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December 22, 2009

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

Re: Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program (dated 9/30/2009)

To Whom It May Concern:

The City of New York (City) submits the following comments on the New York State Department of Environmental Conservation's (DEC) September 30, 2009 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.[1]

Overview

The City appreciates the opportunity to comment on DEC's plan to permit the development of natural gas in the Marcellus Shale formation, and the potential economic opportunity that this represents for the State. As promising as that opportunity may be, however, the City has concluded that based on the latest science and available technology, as well as the data and analysis presented in the State's dSGEIS, horizontal drilling and high-volume hydraulic fracturing (collectively, "hydro-fracking," or "gas drilling") pose an unacceptable threat to the unfiltered, fresh water supply of nine million New Yorkers, and cannot safely be permitted within the New York City watershed.

As the detailed comments that follow explain, the up to 6,000 wells required to extract natural gas based on current technology, seven million truck trips, one million tons of concentrated chemicals, and millions of gallons of wastewater that are necessities and by-products of current extraction methods, pose a substantial threat to the water supply. Further, the activity is inconsistent with the principles of watershed protection and pollution prevention that are incorporated into its Filtration Avoidance Determination (FAD) under the federal Surface Water Treatment Rule.

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[1] These comments are informed by and incorporate the findings of the attached Final Impact Assessment Report (Report) and the attached Rapid Impact Assessment Report, both of which were undertaken by the City with the assistance of Hazen and Sawyer/Leggette, Brashears and Graham.

Hydro-fracking requires a high-degree of invasive industrial activity, with potential geologic and public health impacts that are not well understood. Given these realities, permitting gas drilling in the watershed would upset the balance between watershed protection and economic activities that the City, DEC, and our upstate partners have worked so hard to establish over the past 15 years.

When lands already owned or controlled by the City and State are taken into account, only six percent of potentially exploitable Marcellus shale is within the New York City watershed. Prohibiting gas drilling of six percent of the available reserves is a more than reasonable price to pay to safeguard the State's greatest natural resource—unfiltered drinking water for nine million state residents.

Background of the City's Filtration Avoidance Determination

The City's position is grounded in data and analysis. But some context is crucial to understanding what is at stake for nine million state residents who rely on the City's water supply. The federal Environmental Protection Agency (EPA) granted the City's first FAD in 1993 and, subsequently, five additional FADs. In 1997, New York City signed a Memorandum of Agreement (MOA) with EPA, various State agencies, 70 watershed municipalities and many environmental organizations to establish a land acquisition program, updated rules, and a set of partnership programs for the watershed's protection. Since that time, the City has since spent or committed approximately $1.5 billion, funded almost exclusively by rate paying customers, on the development and implementation of the watershed protection plan for the Catskills/Delaware watershed (the Cat-Del System).

A key component of these ongoing efforts is the City's Land Acquisition Program. Since its creation, the Land Acquisition Program has protected more than 103,000 acres in the Cat-Del watersheds. When combined with lands protected by the State and other entities, these acquisitions have raised the level of permanently protected land in the Cat-Del System from 24 percent in 1997, to 34 percent today.[2] Together with City-funded acquisitions by the Watershed Agricultural Council (WAC), the program has acquired or is under contract for lands with a value of $354 million.[3]

The New York City Department of Environmental Protection (DEP) also pays taxes on its upstate holdings, including system infrastructure and vacant land. For the current fiscal year, the City's total upstate tax bill is approximately $120 million (that includes properties east of Hudson). And other watershed protection efforts—like septic repairs, stormwater retrofits and stream restorations—result in quality-of-life improvements for watershed residents. Finally, DEP has made significant improvements in allowing recreational uses of City property in the watershed, which have been well received by local communities. The success of these protection efforts has been recognized by both the EPA and the State. A 2006 EPA report, evaluating the

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[2] DEP, Long-Term Land Acquisition Plan 2012 to 2022 (September 30, 2009).

