Otsego County Soil & Water Conservation District

Comments on 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.

Comments Provided to:

Bureau of Oil & Gas Regulation
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12/16/2011

TABLE OF CONTENTS

Note: the format of the following document is as follows: text taken directly from the dSGEIS in standard font, comments and recommendations are in *italics.*

*no comments offered on Chapter 10

Introduction to Comments:

The Otsego County Soil and Water Conservation District considers the new, high volume hydraulic fracturing process being reviewed here for low permeable formations to be a significant development in the land use of the area under consideration. The process differs in significant ways from what has been experienced in the past in NY and in ways that raise environmental concerns regarding health, water quality, best uses and protection of the ecosystems that provide those best uses.

Following this introduction are the Districts updated comments on the revised Draft Supplemental Generic Environmental Impact Statement (DSGEIS). Our comments reflect changes made since the 2009 draft and remain consistent with comments offered in 2009 in areas where no changes were made.

In order to be thorough, provide comments in regards to specific sections and follow the format of the DSGEIS, some comments and recommendations are offered more than once. This is also true because some recommendations result in the elimination of a series of issues, but were offered in the context of each and because some concerns spanned many sections of the DSGEIS.

To make our comments more concise than those previously offered, they are limited to specific 'recommendations' regarding the chapter and section being reviewed. For an explanation of the underlying rationale for any specific recommendation, please see the corresponding section in the Districts 2009 comments.

One core recommendation that spans the DSGEIS is that the State regard the language in the Environmental Conservation Law (ECL) regarding its responsibilities to protect, conserve and improve the environment and the prevention of water pollution in regards to the handling and transport of solids, liquids and gases to take precedence over language in Article 23 of the ECL providing for greater ultimate recovery of the mineral resources.

One comment often repeated is the incompleteness of the DSGEIS in one regard; that it does not contain descriptions of the environmental impacts meant to be assessed regarding accidental discharge of flowback, fracturing fluid or additives used in the fracturing process to the environment (streams, rivers, lakes, aquifers, wetlands, forests, agricultural fields, etc..) and the consequences for the best uses of those ecosystems.

Our perspective is one that promotes strict regulation and implementation of best management practices (BMP's). This perspective does not allow for wholesale rejection of a proposed activity, but rather emphasizes initial decision making, policy

decisions and the reduction or elimination of potential negative impacts. That is to say, that if the new, high-volume hydraulic fracturing process being reviewed here can be done in a way that better protects our environment through the use of BMP's, SEQRA and strict permitting requirements, then those practices, regulations and requirements ought to be used.

Taking a root cause approach, emphasis is also placed on a few permitting decisions, management practices and concepts that are at the source of many potential environmental impacts and concerns. Some examples of this are the avoidance of environmentally sensitive areas, site specific setbacks with state mandated minimums, the knowledge of the chemical make-up of the additives anticipated to be used in the fracturing fluid and determination of flowback as a hazardous waste.

Given the nature of some of the recommendations made below, it is also recommended that the DSGEIS be revised, rewritten and resubmitted for public comment.

It is hoped that this document will be considered by the New York State Department of Environmental Conservation and others when formulating the final rules meant to protect the States soil and water resources and their best uses.

We believe that adoption of these recommendations would better protect our environment from the potential negative impacts of high volume hydraulic fracturing in the area under consideration.

Any correction, question, comment or concern regarding any of the comments and recommendations made here are welcome.

Respectfully submitted,

Scott Fickbohm
District Manager
Otsego County SWCD

CHAPTER 1 – Introduction

1.1.1.2 Flowback Water Recycling – *recommend that flowback be considered a hazardous material when being transported from site to site.*

1.2 Regulatory Jurisdiction - *recommended that, when weighing the cost and benefits of the new, high-volume hydraulic horizontal fracturing process, that greater weight be given to those costs and benefits associated with the preservation of the environment than those associated with mineral resource exploitation. By extension, it is further recommended that the language found within ECL (found throughout) that pertains to cumulative impact, conservation, improvement, protection, prevention of degradation, enhancement of the states soil and water resources and ecosystems, as well as the promotion and regulation of best management practices and all similar language that serves to protect our environment be seen as superseding and taking priority and precedence in every case over the phrase "to provide for greater ultimate recovery of the [oil and gas] resources" as written in Article 23 of the ECL.*

1.7.3.1 2009 Draft SGEIS - *recommend that first and second order streams not be considered for water withdrawal and that all high volume water withdrawals be limited to the mainstems of regions rivers.*

1.7.9 Flowback Water Disposal – *recommend that waste tracking processes similar to the ones regulating disposal purposes be used in the transport of flowback for recycling purposes.*

1.7.10 Management of Drill Cuttings – *recommend testing for radioactivity and metals be required before allowing on-site disposal or transport to landfill facilities.*

1.7.11 Emissions and Air Quality – *recommend re-evaluation include NOX emission and deposition.*

1.8 Additional Precautionary Measures – *recommend that set-backs be determined on a site specific basis and that the setbacks designated for specific water sources described throughout the SGEIS remain as a minimum for those water sources.*

CHAPTER2 – Description of Proposed Action

2.2 Public Need and Benefit – *recommend adding analysis of expected changes (increases and/or decreases) in municipal expenditures and revenues associated with the proposed activity.*

