous materials spills have been frequently reported. Lighting, high and low frequency noise, and air emissions pollution problems have been documented to cause serious health affects and even adverse social conditions.

These are some but not all of the issues that must be studied if we are determined to protect our health and the health of the natural environment. But the issue of the Cumulative Impacts cannot be mishandled: Approval of one well at a time might seem like a manageable project, but this is not about one well, or even 100; the scope of this project is anticipated to include as many as 25,000 wells, and based upon the Industry's models, eventually 50,000 might be seen regionally creating a landscape

few of us will recognize or live in. It will be an industrial zone and there is proof from the regions out west where this has been allowed. Yet presently, based upon testimony given at these hearings, the State EIS requirements for an individual to put in a pond are more rigorous than that required to drill a gas well. Even though each gas well qualifies as a Superfund site (because of the toxic chemicals employed) if it weren't for exemptions from the Superfund Act.

25,000 wells in the NYC and the Upper Delaware River watersheds mean the following;

All of the Upper Delaware Basin (2,880,000 acres from Hancock to Port Jervis) is situated above Marcellus Shale. If developed to the extent anticipated by the gas industry (based upon models from out west) and as limited by the states (although ambiguous; but 1 well per 80 acres in NY and 1 per 25 in PA) there would eventually be somewhere between 25,000 and 50,000 wells in the Upper Delaware River Basin which includes the NYC Watershed and into the Southern Tier. Clearly this watershed region will become an industrial zone. This projected frequency provides the following statistics;

200 to 250 billion gals of water would be used in the initial drilling. All of this water is mixed with toxic chemicals required in the drilling process. Approx 70% of this water is brought back up and requires treatment at special treatment facilities, and the rest is not recovered and can infiltrate our aquifers.

150,000 to 250,000 acres of watershed land will be cleared or deforested. (And will become a storm water run-off condition).

Each well requires at least 600 tanker truck trips; 15 million trips on marginal country roads; expanded network of roads and traffic and truck traffic pollution.

\$150 Billion construction project. Minimal permitting due to evaluation and permitting of individual wells; known as segmentation or "piece-mealing", because Industry is not required to disclose a master plan showing the ultimate objective.

Dr. Theo Colborn, the world renown environmental health expert has reported that the air pollution and ozone produced by these wells will have a serious detrimental impact on health and air quality affecting NYC – 200 miles away.

Impacts to zoning laws and regulations must be reviewed within the parameters of the Marcellus Project. There is no question that if the Marcellus Project happens, the present residential and agricultural environment upstate will be turned into an industrial zone. This has been happening across the country without any requirements for re-zoning. And we must be concerned because this is where we get our food and precious fresh water. Several townships around the country have begun to take legal action to protect their zoning laws, and at least one case is in the PA Supreme Court right now. This is the Nockamixon & Salem Townships vs. Range Resources case. Damascus Citizens had filed an amicus brief in support of the Townships' rights in this case along with the Delaware River Keepers and the American Littoral Society.

The Industry has a master plan and it should be made public. They are not installing a billion dollars worth of infrastructure in this region without a master plan. They know how many wells and how much

extraction is required to make investment profitable. We have a right to know what our region will look like if we proceed with the Marcellus Project.

A comprehensive EIS should include a comprehensive study of all pertinent information related to gas extraction. This must include all of the responsible independent research and literature including reports and reporting, testimonies and impact studies from other states where there has been horizontal drilling and high-volume hydraulic fracturing in shale for many years. Real models exist and cannot and should not be ignored.

In October 2007, world renowned Environmental Health Analyst, Dr. Theo Colborn testified before Rep. Henry Waxman's Congressional Committee on the Applicability of Federal Requirements to Protect Public Health and the Environment from Oil and Gas Development.

Dr. Colborn received Time Magazine's 2007 Hero of the Environment Award and was the recipient of the 2008 Göteborg Award. At 82 years old she is one of the leading scientific experts on the health effects of gas drilling. The NYS DEC should invite Dr. Colborn to NY to share her knowledge with them.

I ask the DEC to do a new GEIS, not a supplement to a GEIS that is totally out of date and irrelevant. The current draft scope of work is flawed in many ways including that it never mentions research methodology or how DEC is going to study any of the topics.

The only reason to drill is for money. The notion that it will provide energy independence or national security is a charade; even as we speak, US extraction companies are selling their assets to foreign companies that will benefit from the exemptions given to extraction in the name of national security. But the potential downside of this project is devastating. Just in the last few weeks the water supply in Pittsburg was contaminated as a result of disposal of drilling wastewater.

I hope NYS will show leadership on this subject because that must and will be the trend; It makes sense not just environmentally but also economically. We really do have to reverse course and look at the big picture. The human health and environmental clean up costs must be factored into the equation or we are not capable planners. And NYC's most valuable resource is it's water.