[3] Other key efforts as part of its watershed protection efforts include: upgrading plans that account for more than 98% of the wastewater flow in the Cat-Del System, at a cost of $355 million; spending $147 million since 1993 on the Watershed Agricultural Program (WAP), which aims to reduce pollutants leaving the farm through the implementation of best management practices; and a $60 million economic development fund for the West-of-Hudson watershed to support the economic vitality of the region.

City's performance, concluded that the City had "successfully satisfied the obligations specified in the 2002 FAD."[4]

DEC is a vital partner in these efforts. Through its Office of the New York City Watershed Program, the agency provides regulatory oversight and technical expertise, and administers State funding for watershed projects.[5] Praising the most recent FAD in 2007, DEC recognized that its extension strengthens protections for surrounding lands and reservoirs, and demonstrates a "tremendous fiduciary responsibility to the taxpayers."[6] That is because continuing to safeguard the watershed at its source will ensure the continued high quality of the water supply and save the minimum of $10 billion that would be required to build a filtration plant for Cat-Del water, and $100 million per year needed to operate it, if the FAD is ever discontinued or revoked.[7] That result is unacceptable because it is entirely unnecessary, and within the State's power to stop. The analysis that follows shows why hydro-fracking and horizontal drilling cannot safely be conducted in the watershed.

Analysis of the State's Gas-Drilling Proposal

The City's 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. DEP is responsible for overseeing the operation, maintenance and management of the water supply, its 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 more than 90% of the City's drinking water. As noted above, the West-of-Hudson watershed supplies water of such high quality that the water does not require filtration.

Based on extensive analysis of the potential impacts of natural gas extraction, hydraulic fracturing threatens the water supply and the FAD in three principal ways:

1. Current extraction methods require a high degree of invasive industrialization that carries inherent short-term and cumulative environmental risks.

2. The chemicals currently used as part of the extraction process, and the significant volumes of wastewater produced can contaminate water supplies.

3. In their current anticipated form, the hydraulic fracturing process could damage water supply infrastructure located within and outside the New York City watershed.

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[4] EPA Region 2, Report on the City of New York's Progress in Implementing the Watershed Protection Program, and Complying with the Filtration Avoidance Determination (August 21, 2006), at 2, available at http://www.epa.gov/region02/water/nycshed/documents/epaeval_august2006.pdf.

[5] DEC's Role In The NYC Watershed, available at http://www.dec.ny.gov/lands/58529.html

[6] Press Release, State Health, Environmental Commissioners Applaud Agreement to Protect NYC Water Supply (July 30, 2007), available at http://www.dec.ny.gov/press/36767.html.

[7] The impacts of chemical contamination and other risks are, of course, environmental. However, the potential economic consequences of those environmental impacts are orders of magnitude greater than in other contexts.

These threats and other adverse impacts, including many known and emerging risks of hydraulic fracturing, are not adequately addressed (if at all) in the dSGEIS. Moreover, the dSGEIS does not fully analyze a range of reasonable alternatives to hydro-fracturing and horizontal drilling, and does not sufficiently mitigate known risks. The duty of the State is to take a hard look at the adverse environmental impacts of the action. A new SGEIS is required to adequately address the significant environmental impacts that would occur from the action, both at the local level and from a cumulative perspective. Site-specific environmental reviews to address the many discretionary elements of subsequent permit applications are also required.

We respectfully disagree with a fundamental assumption underlying many of the conclusions in the dSGEIS – that the combined technologies of horizontal drilling and high volume hydraulic fracturing are in large part similar to activities that have been conducted in New York State for decades. Rather, the extent and intensity of natural gas development that these new technologies make possible, together with the large volumes of water required, wastewater produced and associated industrial activities, raise serious concerns about a host of issues and potential impacts that was not previously anticipated or addressed in the 1992 Generic Environmental Impact Statement (GEIS) or in any existing regulatory program. Indeed, new information about spills from conventional gas wells in New York that have been unremediated calls into question the adequacy of the minimal requirements of the existing regulatory program to manage conventional pathways of harm and whether the scope of the dSGEIS has to be expanded to cover those issues.