2.4.1 Water Use Classifications - *It is also recommended that the Upper Susquehanna River, Hudson River, New York City and Great Lakes watersheds be designated as having significant recreational benefit and are significant ecological waters where the quality of the water is critical to maintaining the value for which the waters are distinguished and that the chemical components of fracturing fluid or flowback be designated as 'specified substances' as described in 6 NYCRR 701.24.*

2.4.3 Drinking Water - *It is recommended that each of the chemicals identified as constituents of fracturing fluids or flowback (in whole or in part, and as amended as new information on chemical composition on either is received by the Department or Department of Health), particularly those known to cause health problems, be integrated into the standards for drinking water and determine Maximum Contaminant Levels (MCL) for each.*

2.4.3.1 Federal - *it is recommended that, to the degree that it has not already been done, New York adopt the same strict regulations described in the Safe Drinking Water Act with regard to high volume hydraulic fracturing as well as naturally occurring substances that may be made mobilized during the drilling process.*

2.4.4.1 Primary and Principal Aquifers –*recommended that high-volume hydraulic fracturing within 1,000 feet of primary and primary aquifers be prohibited.*

2.4.5 Private Water Wells and Domestic-Supply Springs -*it is recommended that setbacks be determined in the field at distances that are appropriate to the high volumes of potential contaminating liquids unique to the activities being reviewed here and guarantee the protection and preservation of all private and public water wells, springs, aquatic and terrestrial ecosystems.*

2.4.6 History of Drilling and Hydraulic Fracturing in Water Supply Areas - *It is recommended that statements meant characterize the relative safety or danger inherent in the new high-volume hydraulic horizontal fracturing process being described in the SGEIS be limited to those referencing the process being reviewed; include any surface water incidents (including related spills), improper management of stormwater (such as those reports available from the PADEP) and describe the process/standard for official confirmation.*

2.4.7.1 through 2.4.10 in entirety - *recommended that these sections be re-written to describe their relative fragility or resilience to potential introduction of the chemical additives found in the fracturing fluid and flowback.*

2.4.7.2 Susquehanna River Basin – *recommended that the water quality impact of the anticipated rate of natural gas development in New York's portion of the Chesapeake Bay be analyzed in terms of increases/decreases nitrogen, phosphorus and sediment export from New York into Pennsylvania.*

2.4.9 Floodplains- *recommended that information and training opportunities be provided to local municipal officials regarding local floodplain development law in regards to their permitting authority and relevant issues related to natural gas development in and around floodplains*

2.4.11.2 Population – *recommend population forecasts also include analysis of population increases associated with the anticipated level natural gas development and that environmental impacts (i.e. increased point and non-source discharges) be described relative to water quality in the Susquehanna River watershed and its impact on the goals committed to in the Departments Chesapeake Bay Watershed Implementation Plan.*

2.4.11.4 Government Revenues and Expenditures – *it is recommended that New York State establish a revenue source from the extraction of natural gas for the purpose of funding the anticipated regulatory and non-regulatory activities by both NYSDEC & NYSDOH and local municipalities. Additionally, it is recommended that local municipalities be trained regarding the New York State Department of Taxation and Finance's statewide method of valuing natural-gas-producing properties for real property tax purposes.*

2.4.14 Transportation - Existing Environment – *recommended that the department also include in this section an analysis of transportation increases associated with the anticipated level natural gas development and that environmental impacts of road degradation and repair be described with an emphasis on dirt and gravel roads in proximity to waterbodies.*

2.4.15 Community Character – *recommended that the department also include in this section an analysis of changes in community character associated with the anticipated level natural gas development with an emphasis anticipated changes as they relate to locally stated goals relative to agriculture, open space, rural character and natural resource conservation.*

CHAPTER 3 – Proposed SEQRA Review Process

3.2.1.1 SGEIS Applicability - Definition of High-Volume Hydraulic Fracturing – *recommend that 80,000+ gallons of water be considered the threshold for 'high-volume'.*

3.2.1.2 Project Scope

It is recommended that criteria for determining the location of infrastructure (including feed pipes and pipelines that do not fall under the jurisdiction of the Public Service Commission) supportive of the drilling process be articulated in the SGEIS with an emphasis on hydrology.

3.2.4 Prohibited Locations - *recommended that permits not be issued for:* 1) *any proposed high-volume hydraulic fracturing where the top of the target fracture zone is shallower than 2,000 feet along the entire proposed length of the wellbore; 2) Any proposed high-volume hydraulic fracturing where the top of the target fracture zone at any point along the entire proposed length of the wellbore is less than 1,000 feet below the base of a known fresh water supply; 3) Any proposed well pad within 4,000 feet of a municipal reservoir or reservoir tributary; 4) Any proposed well pad within 500 feet of a perennial or intermittent stream; 5) Any proposed surface water withdrawal from any source other than the main-stem of the regions rivers; 6) Any proposed groundwater withdrawal 7) Any proposed well pad within 2,000 feet of municipal water supply; 8) Any proposed well pad where topography exceeds a 8% slope; 9) any well pad that does not utilize horizontal, multiple well technique; 10) any proposed well pad located over within a principal or primary aquifer 13) any proposed well within a State or Federally protected wetland and; 14) any proposed well pad where NORM levels are found to be higher than drinking water standards 15) any proposed operation that does not use site specific setbacks from water resources and 16) any pad located within a Forest or Grassland Focus Area.*