Respectfully submitted,

Joe Levine

12/12/2008 STATEMENT BEFORE NEW YORK CITY COUNCIL
DAMASCUS CITIZENS FOR SUSTAINABILITY

[www.DamascusCitizens.org]

We thank Councilman **James Gennaro** for his call to BAN gas drilling by “hydraulic-fracturing” within the New York City Watershed. This morning we will present details about the Pittsburgh metropolitan area’s drinking water systems - and outline a series of events that must not be allowed to occur in the Watershed Region. Our Watershed is a treasured asset -- as it provides drinking water to over 25 million people -- including the 8-million citizens of New York City.

Water is our most precious commodity - but the nation’s water supply is now threatened. An example of this is a recent contact we received from Pittsburgh residents to tell us that the **Pittsburgh Water Authority** had issued an emergency warning -- that due to gas drilling related practices - their drinking water supply is unsafe and residents should use bottled water until further notice.

TIME LINE

Earlier this spring Damascus Citizens for Sustainability began to communicate with grass-roots groups across America. We were told that drilling activity had begun in Hickory, PA -- and there were many citizens there who were describing the same problems being experienced by people in other states where “hydraulic-fracturing” was taking place. We sent a video team to Hickory, PA to collect first-hand testimonials -- these video testimonials have been seen by over 13,000 viewers online at [www.YouTube.com/GasDrillingTruth]. Three of these testimonials state clearly that the drilling wastewater was being taken from Hickory, PA to northern West Virginia.

At that time, shortly before leaving her position as Secretary of the Pennsylvania Department of Environmental Protection [PA-DEP], **Kathleen McGinty** issued an executive order prohibiting Pennsylvania sewage treatment facilities from accepting wastewater from sites where “hydraulic-fracturing” was being performed. As a result, most of the industry wastewater from Hickory and other locations within Pennsylvania, was transported to sewage treatment plants along the Monongahela River in West Virginia. This practice provided a steady income source -- and most facilities began taking up to 20% or more of their total processing capacity from drilling companies operating in Pennsylvania.

On October 31, 2008 *The Pittsburgh Post-Gazette* reported that “the state received reports of high levels of contaminants in a 70-mile stretch of the Monongahela River - which flows north from West Virginia towards Pennsylvania. Since 350,000 people get their drinking water from this part of the Monongahela, the PA-DEP called for the use of bottled water for customers of 11 public water suppliers in the Pittsburgh metropolitan area -- particularly those whose tap water smelled foul and tasted bad.”

The cause of the alarm was TDS -- “total dissolved solids.” In early October, the Army Corps of Engineers began a release of additional river water through dams to dilute the TDS levels. But we ask -- what was the cause of the sudden and dangerous rise in levels of “total dissolved solids”? Answer: the sewage treatment plants were unable to process the fracturing fluids without causing a rise in TDS because gas drilling wastewater contains toxic chemicals, biocides, and heavy metals that municipal treatment plants CAN NOT PROCESS out.

Now the ever-increasing flow of drilling wastewater is being trucked to points further south and west -- since the PA-DEP has now ordered all treatment facilities along the Monongahela River to no longer accept drilling wastewater. Since no records are required to track what happens to this wastewater, it is not clear how it is being disposed. Drillers are creating millions of gallons more wastewater than existing treatment plants are able to process.

Additionally, **WTAE-TV** Pittsburgh presented a comprehensive investigative report about how drillers are also taking massive amounts of water from rivers, streams, and reservoirs. For instance, water haulers are at the Monongahela River so frequently they sometimes leave their hoses behind at the water's edge. And a hose -- attached to a diesel pump -- takes water from the river continuously. The hose runs up the bank and into tanker trucks. It also splits off into tanker trucks standing in a line. In fact, nine tanker trucks each holding 180,000 gallons fill up 24/7. For some Marcellus Shale gas wells, these trucks will come back and refill with water 40 times causing a substantially reduced river flow which also contributes to the problem by causing the percentage of contaminants to be higher in the remaining water flow.

CONCLUSION:

The above outline only describes what occurred at "the back-end" of the gas drilling process by "hydraulic-fracturing". **John Hanger**, PA-DEP Acting Secretary recently stated that "Each drilling operation in the Marcellus Shale will require substantial volumes of water, much more than conventional drilling operations. They need more water because they have to drill much deeper, sometimes a mile-and-a-half deep, and they use hydraulics to fracture the Marcellus Shale and release the natural gas trapped beneath it." Each well can require as much as 6 million gallons of water mixed with up to 10,000 gallons of "proprietary" toxic chemicals.

But the wastewater being trucked away -- is just that water which "returns to the surface." At least 30% of the drilling wastewater remains in the ground -- sometimes 100% remains in the ground [even industry says this in their data]. Former NYC-DEP Commissioner, **Al Appleton** says that "over time this highly toxic wastewater will find its way into the aquifers and find its way to the surface through "spring-fed water migration."