If, notwithstanding the City's objections, DEC continues to pursue a plan to permit hydro-fracturing and/or horizontal drilling in the watershed, the current dSGEIS must be rescinded and these significant omissions and deficiencies must be addressed. The available knowledge of fractures in the watershed, seepages into DEP tunnels during construction, instances of contamination in other jurisdictions, and the sheer magnitude of truck trips, chemicals, and construction in the Watershed – much of it ignored in the dSGEIS – demonstrates that risks must be disclosed, analyzed, and mitigated on at least a site-specific basis for each well drilled.

The City's most serious concerns are summarized below:

Industrialization and the City's Filtration Avoidance Determination

The dSGEIS finds that "the possibility of high-volume hydraulic fracturing presents no realistic threat to the Filtration Avoidance Determination." This is simply not the case. The proposed action constitutes a significant and unacceptable threat to the FAD, and the integrity of the City's unfiltered water supply system.

The dSGEIS' erroneous finding is based, among other factors, on "New York City's control of a substantial amount of acreage surrounding the reservoirs through fee ownership or conservation easements ...." (dSGEIS, p. 7-63) In fact, DEP owns or has conservation easements on only 13% of watershed lands. Combined with the 21% of watershed lands protected by the State or other entities, a total of 34% of watershed land can be characterized as "protected" from natural gas drilling, though it should be noted that these areas are still subject to compulsory integration into a spacing unit under State law. According to our estimates, this would still allow 3,000 to 6,000 natural gas wells in the NYC watershed (see discussion under

Cumulative Impacts). The potential for this level of natural gas development under the terms and conditions presented in the dSGEIS can reasonably be anticipated to compromise the City's ability to comply with water quality regulations, and public confidence in our ability to adequately protect the water supply.

In the event that the FAD were revoked because of the impacts of natural gas exploration in the Catskill-Delaware watershed, the City would be required to construct a water filtration facility with a current estimated cost of $10 billion to build and $100 million per year to operate. This translates to a significant increase in the price of water and sewer service currently paid by NYC consumers. Additionally, the City expects that the current filtration plant design would be inadequate to remove the chemicals that are likely to be introduced into the watershed as a result of natural gas drilling activities. Additional technology such as advanced oxidation, granular activated carbon adsorption, and/or membrane filtration processes would likely be necessary. All of these advanced processes are significantly more expensive than those included in the current design. It is also important to note that it would take 10 years or more for the City to design and build a plant in the West-of-Hudson watershed capable of filtering the contaminants that would be introduced by hydraulic fracturing.

At a minimum, any regulatory framework for gas exploration, drilling, and development must protect against risks to public health and the environment. An appropriate regulatory framework would have to identify and address the remaining risks, such as the costs to build and operate the filtration plant in the event that drilling caused or contributed to the revocation of the City's Filtration Avoidance Determination. Failure to ensure that DEC's program to regulate and oversee natural gas production fully accounts for the potential costs of drilling in the City's watershed would impose a massive unfunded mandate on the City and its water rate payers, who are already bearing the cost of several billion-dollar projects that are driven by such mandates. In recognition of this growing problem, Governor Paterson recently stated in Executive Order 17 that "the fiscal impact of any legislative or regulatory proposal that imposes a mandate should be evaluated to the fullest extent possible to consider the cost to local governments." The significant potential costs of allowing drilling in the watershed cannot simply be passed on to New York City, and must not be ignored as this process moves forward. Yet the dSGEIS does not discuss or anticipate any regulatory, fiscal, or legal mechanism to make NYC whole should it suffer harm to its drinking water system or to the Filtration Avoidance Determination.