CHAPTER 4 – Geology

4.6 Naturally Occurring Radioactive Materials (NORM) in Marcellus Shale - *recommended that the assumptions made and conclusions drawn in the SGEIS concerning NORM levels and regulatory requirements regarding disposal of flowback liquid and drilling muds be re-evaluated and updated as new information is made available.*

4.7 Naturally-Occurring Methane in New York State – *recommend providing references and citations for the inference that concentrations of naturally occurring methane can vary with Seasons, variations in recharge, stress on the aquifer from usage demand, and mechanical failures.*

CHAPTER 5 - Natural Gas Development Activities & High-Volume Hydraulic Fracturing

Chapter 5 NATURAL GAS DEVELOPMENT ACTIVITIES & HIGH-VOLUME HYDRAULIC FRACTURING – *recommend listing the use of high volume horizontal hydraulic fracturing among technological milestones.*

5.1 Land Disturbance – *recommend including analysis of land disturbance associated with the anticipated level natural gas development and that the environmental impacts of land conversion from forest and agriculture to industrial be described.*

5.1.1 Access Roads - *recommended that any sediment and erosion control activity associated with the construction of high-volume hydraulic horizontal fracturing facilities be designed and implemented by engineers and contractors who have been certified in the Departments 4-hour course on sediment and erosion control measures. To ensure compliance, it is also recommended that Department staff review stormwater pollution prevention plans (SWPPP) and inspect SWPPP implementation when making routine visit. It is also recommended that access roads be required to make use of existing roads on a property, that farmers be consulted in the placement of new roads and that access roads avoid disturbing environmentally sensitive areas such as protected streams, wetlands, or steep slopes.*

5.1.2 Well Pads – *recommended that well pad construction be required to include spill prevention and mitigation best management practices and that well pads be designed and constructed by engineers and contractors who have been certified in the Departments 4-hour course on sediment and erosion control measures.*

5.1.4.2 Anticipated Well Pad Density - *recommended that all permitted drilling activities for Marcellus and Utica shale be restricted to those proposing the multiple wells from a single pad technique and that no variances from the 640 acres spacing unit be offered.*

5.2.4.2 Naturally Occurring Radioactive Materials in Marcellus Cuttings - *recommended that the Department require field surveys using portable Geiger counters prior to allowing any particular disposal method and that the conclusion drawn in the dSGEIS regarding NORM levels as equal to background levels be re-evaluated and updated as new information is made available.*

5.2.5 Management of Drilling Fluids and Cuttings & 5.2.5.2 Closed-Loop Tank Systems - *recommended that the closed-loop system recommended as a best management practice and be a requirement of the Department for the management of drilling muds and cuttings.*

5.4.3.1 Chemical Categories and Health Information -*recommended that the State develop health information and compound-specific toxicity data on all chemicals being proposed in fracturing fluid.*

5.5.2 New York State DOT Transportation Regulations - *recommended that local emergency response officials be given prior notice of when hazardous material will be being transported within their municipal boundaries, that they be given the proper training on how best to respond to accidental spills (that covers the array of chemicals currently known to be involved) and that the development of standard protocol be undertaken that outlines who is involved in emergency response (from the driver to the clean up crew) along with phone numbers and the responsibility of each party.*

5.6 On-Site Storage and Handling of Hydraulic Fracturing Additives - *recommended that Department staff are on-site during the fracturing process to insure that any accidental spill or discharge of chemical additives is dealt with in the quickest manner possible, guarantee Department knowledge of the incident (and by extension, public knowledge) and proper recording. It is also recommended that the best management practices observed in PA (and additional similar practices) be required by New York State for the storage and handling of chemicals used during the fracturing process.*

5.6.1 Summary of Additive Container Types - *recommended that PBS and CBS requirements be made applicable to all non-stationary tanks, barrels, drums or other vessels that store 1000-Kg of additive, all dry chemical additives regardless of packaging, that all such containers and packages be registered with the State, and that inventory records be maintained on all such containers and packages. It is further recommended that approved mitigative steps resulting in the recovery of spilled material be described and required in the SGEIS and that all spills, regardless of secondary containment and recovery, be reported to the state, that the mitigative steps taken be provided in that reporting and that Department staff perform site visits to verify such actions.*

5.7 Source Water for High-Volume Hydraulic Fracturing - *recommended that all permitted drilling activities that require water withdrawal from surface waters, be limited to the mainstem of the regions major rivers, that pre-treatment additives receive the same consideration in the SGEIS as chemicals used in fracturing fluids, that the SGEIS describe pretreatment procedures and disclose composition (and concentration) of chemicals used.*

5.7.2 Use of Centralized Impoundments for Fresh Water Storage – *recommend that delivery and explanation of the Departments 2009 Dam Safety Regulations to the impoundment owner be required.*

5.8 Hydraulic Fracturing Design – *recommend that monitoring the extent and orientation of fractures during fracturing process using microseismic fracture mapping, tilt measurements, tracers or proppant tagging be required and that evaluation of results through a comparison of production pressure and flow-rate analysis to prefracture modeling also be required.*

5.8.1 Fracture Development & 5.8.2 Methods for Limiting Fracture Growth - *recommended that any proposed high-volume hydraulic fracturing where the top of the*

target fracture zone is shallower than 2,000 feet along the entire proposed length of the wellbore and any proposed high-volume hydraulic fracturing where the top of the target fracture zone at any point along the entire proposed length of the wellbore is less than 1,000 feet below the base of a known fresh water supply not be permitted.