Overwhelming evidence and much science now exists to prove that the type of gas drilling proposed for the watershed region - **made possible by total federal deregulation** - causes contaminated drinking water, and carcinogens in the farmland and food chain. Experts have calculated that over 10,000 gas wells are allowed by existing laws -- and will be drilled in the Upper Delaware Watershed, which includes all of the New York City Watershed System.

Thus we urgently request the New York City Council pass a resolution calling for a BAN on gas drilling by "hydraulic-fracturing" within the New York City Watershed.

PUBLISHED NEWS REPORTS:

<http://www.post-gazette.com/pg/08305/924213-35.stm>

<http://www.post-gazette.com/pg/08297/922152-113.stm>

<http://www.post-gazette.com/pg/08327/929978-113.stm>

WTAE-TV 6-MINUTE. -- FULL-SCREEN VIDEO:

<http://www.thepittsburghchannel.com/video/17976058/index.html>



EARTHJUSTICE

BOZEMAN, MONTANA DENVER, COLORADO HONOLULU, HAWAII
INTERNATIONAL JUNEAU, ALASKA NEW YORK, NEW YORK OAKLAND, CALIFORNIA
SEATTLE, WASHINGTON TALLAHASSEE, FLORIDA WASHINGTON, D.C.

**Testimony of
Deborah Goldberg, Earthjustice**

**The Council of the City of New York,
Committee on Environmental Protection
Hearing: Gas Drilling in the New York City Watershed**

December 12, 2008

Thank you very much Chairman Gennaro and Members of the Committee for inviting me to appear before you today. I am Deborah Goldberg, Managing Attorney of the Northeast Office of Earthjustice. Earthjustice is the nation's leading nonprofit environmental law firm, working to protect our natural heritage and public health. Earthjustice has litigated a number of cases to forestall adverse impacts of oil and gas drilling out West. Attorneys in the Northeast Office are eager in general to ensure that New York does not repeat the mistakes made in Western states, and in particular to ensure that the New York City drinking water supply is not placed at risk by an inadequately protective state regulatory program governing natural gas development.

Although the New York State Department of Environmental Conservation ("DEC") is still in the early stages of supplementing its Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program ("GEIS"), the Draft Scope for the supplemental GEIS inspires little confidence that DEC's Division of Mineral Resources ("DMR") will conduct an adequate environmental review of gas drilling in the Marcellus Shale and other low-permeability formations. Most seriously, there is no mention whatsoever of the methodologies DMR intends to use in evaluating potential environmental impacts of such drilling, including potential impacts on the New York City watershed and the infrastructure that delivers drinking water to nine million people in this State. The purpose of public comment on the proposed work plan is largely defeated when the public cannot critique – because it cannot discern – how the agency intends to conduct legally required environmental analyses. DEC's refusal to hold a scoping hearing within the City suggests, moreover, that DMR personnel are not interested in being held accountable for the deficiencies of the Draft Scope.

Under these circumstances, it is imperative that the City Council take an active role in the environmental review process, to ensure that the interests and concerns of New York City residents are taken seriously. The Council should weigh in immediately (the deadline for written comments is this coming Monday, December 15) and specifically should ask DEC: (1) to prepare a revised Draft Scope, *including clear descriptions of all methodologies* that the agency proposes to use in conducting its environmental analyses, and (2) to release the revised draft for a second round of oral and written comment. (The comments that Earthjustice is submitting jointly with the Natural Resources Defense Council and other concerned organizations offer detailed recommendations for the structure and content of a revised Draft Scope.) The Council should weigh in again when the draft supplemental GEIS ("DSGEIS") is published for comment.

The Council should insist upon ample time for both comment periods, with public hearings to be held in multiple locations upstate, including two centrally located watershed towns, and at least one location within the City.

Substantively, the City Council should be advocating for a zero-risk policy with respect to drinking water. No resident of the State, no matter where he or she lives, should be asked to sacrifice clean drinking water for the sake of natural gas extraction. The New York City watershed, which supplies drinking water to nine million people, should be closed to drilling, and this body should act forcefully to preserve the City's water quality. Moreover, although the Council has no jurisdiction to regulate land use outside the watershed, it should exercise its moral authority to press for drinking water security throughout the state.