Cumulative Impacts of Gas Drilling in the Watershed

The City concurs with NYSDEC's premise that the "...level of impact on a regional basis will be determined by the amount of development and the rate at which it occurs." (dSGEIS, p. 6-143) (emphasis added) However, the dSGEIS does not adequately evaluate cumulative impacts, as SEQRA clearly requires. Specifically, the dSGEIS does not rigorously evaluate the cumulative impacts of horizontal drilling and high-volume hydraulic fracturing under a reasonable worst-case development scenario, nor does it evaluate the extent to which the proposed mitigation measures address those impacts.

The City's expert analysis shows that at the rates and densities of natural gas well development recorded in comparable formations, 3,000 to 6,000 wells could be drilled in the NYC watershed, with annual well completion rates on the order of 100 to 500 wells per year in peak years. Delivery of the equipment, chemicals and water needed for well development will

require many hundreds of truck trips per well, as will removal of equipment and hauling of flowback water. The proposed action will generate millions of truck trips, thousands of acres of site clearing and grading, millions of tons of fracking chemicals, and millions of tons of waste from produced water. Spills of hazardous materials will be inevitable, and can result in significant harm even if they are eventually remediated. As noted above, the track record of spill response and mitigation has been called into question, even without the substantially increased risks associated with the reasonably increased risks associated with the anticipated rate of drilling in the Marcellus shale.

Water Quality

Natural gas drilling has significant potential to adversely impact water quality through a variety of mechanisms, including but not limited to on-site spills, vehicle-related spills, and subsurface migration of contaminants. While we acknowledge that some safeguards are in place or proposed, we firmly believe that the risk to the water supply is significant and unacceptable, even with these safeguards.

Fracking Chemicals

The dSGEIS does not adequately analyze types and quantities of chemicals that will be used, stored and transported within the watershed; such chemicals are not well understood in any event. The oft-repeated statistic that fracking fluids comprise only 0.5 to 2 percent chemical additives is a better indication of the enormous water requirements involved in hydrofracturing than it is of the benign nature of the process. Even at 0.5 percent concentration, the additives in fracking fluid are an order of magnitude more concentrated than the dissolved pollutants in raw sewage. At 4 million gallons (mg) per job, a 1 percent concentration of chemical additives represents 160 tons of "chemistry" – much of it hazardous, unknown, and undisclosed.

The dSGEIS disclosure requirements are insufficiently protective of human health and the environment. First and foremost, disclosure is solely to DEC. The dSGEIS concludes that any chemical information disclosed in the permit submitted to DEC would be excluded from public disclosure under the trade secret exemption to the Freedom of Information Law. Without this information, the City, and other regulatory agencies, will be greatly hampered in the ability to conduct surveillance monitoring, protect inspection staff, safely and effectively respond to spills or other emergencies, and ultimately protect the public health of the water supply consumers. The City is ultimately faced with a scenario in which thousands of tons of unknown hazardous chemicals could be introduced into the watershed each year.

Second, the disclosure requirements to DEC are insufficient in that the proposed Environmental Assessment Form (EAF) Addendum requires that drillers would only be required to identify the additives to be used, but not necessarily their composition. This is a crucial distinction since many of the products contain undefined mixtures of chemicals; information about these mixtures would be necessary to effectively monitor these hazardous chemicals in the environment. For nearly one-quarter of the 197 products identified to DEC during the dSGEIS process, complete information on composition was not provided. Further, in addition to the 260 unique chemicals identified in the industry submission, there are "an additional 40 compounds which require further disclosure since many are mixtures." (dSGEIS, p. 5-34) The fact that DEC was unable to elicit complete chemical information from service companies during the environmental review process suggests the significant challenges associated with obtaining

adequate data on chemical composition as fracking proceeds in New York State. It would also be unrealistic to assume that these submitted data cover all the products and chemicals that will be used in the future, and it is currently unclear whether the dSGEIS establishes a requirement for ongoing disclosure of chemical composition data.