5.9 Hydraulic Fracturing Procedure - *it is recommended that Department staff be required to be on-site when casings are being poured, inspect surface casings for imperfections before allowing installation of production casings and inspect and certify the proper installation of all casing before allowing frilling operations to continue.*

5.10 Re-fracturing - *it is recommended that identical standards relative to environmental safety for initial well development be applied to future re-fracturing. If there are departures from the fracturing process described in the dSGEIS, it is recommended that the SGEIS provide a full account of those differences (including chemicals used) as well as a description of any new potential environmental impacts.*

5.11.1 Flowback Water Recovery – *recommend analysis on how low flowback recovery (<35%) differs significantly from deep well injection as a waste disposal method.*

5.11.3 Flowback Water Characteristics – *recommend that the Department increase the number of analyses of flowback from in-state and out-of-state operations, with corresponding complete compositional information on the fracturing additives that were used at the source wells, oversee sample collection and analysis efforts including the integration of methodologies capable of detecting fracturing fluid components. Further, it is recommended that the Department develop and make public standard protocols for sample collection and analysis.*

5.11.3.1 Temporal Trends in Flowback Water Composition – *recommend that this section describe the time interval in which changes were observed and the percent change for each parameter measured and that a description of where flowback will be in the 'process' relative to the time interval in which changes in composition were observed also be included. Further, it is recommended that the Department increase the amount of research into temporal changes in flowback composition.*

5.11.3.2 NORM in Flowback Water - *recommend this section describe the results relative to ambient concentrations found in well and surface waters within proximity of the well producing the flowback and that the Department increase the number of analyses of NORM in flowback from in-state and out-of-state operations.*

5.12 Flowback Water Treatment, Recycling and Reuse through 5.12.4 Comparison of Potential On-Site Treatment Technologies - *recommended that the SGEIS contain the chemical composition of all additives, compounds and solutions used in treatment of flowback liquid and environmental assessments be developed for those chemicals.*

5.13.1 Cuttings from Mud Drilling - *recommend testing for radioactivity and metals be required before allowing on-site disposal or transport to landfill facilities.*

5.13.3 Flowback Water – *recommend State Pollutant Discharge Elimination System (SPDES) permit requirement for every high volume well given volume of flowback not recovered; recommend use of production brine for dust control and de-icing only be allowed after chemical analysis.*

5.13.3.1 Injection Wells – *recommend that discussion be provided that describes rationale for viewing injection wells as different from the low recovery rate of the drilling process described here.*

5.13.3 Flowback Water through 5.13.4 Solid Residuals from Flowback Water Treatment - *recommended that all flowback be considered hazardous material by the State and that disposal and transportation be based on the regulations that govern the handling of material under this classification.*

5.16.1 Partial Site Reclamation – *recommend that implementation of NYS Department of Agriculture and Markets guidelines on site reclamation be required for operations on active farms.*

5.16.6 Brine Disposal & 5.16.7 Naturally Occurring Radioactive Materials in Marcellus Production Brine - *recommend use of production brine for dust control and de-icing only be allowed after chemical analysis is performed and that chemical monitoring take place at a reasonable interval.*

5.16.8 Gas Gathering and Compression & 5.16.8.1 Regulation of Gas Gathering and Pipeline Systems - *recommended that Siting of gas gathering and pipeline systems, including the centralized compressor stations be SEQRA review*; *the SGEIS contain a full description of the potential environmental impacts relative to the long term placement of pipelines throughout the landscape. It is further recommended that, where pipeline infrastructure fall below the requirements established in the PSL for regulation by the PSC, that DEC develop and describe regulations regarding the siting, construction and maintenance of such pipeline infrastructure and its environmental impact in the SGEIS.*

5.17 Well Plugging - *recommended that Department staff inspect plugged wells on an annual basis to ensure proper function.*

CHAPTER 6 – Potential Environmental Impacts

6.1 Water Resources - *recommended that the SGEIS consider potential groundwater contamination from the hydraulic displacement during the fracturing procedure when implemented at shallow depths as a possible adverse impact and consider that all the impacts listed could differ from well pad to well pad depending on chemicals used, their interaction with the target formation (which will also be different between formations), the temporal changes in flowback composition and the heterogeneity of the underlying geology across the landscape and that this preclude the conclusion of generic impacts.*

6.1.1 Water Withdrawals – *recommend that the Department consider seasonal and long-term precipitation rates as the dominant factor influencing the negative environmental impact of water withdrawals and as a factor independent of 'proper control'; recommend that surface water withdrawals be permitted only from the mainstem of regions major rivers.*

6.1.1.6 Aquifer Depletion & 6.1.1.7 Cumulative Water Withdrawal Impacts - *recommend that the Department work with SRBC and amend the Departments requirements to limit surface water withdrawals for high-volume hydraulic fracturing to the regions major river systems*.