The threats to drinking water are real and serious. Just a couple of months ago in Pennsylvania, environmental officials acknowledged that elevated levels of total dissolved solids ("TDS") in the Monongohela River – the main source of drinking water for 850,000 people in Pittsburgh – may well have originated from sewage treatment plants handling large volumes of gas drilling wastewater. Similar TDS levels in New York City's water supply could force construction of a filtration plant costing as much as \$20 billion – eating up any economic windfall New Yorkers might hope to reap from drilling income. Out West, mounting evidence of water contamination is prompting local moratoria on drilling and new state regulatory programs, even though some industry practices there appear to be more environmentally protective than what DEC now requires from drilling companies. We may not be able to prevent every accident, but New York should ensure that DEC fully investigates best management practices and demands use of state-of-the-art technologies at every stage of the drilling process. In areas that are not placed off limits to drilling, DEC's regulatory program will be New Yorkers' only protection; otherwise applicable federal law is shot through with exemptions for the oil and gas industry.

The City Council should not be deterred by DEC's repeated suggestions that contamination from well drilling has never been a problem in New York. In fact, DMR has been quite cagy about what it claims. The Draft Scope states: "The Department has no *record* of any *documented* instances of groundwater contamination *caused by hydraulic fracturing for gas well development* in New York," and DMR staff "do not recall any such instance." Draft Scope at 10 (emphasis added). But DEC does not require monitoring of groundwater near well bores, waste pits, or any other infrastructure related to gas drilling, either before the drilling – to develop a baseline measurement from which to calculate changes in groundwater quality – or during or after the drilling. It is no surprise that there is "no record of any documented . . . contamination" under those circumstances.

Moreover, it is virtually impossible to document that groundwater contamination is "caused by hydraulic fracturing for gas well development," because the drilling companies routinely claim that the compounds they use for drilling and extraction are trade secrets. Until very recently, DEC did not require companies to disclose the chemicals used in hydraulic fracturing, and without that knowledge it would have been virtually impossible to trace any groundwater contamination to the well development. Even now that DEC has begun asking for such disclosure, the information produced by the companies is far from adequate. For example, one

company provided the following response to DEC's request for identification of the composition of fracturing fluids that would be used for natural gas recovery:

The additives potentially used in these wells include:

- Biocide to prevent the growth of bacteria in the well.
- Corrosion inhibitor to prevent the degradation of the well casing.
- Friction reducers to assist in the pumping of the frac fluid.
- Scale inhibitors to reduce the buildup of minerals in the well.
- Guar gel to thicken the water up so it will help carry the frac sand into the formation.
- Breaker to cause the guar gel to "break back" into an easier flowing fluid (more like water), so we can get the fluids back out of the ground, but not carry the sand back up with it. The sand stays in the formation to make the gas flow out of the formation easier.
- Iron stabilizer to prevent precipitation by keeping ions in a soluble form until the treatment fluid can be flowed back from the formation.
- Oxygen scavenger to prevent the degradation of the well casing.

Letter from Eric B. Gillespie (Chesapeake Energy) to Linda Collart (DMR), dated July 8, 2008, at 2. With the exception of guar gum (a coincidence?), we learn *nothing* about the chemicals that the company proposes to use for hydraulic fracturing. Moreover, there are additional chemicals used in the well drilling process, quite apart from the gas recovery process, as to which we have no information. DMR needs to do better than this. The City Council should insist that the chemical components of *all* compounds used at any stage of the gas development process be disclosed to DEC and that DEC post the information on its website so that the public can keep the agency accountable.

Full and public disclosure is crucial because DMR admits the potential for contamination at the surface. The Draft Scope states:

Potential impacts of improper surface handling of fracturing fluids discussed in the GEIS and the few incidents *recalled or recorded* by Department staff are all associated with accidental discharges of small quantities, primarily of returned fluids, or flowback, in which any additives would be significantly diluted. To date, no spill or discharge of chemical fracturing fluid additives in their pure, undiluted liquid or solid form has ever been *reported* to the Department, nor has the Department *documented* any environmental degradation that could be attributable to such an event.

Draft Scope at 11 (emphasis added). The fact that DEC must mention incidents that are *either* "recalled or recorded" implies that DEC staff know of incidents that they have never documented. This apparent record-keeping laxity might go some distance in explaining the touted absence of documented problems. Moreover, DEC should not be permitted to rest its claim that gas drilling is environmentally benign on the failure of industry to report toxic releases. Before DEC permits gas drilling at a scale and in locations we have never seen before, the agency should be required actively to test a representative sample of both active and

abandoned well sites for soil and water contamination. After all, “more than 1,000 . . . cases of contamination have been documented by courts and state and local governments in Colorado, New Mexico, Alabama, Ohio and Pennsylvania.” Abraham Lustgarten, *Buried Secrets: Is Natural Gas Drilling Endangering U.S. Water Supplies?*, ProPublica, Nov. 19, 2008, <http://www.propublica.org/feature/buried-secrets-is-natural-gas-drilling-endangering-us-water-supplies-1113>.

The Council should look with extreme skepticism not only at DMR’s claims about the record of contamination in New York but also at its claims about the potential for contamination in the future. DMR contends that injected fluids do not come into contact with groundwater because: (1) aquifers must be sealed behind cemented steel pipe before a well is drilled for hydraulic fracturing, and (2) the shale deposits are located thousands of feet below the aquifers. None of these arguments stands up to scrutiny.