Surface Spills

The dSGEIS dismisses the potential for serious adverse impacts to water quality as a result of surface spills. This finding is based on an analysis that is technically flawed and relies on several assumptions which are not at all conservative, such as complete and instantaneous mixing of chemicals and dilution of chemicals with the entire volume of upstream reservoirs (the latter assumption is also physically impossible) and absorption to the soil of all fracking chemicals. When the gross errors in the analysis are corrected, the likelihood of Maximum Contaminant Level (MCL) violations is significantly greater than predicted. Additionally, MCLs are likely to become more stringent as information on the effect of contaminants on public health continues to improve, rendering an assessment based strictly on current MCL levels inadequate.

The analysis ignores a number of spill scenarios that could realistically occur, such as a truckload of raw fracking chemicals or a tanker of flowback/produced water entering a NYC reservoir or headwater stream. Given the enormous volume of chemicals and wastewater that would be transported into and generated within the NYC watershed over a multi-decade development period, such acute spill scenarios merit more serious consideration.

In addition to acute spills, it is reasonable to expect – and data from DEC's own mining program and other states provide evidence – that a chronic level of minor spills will occur. This is an inevitable outcome of a complex mechanized industrial activity occurring hundreds of times per year across the watershed. The dSGEIS does not acknowledge or analyze the impacts from such chronic spills. Moreover, even if mitigated, the cumulative impact of chronic spills will be to compromise public and regulatory confidence in the integrity of NYC's unfiltered water supply.

Subsurface Contaminant Migration

The dSGEIS does not meaningfully consider the possibility of subsurface migration of methane or other gases, fracking fluids, or formation water or brine. The analysis ignores critical data and gives inadequate consideration to the possibility of error and long-term consequences. It focuses on the short-term impacts of hydrofracturing operations without giving due consideration to long-term subsurface changes, and underestimates the likelihood of vertical migration of contaminants. The dSGEIS' conclusion that subsurface migration is not a serious concern appears to be based on the bulk properties of the rock separating the fracking zone from shallow aquifers and DEP tunnels (see dSGEIS App. 11). While the intervening rock layers could in principle provide substantial protection against migration, the pre-existing fractures, and the fractures that will be created through the gas production process, substantially increase hydraulic conductivity by several orders of magnitude as compared with the conductivity of unbroken rock.

An equally disturbing omission is observed in the selective presentation and use of available geologic data. The dSGEIS presents only mapped faults and fails to present or evaluate the significance of hundreds of other brittle structures (e.g., shear zones and linear features) that

indicate fracturing of the underlying bedrock and pathways for hydraulic contamination. The same data source reviewed in the dSGEIS indicates that extensive subsurface fracture systems and known "brittle" geological structures exist that commonly extend over a mile in length, and as far as seven miles in the vicinity of NYC infrastructure. These fracture systems have been demonstrated to transmit fluid and pressure, as evidenced by saline water and methane seeps encountered at grade and in shallow formations near NYC infrastructure during and since its construction.

The dSGEIS also discounts the risks from failure of well casings and grout designed to prevent vertical contamination between layers, despite the well-documented occurrence of such failure in conventional gas and oil wells in New York State and elsewhere.

Contrary to the findings in the dSGEIS, migration of fracking chemicals and/or poor quality formation water into overlying groundwater, watershed streams, reservoirs, and directly into tunnels is a reasonably foreseeable risk. This concern is further substantiated by similar events that have occurred in Pennsylvania over the past few years of drilling in the Marcellus shale and new information about contamination from conventional gas and oil wells in New York State. As the State has learned from its experience with MTBE and other pollutants, once groundwater is contaminated, chemicals are very hard if not impossible to remove.

Wastewater Disposal

The large volume and character of wastewater generated by hydraulic fracturing of horizontal wells is a direct result of the technology under evaluation in the dSGEIS, and raises issues and potential impacts, which are both quantitatively and qualitatively different from considerations addressed in the 1992 GEIS.

The dSGEIS does not provide a thorough evaluation of waste disposal issues, and instead describes existing permitting requirements. The absence of a thorough evaluation of waste disposal issues is a major deficiency in the dSGEIS analysis given the large volumes of concentrated waste streams generated by natural gas development. The elevated chlorides and total dissolved solids (TDS) concentrations (228,000 mg/l and 337,000 mg/l, respectively) documented in Section 5 of the dSGEIS clearly indicate the need for analysis of wastewater impacts.