6.1.3.1 Surface Spills and Releases at the Well Pad through 6.1.3.3 Flowback Water and Production Brine - *recommended that the SGEIS contain the impacts that can be expected by the potential introduction of surface spills and releases to the environment of concentrated forms of the chemicals to be used in the fracturing fluid, the fracturing fluid itself, petroleum fuel and flowback liquid on lakes, rivers, streams, creeks, wetlands, agricultural fields, forested ecosystems and organisms that are necessary for, and dependent on, the best uses of those waterbodies. Further, recommend that NYSDOS consider the quantitative differences between the actions proposed here and those described in the 1992GEIS (high volume) as significant and reason for re-evaluation.*

6.1.3.4 Potential Impacts to Primary and Principal Aquifers – *recommended that descriptions of the environmental impacts of potential spills or discharges of the chemicals intended for use in the fracturing process (either in concentrated or dilute form, to the degree they are known), flowback liquids and brine (to the degree that it is known), associated nutrients or any of the other chemicals that are anticipated to be on-site (including diesel fuel or chemicals related to the on-site treatment process) to primary and principal aquifers and highly vulnerable areas as defined by the Department's Division of Water Technical & Operational Guidance Series be described in the SGEIS and that high-volume hydraulic fracturing not be permitted above these areas.*

6.1.4 Groundwater Impacts Associated With Well Drilling and Construction - *recommended that the SGEIS contain information on the impacts to groundwater and dependent natural ecosystems from turbidity, the potential introduction of harmful, yet*

naturally occurring substances and those potentially introduced as part of the high-volume hydraulic fracturing process (as described above).

6.1.5.3 Adverse Impacts to Unfiltered Drinking Waters from High-Volume Hydraulic Fracturing – *recommend the Department review the environmental concerns described here in the context of the Susquehanna River watershed and New York's participation in the Chesapeake Bay Program. Recommended that the Department describe the implications of natural gas development within the Susquehanna watershed on successful implementation of its Chesapeake Bay Watershed Implementation Plan (i.e. reduction of nitrogen, phosphorus and sediment). Further, it is recommended that the Department work with EPA to account for and properly assign allocation of potential increases in export of nitrogen, phosphorus and sediment to the natural gas industry within the Chesapeake Bay model.*

6.1.6.2 Subsurface Pathways – *recommend inclusion of naturally occurring substances potential displaced during the fracturing process at shallow depths be considered as a potential negative impact and that all studies used to support conclusions in the SGEIS are conducted by public entities or those with no interest in the outcome of the evaluation process. It is further recommended that the chapters and sections pertaining to potential environmental impacts related to the new high-volume hydraulic horizontal fracturing process being reviewed here be composed of information describing those potential impacts relative to the potential introduction of fracturing fluid, its chemical constituents, flowback and diesel fuel.*

6.1.7 Waste Transport - *recommended that flowback liquids be considered a hazardous material and the all the applicable standards for its handling, storage and transport be applied. Also recommended that local emergency response officials be given prior notice of when flowback liquids will be being transported within their municipal boundaries, that they be given the proper training on how best to respond to accidental spills, that development of protocol be undertaken that outlines who is involved in emergency response (from the driver to the clean up crew) along with phone numbers and the responsibility of each party.*

6.1.8 Fluid Discharges through 6.1.8.5 Other Means of Wastewater Disposal- *recommended that the chapters and sections pertaining to potential environmental impacts related from the new high-volume hydraulic horizontal fracturing process being reviewed here to surface waters be composed of information describing those potential impacts relative to the potential introduction of fracturing fluid, its chemical constituents, flowback and diesel fuel.*

It is recommended that flowback material be considered hazardous material by the State so that proper manifesting can take place and facilities intended to treat and discharge the resulting effluent have prior knowledge of the chemical composition of the material they are accepting.

6.1.9.1 NORM Considerations – Cuttings - *recommended that the Department require field surveys using portable Geiger counters prior to allowing any particular disposal method and that the conclusion drawn in the SGEIS regarding NORM levels as equal to background levels be re-evaluated and updated as new information is made available.*

6.1.9.3 Cuttings and Liner Associated With Mud-Drilling- *recommended that potential fluid discharges and the resulting environmental impact of each to soil, aquifers, wetlands, streams, rivers, terrestrial ecosystems, agricultural fields, be described in the SGEIS.*

6.2 Floodplains - *recommended that no permits be issued for the new high-volume hydraulic horizontal fracturing process being reviewed here that are proposed to take place within established floodplains. It is further recommended that the SGEIS describe what the environmental impact to aquatic ecosystems would be should the chemicals anticipated to be present on site be introduced to those systems during a flood.*

6.3 Freshwater Wetlands - *recommended that the SGEIS describe potential impacts from spills, discharges (of either the chemicals involved in the fracturing process in either concentrated or dilute form, chemicals contained in the flowback and brine liquids or other chemicals that may be on-site) on wetland ecosystems.*

6.4 Ecosystems and Wildlife - *It is therefore recommended that the SGEIS include the potential environmental impacts to the ecosystems types found within the area under consideration from contamination resulting from spills or discharges containing flowback liquids, from spills or discharges from fracturing fluids or the chemicals from which it is made.*

6.4.1.2 Impacts of Forest Fragmentation – *recommend well pads be located nearby existing openings maintained by human activity (e.g., old fields, agricultural fields) or toward the edges of forest patches to minimize impacts to forest interior habitats. Further, it is recommended that anticipated changes in land use by acreage be analyzed to estimate nutrient and sediment export from New York into Pennsylvania via the Susquehanna and Chemung Rivers.*