Whereas it is true that current regulations require cemented steel pipe to seal off aquifers, DEC has not demonstrated that its requirements adequately protect groundwater. The protective value of cemented steel piping depends upon the quality of the cement job and the integrity of the cement and pipe over time. DEC does not prescribe criteria for casing or cementing, and it does not require industry to develop a log documenting the quality of the cement bond. Moreover, current regulations set no standards for transforming existing wells into Marcellus Shale gas producers, whether through deepening the well or by drilling horizontally. Until best management practices are required and routinely followed in this state, New Yorkers will face unnecessary environmental and health risks.

Moreover, DEC cannot deflect concern about these risks simply by pointing to the depth of gas shale formations. The depth of the Marcellus Shale varies dramatically, and it actually reaches the surface in some parts of this state. There is therefore no guarantee that there will be thousands of feet between injected fluids and groundwater. To the extent that the SGEIS is expected to cover other low-permeability shale formations, we have no idea about the intervening distance to groundwater, because DEC has not even identified where they are, much less mapped their depth. At any rate, there is no indication that DEC is planning to restrict drilling in locations with shallow shale deposits.

Even if drilling were limited to deep shale, however, mere depth does not guarantee protection of groundwater quality. Drilling could intersect with natural faults or fractures or expand them significantly, and there is no evidence that DEC has mapped either the aquifers overlying the target shale formations or the natural faults or fractures between them. The scale of proposed development also could change the hydrogeologic properties of the shale over extensive areas, increasing fluid exchange between the shale and adjacent formations. DMR cannot simply assume that drilling and fracturing fluids will be safely separated from groundwater, and the Draft Scope must explain how the agency intends to evaluate that proposition.

In sum, the dearth of meaningful information – whether about the toxicity of fluids injected into or produced from gas wells, the hydrogeologic character of the regions where drilling is expected, or the environmental impacts of high-volume hydraulic fracturing – is grounds for caution, not an excuse for the *status quo*. The burden should be placed squarely on DEC and the

industry to demonstrate that the regulations governing drilling and the actual practices of the drilling companies guarantee zero-risk to drinking water and otherwise adequately protect the environment and public health and safety. Moreover, DEC should demonstrate that the permit fee structure it intends to impose will be sufficient to support far more rigorous enforcement of environmental requirements than currently occurs. After all, if DEC now does not have sufficient personnel to staff one public hearing in New York City, how is it possibly going to monitor regulatory compliance at thousands of new natural gas wells?

TO: The Council of the City of New York
Office of the Speaker
City Hall
New York, NY 10007

SUBJECT: Comments on Oversight - Gas Drilling in the NYC Watershed, Part II

FROM: Croton Watershed Clean Water Coalition
PO Box 484, Bedford, NY 10506
Email: crotonwshed@aol.com
Tel.: 914-234-6470; Fax: 914-234-6139

DATE: Friday, December 12, 2008

Thank you for the opportunity to comment on the October 6, 2008 Draft Scope for dSGEIS on the Oil, Gas and Solution Mining Regulatory Program.

In today's world of high energy costs, the need to get free from overdependency on foreign oil, and a new technology developing, renewed attention has been focused on extracting natural gas from the Marcellus Shale formation that covers an area from Ohio to West Virginia, north through Pennsylvania and into New York State from the Catskills to Lake Erie.

This advanced technology of high-volume hydraulic fracturing is a process that was developed by Halliburton (of which Vice President Dick Cheney was a former CEO) specifically for the extraction of natural gas, and once in use it will have profound impacts on people's lives, the land we live on, the water we drink, the air we breathe, and the vegetation and wildlife that all play a part in keeping the balance in a healthy environment. In anticipation of new wealth there has been an Upstate land rush to contract leases from landowners and farmers.

"The first wells in New York, which have the required state permits, are already being drilled, and the process could play out over 40 years." [New York Times, June 29, 2008, "Gas Drillers in Race for Hearts and Land", Peter Applebome] The permits for this drilling were acquired under the New York state Department of Environmental Conservation; its Generic Environmental Impact Statement was finalized in 1992. Since then horizontal drilling has been more highly developed and together with rising energy prices makes it attractive to energy companies to implement.

The horizontal drilling and hydraulic fracturing employed uses millions of gallons of water that will be chemically treated to crack the shale formations thousands of feet underground to release the gas contained there. There is a belated though growing environmental awareness of the possible harmful effects of this drilling, especially if it is allowed within the areas of Upstate reservoirs and the New York City watershed: polluted air and water, industrial impact and noise, possible well blowouts, and toxic chemicals leaching into the water.