Pennsylvania's recent experience is instructive. This past year, following water quality impacts in the Monongahela River that resulted from disposal of drilling wastes at municipal wastewater treatment plants, the Pennsylvania Department of Environmental Protection proposed effluent discharge limits of 500 mg/l for TDS. Gas industry technical papers indicate that there are no treatment plants currently in operation in Pennsylvania that can meet this standard. Furthermore, the only established technology that could meet this standard (evaporation/crystallization treatment) would generate 400 tons of salt waste for every 1 million gallons of treated waste.

The analysis of wastewater disposal issues is further deficient because of the absence of an analysis of cumulative impacts. Such an analysis would presumably address the insufficiency of regional waste disposal capacity, and the potential that this lack of capacity coupled with associated high disposal costs could lead to illegal dumping. Clearly, there is a need for a

thorough waste stream analysis in order to fully evaluate potential impacts of the proposed action.

Radioactivity

The City initially raised concerns over naturally occurring radioactive material (NORM) in comments on the draft scope for the SGEIS (letter to DEC dated December 12, 2008) stating: "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." We commend DEC for obtaining Marcellus-specific monitoring data as part of the dSGEIS, but these data raise serious issues for public health, particularly with disposal of both solid waste (i.e., drill cuttings and equipment) and wastewater (flowback and/or produced water). DEC acknowledges in the dSGEIS that more analysis is needed, including an analysis of local capacity to handle the associated waste stream (both solid waste and wastewater). Such an analysis must be completed before any activity that is likely to generate radioactive waste can move forward. Proposing additional testing and evaluation in the future is not sufficiently protective of public health and does not meet the standard for an environmental review of potential impacts, which requires that such impacts be studied and disclosed prior to any decision on the proposed action.

Finally, all of these water quality risks would be heightened if the network of pads, roads, pipelines and other infrastructure induces exploitation of the deeper gas bearing shale layers (the Utica, Oriskany, or Trenton/Black River formations) that underlie the NYC watershed. Yet the dSGEIS does not analyze the likelihood of that induced exploration or its overall cumulative effects.

Water Supply Reliability and Infrastructure Integrity

Cumulative Water Withdrawal Impacts

The dSGEIS analysis does not evaluate the impacts that natural gas water withdrawals may have on pre-existing consumptive uses, despite highlighting withdrawals as a potential impact from natural gas development. As such, the mitigation measures proposed are flawed in that pre-existing consumptive uses are not required to be included in the interim passby flow calculations. The interim passby flow analysis, which is based on an outdated methodology, also lacks specific monitoring and enforcement requirements that would ensure compliance. These withdrawals could have significant impacts on the City's mandated release targets and water supply flexibility, but these impacts are not adequately disclosed or discussed in the dSGEIS.

Additionally, it is not clear that DEC has sufficient regulatory authority to mitigate adverse environmental impacts of cumulative surface water, since it lacks authority over groundwater withdrawals that are not intended for public water supplies. The dSGEIS relies heavily on the protections established by the Susquehanna River Basin Commission (SRBC) and Delaware River Basin Commission (DRBC) in their respective basins, and sidesteps the fact that DEC lacks the authority to regulate withdrawals and effectively mitigate cumulative water withdrawal impacts in the rest of the state, including the Catskill portion of the West-of-Hudson NYC watershed.