6.5.1.1 Emission Analysis NO_x - Internal Combustion Engine Emissions – *recommended that the information described here also be put in the context of potential of NOX deposition on New York's water quality and its efforts to achieve total nitrogen reductions from the Susquehanna and Chemung River watersheds by 2025 as required by participants in the Chesapeake Bay Program.*

6.5.1.4 Number of Wells per Pad Site – *recommend that only multi-well applications be permitted for the high-volume hydraulic horizontal fracturing process being reviewed here.*

6.11.3 Damage to Local Roads, Bridges, and other Infrastructure – *recommend assessment of damage to local roads and infrastructure include environmental impact of*

such damage (erosion, sedimentation, flooding, etc..) on the aquatic resources hydrologically linked to road systems by proximity or via stormwater drainage systems.

6.11.6 Transportation of Hazardous Materials - *recommended that all flowback be considered hazardous material by the State and that disposal and transportation be based on the regulations that govern the handling of material under this classification. It is also recommended that local emergency response officials be given prior notice of when hazardous material will be being transported within their municipal boundaries, that they be given the proper training on how best to respond to accidental spills (that covers the array of chemicals currently known to be involved) and that the development of standard protocol be undertaken that outlines who is involved in emergency response (from the driver to the clean up crew) along with phone numbers and the responsibility of each party.*

CHAPTER 7 – Mitigation Measures

Chapter 7 – Mitigation Measures & 7.1.1.1 Department Jurisdictions– *recommend that the high-volume hydraulic horizontal fracturing process being reviewed here be considered significantly different from the process reviewed 1992 and where the 1992 GEIS and its supporting documents contain similarities with the high-volume hydraulic horizontal fracturing process, that the SGEIS describe mitigation methods in the context of the new process.*

7.1.1.3 Other Jurisdictions - River Basin Commissions through 7.1.1.6 Cumulative Water Withdrawal Impacts – *recommend that the Department work with DRBC and SRBC to limit water withdrawals for the high-volume hydraulic horizontal fracturing process to the regions river systems and amend the Departments regulations to reflect the same.*

7.1.2 Stormwater through 7.1.2.2 Industrial Activities - *recommended that engineers designing SWPPP's and the contractors implementing the BMP's be licensed in NY, be required to visit the site when developing SWPPP's and be required to attend the States 4-hour training course in SWPPP implementation. Further, it is recommended that the Department review all SWPPP's and regularly inspect permitted sites for compliance.*

7.1.3 Surface Spills and Releases at the Well Pad – *recommend reporting to local emergency, health and environmental officials of any surface spill or accidental discharge of any chemical, fracturing fluid mixture, flowback, diesel fuel or any other on site release requiring spill mitigation within 24 hours. It is also recommended that local officials be provided information and training regarding the response procedures to spills of the nature anticipated to potentially occur with the activity proposed.*

7.1.3.1 Drilling Rig Fuel Tank and Tank Refilling Activities - *recommended that diesel tanks greater than 10,000 gallons and on site greater than 1 month be considered stationary and be required to gain coverage under the Departments petroleum bulk storage regulations and tank registration requirements and that exemptions, if the tank is removed for any reason, be made on a case by case determination during the permitting process and field verified.*

7.1.3.2 Drilling Fluids – *recommended that cuttings and all associated drilling fluids would be required to be managed on-site within a closed-loop tank system and be tested for NORM's and heavy metals prior to any disposal method.*

7.1.3.4 Flowback Water - *It is therefore recommended that the mitigation activities required in the SGEIS be inspected by Department staff at the appropriate intervals, depending on BMP, and that the resources needed to properly staff this effort be incorporated into revenue derived by the state for allowing this activity.*

7.1.3.5 Primary and Principal Aquifers – *recommend that he the Department not issue any permits for drilling activity above a Primary or Principal aquifer and that buffer*

width be determined on a site specific basis with the setback described here used as a minimum.

7.1.4.1 Private Water Well Testing – *recommend that the Department establish specific criteria for the designation of 'qualified professional' (i.e certification) and establish a statewide standard for proper sampling and laboratory protocol, in addition to the use of proper sample containers, preservation methods, holding times, chain of custody, analytical methods and laboratory QA/QC and require that these standards be followed by NYSDOH ELAP approved laboratories.*

Also recommended that State derived funds be established and allocated County Health departments so that they can be trained to compile, organize, manage and analyze the resulting data and investigate complaints made by the public. Further, it is recommended that the Department notify County Health and other officials in the vent of a potentially polluting non-routine well pad incidents as listed in this section.