In July 2008 New York State Governor David A. Paterson signed a measure in regard to energy production in New York State that included allowing additional gas wells and the use of intensive horizontal drilling. At the same time he ordered the State Department of Environmental Conservation agency "to come up with a tougher generic environmental impact statement that addresses the water-intense drilling known as hydrofracking." [New York Times, July 27, 2008, "The Light Is Green, and Yellow, on Drilling", Peter Applebome] It is interesting that on Page 14 of the October 6, 2008 dSGEIS, Paragraph 2.1.4 it states: "Drilling of multiple wells from common pads is anticipated for Marcellus Shale development, and is viewed favorably because it reduces the number of long-term production sites...."

In the meantime drilling applications will undergo an ad hoc review that supposedly will include environmental concerns about the massive amounts of water needed in the extraction process, where the water will be taken from, how it will be chemically treated, how it will be stored, handled and disposed of, and where it will be disposed of and how water supplies will be protected from contamination. At the same time, one should remember that New York now has only 19 environmental conservation officials to inspect state wells which over the next twenty years could number in the thousands in Upstate New York.

Governor Paterson's initial order to the State Department of Environmental Conservation was in the right direction, though did not go far enough in regard to Upstate reservoirs and the New York City Watershed where gas drilling should be outright banned. The implications are far greater than most people realize. Among other factors, gas drilling in the watershed cannot be done "without imperiling the federal waiver that has allowed New York to avoid building a filtration plant that would cost \$10 billion to \$12 billion[.]" [New York Times, August 10, 2008, "Putting Water Ahead of Natural Gas", Peter Applebome] It is bad enough that the NYCDEP did not keep developers at bay in the New York City watershed which resulted in the Memorandum of Agreement of 1997 and the building of a massive chemical filtration plant in Van Cortlandt Park in the Bronx using outdated DAF technology instead of membrane filtration and the cost already over \$3 billion.

In a 2004 study the Environmental Protection Agency claimed that the high-volume hydraulic fracturing process did not pose any risk to drinking water. However, an investigation "shows that the body of the study contains damaging information that wasn't mentioned in the conclusion. In fact, the study foreshadowed many of the problems now being reported across the country." ["Industry and EPA Collaborated to Hide the Truth about How Natural Gas Drilling Is Threatening Drinking Water" by Brahm Lustgarten, ProPublica, posted November 20, 2008]

Also, "documents obtained by ProPublica show that the EPA negotiated directly with the gas industry before finalizing those conclusions, and then ignored evidence that 'fracking might cause exactly the kind of water problems now being recorded in drilling states.'

"Buried deep within the 424-page report are statements explaining that fluids migrated unpredictably – through different rock layers and to greater distances than previously thought - in as many as half the cases studied in the United States. The EPA identified some of the chemicals as biocides and lubricants that 'can cause kidney, liver, heart, blood, and brain damage through prolonged or repeated exposure.' It found that as much as a third of injected fluids, benzene in particular, remains in the ground after drilling and is 'likely to be transported by groundwater.'"

This is in direct contrast to what is stated on Page 10 of the October 6, 2008 dSGEIS,

Paragraph 2.1.2 which states that "the injected fluid does not come into contact with groundwater; it is, in fact, injected into and recovered through a wellbore that has been specifically constructed to safely convey hydrocarbons under pressure to the surface without negatively impacting fresh water aquifers."

Reports from various states also reveal a different picture. In July 2008 a water well in Bulette County, Wyoming was found to contain "benzene, a chemical believed to cause aplastic anemia and leukemia, in a concentration 1,500 times the level safe for people."

It was documented by the U.S. Bureau of Land Management. "But more than 1,000 other cases of contamination have been documented by courts and state and local governments in Colorado, New Mexico, Alabama, Ohio and Pennsylvania. In one case, a house exploded after hydraulic fracturing created underground passageways and methane seeped into the residential water supply. In other cases, the contamination occurred not from actual drilling below ground, but on the surface, where accidental spills and leaky tanks, trucks and waste pits allowed benzene and other chemicals to leach into streams, springs and water wells." ["Industry and EPA Collaborated to Hide the Truth about How Natural Gas Drilling Is Threatening Drinking Water: by Abrahm Lustgarten, ProPublica, posted November 20, 2008]

So it does not mean very much when on Page 10 of the October 6, 2008 dSGEIS, Paragraph 2.1.2 it states: "The Department has no record of any documented instance of groundwater contamination caused by hydraulic fracturing for gas well development in New York, ..." Agencies in other states also did not have records of such instances until patterns started developing of water contamination or physical ailments, and the only new factor was the hydraulic fracturing in a particular area. The exact chemical composition of the fluids used in the hydraulic fracturing is a closely guarded trade secret of Halliburton. A vice president of Chesapeake Energy, the largest gas driller in the country, compares it to Coke protecting its formula. When people have become seriously ill Halliburton has had to disclose certain information in some very specific circumstances, though not to the general public.