Stream/Reservoir Buffers

The setbacks established in the dSGEIS do not prevent drilling in any sensitive areas but instead require a site-specific SEQRA analysis, with no defined mechanism for DEP (or public) review, for a well pad within 300 feet of a reservoir or 150 feet of a stream. These setbacks are wholly insufficient to protect NYC drinking water quality based on the surface and subsurface contamination risks identified previously. First, the setbacks must be measured from the closest point of the natural gas spacing unit (which encompasses the full horizontal extent of well bores) and not just the well pad. As proposed, horizontal wells could be drilling below main tributaries or even the reservoirs themselves. Second, the closest part of spacing units should be excluded within a 1,000-foot buffer of streams and a 2,000-foot buffer around reservoirs. These proposed buffer zones are consistent with the setback distances required for public water supply wells established in the original 1992 GEIS. Surface water supplies deserve equivalent protections.

Infrastructure Integrity / Tunnel Buffer

The dSGEIS ignores numerous subsurface features (discussed previously under Subsurface Contaminant Migration) that could enhance mobility of drilling fluids and formation materials. These same pathways could expose the City water tunnels to elevated external pressures that they are not designed to withstand.

The dSGEIS requires a site-specific SEQRA review for issuance of a permit to drill any well whose location is determined by DEP to be within 1,000 feet of subsurface water supply infrastructure. The 1,000-foot infrastructure setback was developed in connection with vertical geothermal wells and was based on concerns associated with drilling through a City water tunnel. The concerns raised by horizontal drilling and hydraulic fracturing are entirely different for several reasons:

- Horizontal well laterals can extend for over a mile from the actual well pad (the dSGEIS would currently allow fracking to occur underneath a City water tunnel).
- The hydraulic fracturing process is specifically designed to fracture rock, which inevitably intercepts and enhances existing hydraulic pathways, and chemicals from such operations have traveled 7,000 feet or more through natural and induced subsurface fissures.
- The unreinforced linings of the City water tunnels were designed to keep water in, not to withstand external pressures. Fracking raises the distinct possibility that the unreinforced tunnel linings will be exposed to pressures in excess of their design strength. This could occur during fracturing, or it could occur after fracturing, when newly expanded fractures expose tunnel linings to naturally occurring formation pressures.
- Hydraulic fracturing operations adjacent to the naturally occurring fracture systems that intersect City water tunnels will increase the risk of (a) contaminating drinking water with fracking chemicals and poor quality formation water; (b) methane accumulation around and within DEP subsurface infrastructure; and (c) tunnel liner structural failure.
- The impact of repeatedly fracturing and expanding strata of rock underlying thousands of square miles as thoroughly and extensively as economically feasible, and then depressurizing it through the removal of compressed gas, is not addressed. Potential impacts can reasonably be anticipated to include movement at faults and fractures,

alteration of subsurface flow pathways, and vertical migration of gas, liquid and previously contained pressure.

To protect water quality and water supply reliability/infrastructure integrity, natural gas spacing units should be excluded within a buffer zone of at least seven miles from NYC subsurface water supply infrastructure. This distance is based on the lateral extent of known fractures that intersect DEP tunnels.

Failure to Comply with SEQRA

On the merits, gas drilling as proposed cannot safely be done in the watershed. And the omissions and deficiencies described above clearly show that the dSGEIS does not meet the requirements of the Environmental Conservation Law. The City's concerns with the SEQRA process are summarized below.

Segmentation

The dSGEIS has segmented the review of the proposed action by excluding certain critical elements (e.g., waste disposal, cumulative impacts, induced growth, air quality impacts, pipeline construction, and ancillary infrastructure). SEQRA requires that impacts associated with a "whole action" be evaluated and provides tests for segmentation based on timeframe, goals, geography, common planning/ownership, and functional dependence. All of the excluded actions violate one or more of these tests.

Inadequate Analysis

A number of the analyses in the dSGEIS are inadequate or incomplete and therefore do not satisfy SEQRA's requirement to identify all areas of environmental concern, and provide a reasoned elaboration of NYSDEC's conclusions.

Cumulative Impacts – The dSGEIS does not contain a comprehensive cumulative impact analysis. By neglecting to evaluate a reasonable worst-case scenario of natural gas wells in the New York City watershed, the dSGEIS does not adequately evaluate the potential adverse environmental impact from the proposed action. By focusing only on the impacts of single well development the dSGEIS does not fully disclose the potential adverse environmental impacts that could result from the proposed action under the reasonable worst-case scenario.