7.1.4.2 Sufficiency of As-Built Wellbore Construction - *recommended that the mitigation activities described in the SGEIS in regards to surface casings, surface casing cement, intermediate and production casing cement and centralizers including be inspected, documented and certified prior to the commencement of drilling by Department staff at the appropriate intervals, and that the resources needed to properly staff this effort be incorporated into revenue derived by the state for allowing this activity.*

7.1.5 Setback from FAD Watersheds- *recommend that the Department consider its conclusions reached relative to FAD watersheds in the context of all public water supplies derived from surface waters and the risk of causing significant adverse impacts to these irreplaceable water supplies as well as the potential economic consequence of such impacts and prohibit high-volume hydraulic fracturing in all watersheds that provide water to a public supply as well as in a 4,000 -foot buffer area surrounding these watersheds.*

7.1.6 Hydraulic Fracturing Procedure - *recommended that the mitigation activities described in the SGEIS in regards to surface casings, surface casing cement, intermediate and production casing cement and centralizers including be inspected, documented and certified prior to the commencement of drilling by Department staff at the appropriate intervals, and that the resources needed to properly staff this effort be incorporated into revenue derived by the state for allowing this activity.*

Also recommended that any proposed high-volume hydraulic fracturing where the top of the target fracture zone is shallower than 2,000 feet along the entire proposed length of the wellbore and any proposed high-volume hydraulic fracturing where the top of the target fracture zone at any point along the entire proposed length of the wellbore is less than 1,000 feet below the base of a known fresh water supply not be permitted.

7.1.7.1 Drilling and Production Waste Tracking Form- *recommended that flowback liquid be considered hazardous materials and that the adherence to the appropriate regulations be required for its handling, storage and transport. It is also recommended that local*

emergency response officials be given prior notice of when flowback will be being transported within their municipal boundaries, that they be given the proper training on how best to respond to accidental spills (that covers the array of chemicals currently known to be involved), that development of protocol be undertaken that outlines who is involved in emergency response (from the driver to the clean up crew) along with phone numbers and the responsibility of each party.

7.1.7.3 Flowback Water Piping - recommended the Department consider establishing a new framework to regulate the piping of flowback that takes into account the potential negative environmental impact associated with the introduction of flowback into the environment or, as an alternative, consider flowback to be a hazardous materials and that the adherence to the appropriate regulations be required for its handling, storage and transport.

7.1.7.4 Use of Tanks Instead of Impoundments for Centralized Flowback Water Storage – *recommend that the use of open impoundments for the purpose of storing flowback liquid be prohibited.*

7.1.8 SPDES Discharge Permits – *recommend the Department consider the fracturing process itself as a discharge to groundwater given the amount of flowback that is retained and distinguish how the volume of flowback retained in the ground through the fracturing process is significantly different than deep well injection as a form of waste disposal.*

7.1.8.1 Treatment Facilities – *recommend the Department consider the cumulative impact of several POTW's, that individually meet discharge requirements, may have when operating in a single rivers watershed.*

7.1.8.2 Disposal Wells – *recommend description of rationale for distinguishing between the volumes of flowback retained in the ground through the fracturing process and deep well injection as a form of waste disposal and that injection wells not be considered as a waste disposal method for flowback until such time as information regarding flowback composition derived from low permeability formations in NY can be produced and assessed.*

7.1.12.1 Setbacks - *recommended that setbacks from any waterbody (surface or ground) to any operation using the new high-volume hydraulic horizontal fracturing process being reviewed here, at any depth, be determined on-site by slope, surface hydrology and soil type (where buffer width increases with potential volume of contaminate, slope, permeable soil characteristics, etc…) and that the setbacks designated for specific water sources described throughout the SGEIS remain as a minimum for those water sources.*

7.1.12.1 Setbacks from Ground Water Resources - *recommended that the points of measurement for a buffer from a public groundwater source be the closest edge of the well pad to the closest edge of the outer assessment area found on NYSDOH SWAP maps and that no operation using the new high-volume hydraulic horizontal fracturing process*

being reviewed here be permitted if operations are less than 2,000 feet from a municipal water supply or less than 150 feet from a private water well or domestic-supply spring.

7.1.12.2 Setbacks from Surface Water Resources - *recommended that setbacks from any waterbody (surface or ground) to any operation using the new high-volume hydraulic horizontal fracturing process being reviewed here, at any depth, be determined on-site by slope, surface hydrology and soil type (where buffer width increases with potential volume of contaminate, slope, permeable soil characteristics, etc…) and that the setbacks designated for specific water sources described throughout the SGEIS remain as a minimum for those water sources.*

7.3 Protecting Freshwater Wetlands - *recommended that no operation using the new high-volume hydraulic horizontal fracturing process being reviewed here be permitted to drill within an State or Federally protected wetland, that the setbacks provided in section 7.3 be used as a minimum, that the width of the setback be determined by slope, surface and subsurface hydrology, soils and volume of potential spill based on site conditions and be measured from the closest boundary of a wetland delineation.*

7.4.1.2 Reducing Indirect and Cumulative Impacts of Habitat Fragmentation – *recommend the Department not issue permits for high-volume hydraulic horizontal fracturing process within Grassland and Forest Focus Areas.*

7.5.1.1 Control Measures for Nitrogen Oxides-NO_x - *recommended that all engines anticipated to be used during the new high-volume hydraulic horizontal fracturing process be required have, or be fitted to have, technologies that reduce NOx and other potential pollutants to the greatest degree.*

7.6.2 Site Selection through 7.6.7 Leak and Detection Repair Program - *it is recommended that the mitigation measures described in sections 7.6.2, 7.6.4, 7.6.5, 7.6.6 (Site Selection, Well Design & Drilling, Well Completion Well Production and Leak and Detection Repair Program respectively) be required for any proposed activity involving the new high-volume hydraulic horizontal fracturing process being reviewed here.*

7.7.2 Regulation of NORM in New York State – *recommend that the Department require that radiation surveys be conducted at specified time intervals on all flowback and brine liquids being transported from the site.*

7.11 Transportation Mitigation Measures - *recommended that, regardless of a road use agreement being reached, operators be required to make route selection known to emergency coordinators when moving concentrated chemicals, flowback liquids and brine liquids, that the local officials be trained and equipped to handle spills involving the specific chemicals anticipated to be on site, flowback and brine liquids and that they be provided with a clear description of the line of communication (who is involved and their responsibilities) between a spill and ultimate clean-up.*

Further recommended that the environmental impact of increased road use is likely to have on water quality, specifically focusing on the impacts to dirt and gravel roads either

hydrologically connected (road ditches) or in proximity to surface water resources and proscribe the mitigation actions that would be required to reduce those impacts.