It is interesting that the EPA began its study on hydraulic fracturing in 2000 by order of an Alabama court that "forced the agency to investigate fracturing-related water contamination there under the Safe Drinking Water Act. While the EPA was still working on its report, legislation was being recrafted to exempt hydraulic fracturing from the Safe Drinking Water Act." ["Industry and EPA Collaborated to Hide the Truth about How Natural Gas Drilling Is threatening Drinking Water" by Abrahm Lustgarten, ProPublica, posted November 20, 2008]

The ProPublica report goes on to say that a few months after the EPA released its report, the 2005 Energy Policy Act was passed which contained "three paragraphs that stripped the federal government of most of its authority to monitor and regulate hydraulic fracturing's impact on the environment. By default, that responsibility would now fall to the states."

As stated on Page 28 of the October 6, 2008 dSGEIS, Paragraph 4.2.2.1: "The federal Energy Policy Act of 2005 amended the UIC (EPA-Underground Injection Control) provision of the Safe Drinking Water Act to exclude hydraulic fracturing from the definition of 'underground injection'. The objective of the federal UIC program is to protect underground sources of drinking water from contamination by underground injection of hazardous and non-hazardous fluids. However, protection of groundwater resources during oil and gas extraction activities is a responsibility of state government."

Which brings us back to Governor Paterson's and the New York State Legislature's actions which did not go far enough in ordering the State Department of Environmental

Conservation to develop a tougher generic environmental impact statement addressing the high water usage of hydrofracking drilling because it left the Upstate reservoirs and the New York City watershed vulnerable. In this regard we join the position of other environmental groups, including the Sierra Club, the Natural Resources Defense Council (NRDC) and Riverkeeper, and ask that Governor Paterson put a permanent ban on gas drilling activity in the areas of the Upstate reservoirs and the New York City watershed.

Also, in areas where it is allowed, there should be close monitoring and regular testing of water quality as the work progresses.

Respectfully submitted,
Maya Z. Homics
Maya Z. Homics
CWCWC Director

December 12, 2008

To: James Gennaro, New York City Councilman

From: Keith LaPan
97 Second Avenue, #10
New York, NY 10003
krlapan@nyc.rr.com

RE: Natural Gas Development in the Upper Delaware Region

Thank you Councilman Gennaro, for your attention to this vitally important issue.

As a resident of New York City and a part-time resident and property owner in NE Pennsylvania, I am very concerned with the fact that the NY State Dept. Environmental Conservation Draft Scope is not being followed by a second Draft Scope and another public comment period and more hearings. It is imperative that the public is heard from on this vitally important health and environmental issue. I urge everyone to write to the DEC commissioners seeking an additional public comment period and a revision of a seriously flawed draft scope.

Recent experience in other areas of the country shows that the new technologies being employed in natural gas drilling, specifically hydraulic fracturing, which injects a slurry of toxic chemicals deep into the shale layer, present new hazards that have not been adequately reviewed or studied. Has anyone from the DEC visited these areas where wells have been contaminated by deep drilling; where surface and ground waters are at risk, where methane is leaching into water wells and in one case, filled one family's home with toxic gas until it exploded?

Once this genie is out of the bottle, it will not easily be put back.

Advocates say that natural gas is a clean burning fuel. That may be true, but the extraction process results in air, water and noise pollution where people live, work and go to school.

Water will be the most sought after resource the world over, later in the 21st century. No resource is more important than water; any technology that could result in the diminution of the quantity or quality of this precious resource should meet a skeptical response from policy makers and be subject to the most stringent regulation. And yet we find out the gas industry is not subject to any regulation. We cannot count on the industry to regulate itself. It has only one motive - profit.

We expect nothing less than the most thorough Environmental Impact Study be made in NY, resulting in regulations that protect the health of our citizens and resources of our state. Anything less will be a violation of the trust that the public has put in its elected and appointed officials.

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: GRACE VAN HULSTEN

Address: 364 NEW TURNPIKE RD, COHECTON, NY

I represent: CATSKILL CITIZENS FOR SAFE ENERGY

Address: CALICOON CENTER C/O FERGUSON, B.

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: Rita Shore

Address: 37 1/2 St Marks Pl

I represent: SSA

Address: _____

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

Name: ALBERT APOLLEON (PLEASE PRINT)

Address: 1619 3rd Ave - 15A

I represent: _____

Address: _____

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

Name: Joe Fishman (PLEASE PRINT)

Address: 395 RSD NYC 10023

I represent: Sletta Club

Address: _____

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 12/12/08

(PLEASE PRINT)

Name: Carl Arnold

Address: 156 Prospect Park West, B'ham 11215

represent: Green Party, CDOG (Chenango, Delaware)

ee: Otsego against Gas

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 12/12/08

(PLEASE PRINT)

Name: Joy Garland

Address: 440 E. 20 ST.