Induced Growth – The dSGEIS does not evaluate the potential adverse impacts of induced growth due to natural gas development. Induced growth and the resulting development would increase traffic, impervious surface areas, stormwater flows, wastewater flows, and water usage, each of which have the potential to adversely impact the region, especially without careful advance planning and analysis.

Waste Stream – The dSGEIS does not adequately evaluate the waste stream resulting from natural gas development. Many issues remain unaddressed, such as the amount of wastewater generated, treatment and disposal requirements for the wastewater, and the regional capacity for disposal. Given the large quantities of wastewater involved and the potential radioactivity of the waste stream, this must be comprehensively addressed prior to any permitting.

Public Health – The dSGEIS does not sufficiently address public health concerns. A separate impact assessment on public health is warranted given the hazardous chemicals that are proposed for use, the potential radioactivity of the waste products, the rate and scale of the drilling and accompanying activities, and, last but not least, the fact that one of the newly impacted areas supplies high quality drinking water to nearly half the State's population.

Alternatives – The dSGEIS does not address alternatives to natural gas development. Alternatives to hydraulic fracturing and waste disposal are described but not assessed. The alternatives chapter considers only potential economic and energy interests and does not acknowledge the evolving history of contamination in other states, particularly Pennsylvania, where hydraulic fracturing and horizontal drilling have occurred. Given that the potential impact on the NYC water supply was one driving force behind doing a supplemental analysis, consideration of a partial or full prohibition within the watershed would be consistent with the Environmental Conservation Law. Such a prohibition seems to have been dismissed on the basis of economic and energy interests, without a proper consideration of the full array of potential environmental impacts and costs, and without a proper balancing of environmental protection concerns.

State Administrative Procedures Act

The mitigation section of the dSGEIS relies on DEC's commitment to write permits that will impose requirements of general applicability, or requirements that would apply to all drilling applications meeting certain conditions (such as high-volume hydraulic fracturing, multi-well pads, or proximity to natural features), as a basis for its conclusions concerning the lack of impacts from these activities. Such requirements are, however, rules and therefore require promulgation pursuant to the State Administrative Procedures Act. In the absence of binding rules adopted pursuant to SAPA, the dSGEIS' statements concerning DEC's intention to impose any permit conditions are not binding. Accordingly, such statements cannot and do not militate against potential adverse impacts.

Conclusion

Balancing environmental and public health concerns with the need for adequate energy resources and economic development is a complex and challenging issue – not only in New York but throughout the nation. New York City's watershed is a unique resource and deserves special attention and consideration. Even without the benefit of the complete review mandated by SEQRA, it is clear from the technical information in the dSGEIS, and the City's own analysis, that horizontal drilling and hydraulic fracturing – using current extraction methods and based on the latest science – presents an unacceptable risk to the City's water supply, and the FAD.

If a less invasive process, using fully disclosed and better understood agents, is developed to extract natural gas in the future, the City will gladly evaluate whether it is or can be compatible with the control we are required to maintain in the watershed. But the State's proposal to permit hydro-fracking and horizontal drilling does not meet that standard.

Given the serious omissions in the supplemental analysis and the grave consequences of the proposed action, the City strongly urges DEC to rescind the dSGEIS. If DEC chooses to continue the pursuit of a plan to permit gas drilling in the New York City watershed, the deficiencies with the dSGEIS must be addressed, and a revised draft released for public review and comment. We look forward to continuing to work with DEC and NYSDOH on this important issue. If you have any questions please do not hesitate to contact me.

Sincerely,

Steven W. Lawitts

c: The Honorable Pete Grannis, Commissioner, DEC
The Honorable Judith Enck, Regional Administrator, EPA Region 2
The Honorable Richard Daines, Commissioner, New York State Department of Health
Mr. Phil Bein, New York City Watershed Inspector General