I represent: myself

Address: 440 E. 20 ST. 7F NYC 10009

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 12-12-08

(PLEASE PRINT)

Name: Deborah Goldberg

Address: 8 116 John St. #B100 NYC

I represent: Earthjustice

Address: same

▶ Please complete this card and return to the Sergeant-at-Arms ◀

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 12/12/08

(PLEASE PRINT)

Name: BARBARA ARNOLD

Address: 109 Marcellus Rd, Beachlake, PA

I represent: DAMASCUS Citizens for Sustainability

Address: DamascusCitizens.org

▶ Please complete this card and return to the Sergeant-at-Arms ◀

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Katrinka Moore

Address: 139 Fulton #909 NYC 10038

I represent: _____

Address: _____

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 12/12/88

(PLEASE PRINT)

Name: Larry Fuchsman

Address: 26 East 22nd St

I represent: _____

Address: _____

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. GAS DRUG Res. No. _____

☐ in favor ☒ in opposition

Date: 12/12/08

(PLEASE PRINT)

Name: JAN LONDON

Address: 23 ORCHARD ST - TEANECK, N.J. 07666

I represent: MYSELF

Address: _____

▶ Please complete this card and return to the Sergeant-at-Arms ◀

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 12/12/08

(PLEASE PRINT)

Name: HEIDI GOGINS

Address: 1576 Crescent Valley Rd
Bovina Ctr NY 13740

I represent: myself + my neighbors

Address: _____

▶ Please complete this card and return to the Sergeant-at-Arms ◀

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition 7

Date: _____

(PLEASE PRINT)

Name: STUART L. ROY

Address: P.O. Box 111

I represent: 100

Address: _____

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: MICHAEL LEON

Address: 710 COOPER SQUARE NYC (1003)

I represent: NY CITIZENS FOR SUSTAINABLE

Address: ENVIRONMENTAL SOLUTIONS STATEMENT

7 DC 5
Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☒ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: JOE LEVINE

Address: 561 BWAY

I represent: DAMASCUS CITIZENS

Address: _____

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: FAT CARULLO

Address: 631 RIVER RD MILANVILLE PA

I represent: DAMASCUS CITIZENS

Address: _____

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____
☐ in favor ☐ in opposition

Date: 12/12/08

(PLEASE PRINT)

Name: MAYA HOMICS

Address: 2787 Webb Ave, Bx NY 10468

I represent: Croton Watershed Clean Water Coalition

Address: PO Box 484, Bedford, NY

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____
☐ in favor ☐ in opposition

Date: 12/12/08

(PLEASE PRINT)

Name: BUCK MOORHEAD

Address: 2 JANE ST NYC 10014

I represent: CITIZENS.

Address: _____

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____
☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Dusty Harwitz

Address: 1436 U St, NW, suite 100, Washington, DC 20009

I represent: Environmental Working Group

Address: _____

▶ Please complete this card and return to the Sergeant-at-Arms ◀

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____
☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Ramsay Adams

Address: P.O. Box 381 Youngsville NY

I represent: Catskill Mountaintooper

Address: _____

▶ Please complete this card and return to the Sergeant-at-Arms ◀

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 12/12/08

(PLEASE PRINT)

Name: Steven W. Lawitts

Address: _____

I represent: Acting Commissioner, NYC DEP

Address: _____

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Langhorne Smith

Address: Albany, NY

I represent: New York State Museum

Address: Albany NY

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____
☐ in favor ☐ in opposition

Date: _____

Name: ERIC GOLDSTEIN (PLEASE PRINT)

Address: _____

I represent: NATURAL RESOURCES DEFENSE COUNCIL

Address: 40 W 20 ST

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____
☐ in favor ☒ in opposition *for drilling*

Date: 12 Dec 08

Name: Kate Marsiglio + Dan Marsiglio (PLEASE PRINT)

Address: 1738 Freer Hollow Rd, Walton, NY 13756

I represent: Stony Creek Farm, Delaware County

Address: Same

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____
☐ in favor ☐ in opposition

Date: _____

Name: Joel Kupferman (PLEASE PRINT)

Address: 351 Broadway

I represent: NY ENV. LAW & JUSTICE PROJ.

Address: 351 Broadway

▶ Please complete this card and return to the Sergeant-at-Arms ◀

**THE COUNCIL
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____
☐ in favor ☐ in opposition

Date: 12-12-08

Name: Arnold M. Froese (PLEASE PRINT)

Address: 340 West 28th St., #21J NYC 10001

I represent: Sierra Club, Atlantic Chap. Grp. NYC

Address: 40 Exchange Pl., NYC #2010

▶ Please complete this card and return to the Sergeant-at-Arms ◀