7.13 Emergency Response Plan – *recommend that operators share emergency response plans with County emergency departments and local officials in the towns in which they are operating.*

CHAPTER 8 - Permit Process And Regulatory Coordination

8.1.1.1 SEQRA Participation - *recommended that permits not be issued for:* 1) *any proposed high-volume hydraulic fracturing where the top of the target fracture zone is shallower than 2,000 feet along the entire proposed length of the wellbore; 2) Any proposed high-volume hydraulic fracturing where the top of the target fracture zone at any point along the entire proposed length of the wellbore is less than 1,000 feet below the base of a known fresh water supply; 3) Any proposed well pad within 4,000 feet of a municipal reservoir or reservoir tributary; 4) Any proposed well pad within 500 feet of a perennial or intermittent stream; 5) Any proposed surface water withdrawal from any source other than the main-stem of the regions rivers; 6) Any proposed groundwater withdrawal 7) Any proposed well pad within 2,000 feet of municipal water supply; 8) Any proposed well pad where topography exceeds a 8% slope; 9) any well pad that does not utilize horizontal, multiple well technique; 10) any proposed well pad located over within a principal or primary aquifer 13) any proposed well within a State or Federally protected wetland and; 14) any proposed well pad where NORM levels are found to be higher than drinking water standards 15) any proposed operation that does not use site specific setbacks from water resources and 16) any pad located within a Forest or Grassland Focus Area.*

8.1.1.3 Local Government Notification – *recommend direct notification to affected local governments by the Department be required at the time of application.*

8.1.1.5 Local Planning Documents – *recommend that a review for conservation easements on lands within the spacing unit also be required.*

8.1.1.6 County Health Departments - *recommended that State derived funds be established and allocated County Health departments so that they can investigate complaints made by the public including funds for staff to be trained on how to properly compile, organize, manage and analyze the resulting data.*

8.1.2 State – *recommend that NYS Department of Agriculture and Markets be listed as a state agency with a role regarding pipelines and associated facilities relative to reclamation of farmland from surface disturbances and that adherence to NYS Department of Agriculture and Markets guidance documents on such reclamation be required.*

8.1.1.4 Local Floodplain Development Permits - *recommended that no permits be issued for the new high-volume hydraulic horizontal fracturing process being reviewed here that are proposed to take place within established floodplains.*

8.1.2.1 Public Service Commission – *recommend that the Department work with the PSC to establish siting and safety regulations for pipelines associated with the high-volume hydraulic horizontal fracturing process being reviewed here that fall under the current 1,000 foot and 125 psig pressure thresholds regardless of location.*

8.2.1 Well Permit Review Process – *recommend that the Department include NYS Department of Agriculture and Markets as having an advisory role regarding the reclamation of agricultural fields and that Department review the "Soil and Water Conservation Districts Role In Natural Gas Development in NYS" document adopted by the NYS Soil and Water Conservation Committee (May 18, 2010) and work with the Department of Agriculture and Markets and the NYS Soil and Water Conservation Committee to support programming that focuses on local involvement in the best management practices described therein.*

8.1.3.1 U.S. Department of Transportation – *recommend that the Department pursue classification of flowback as a hazardous material and adopt the Federal hazardous materials regulations described in this section.*

8.1.3.3 EPA's Mandatory Reporting of Greenhouse Gases – *recommend that the Department include with its reporting of GHG to EPA an analysis of NOx emission/deposition and its implications for TN export to the Chesapeake Bay watershed.*

8.1.3.2 Occupational Safety and Health Administration – Material Safety Data Sheets - *recommended, in the interest in providing the best guidance possible, prescribing best management practices and accurately assessing the potential environment impact, that no permitting of the new high-volume hydraulic horizontal fracturing process being reviewed go forward without complete, comprehensive and public knowledge of the chemical composition (including concentrations) of the fracturing fluid intended for use in both fracturing applications including the produced flowback liquid.*

Therefore it is also recommended that the Department determine what can and cannot be used in fracturing fluid so that clear and comprehensive knowledge can be had before the commencement of operations or that a phased permitting approach be adopted where experience can be gained and data collected from sites inside and outside NY (PA).

8.2.1.1 Required Hydraulic Fracturing Additive Information - *recommended, in the interest in providing the best guidance possible, prescribing best management practices and accurately assessing the potential environment impact, that no permitting of the new high-volume hydraulic horizontal fracturing process being reviewed go forward without complete, comprehensive and public knowledge of the chemical composition (including concentrations) of the fracturing fluid intended for use in both fracturing applications including the produced flowback liquid.*

It is also recommended that the Department determine what can and cannot be used in fracturing fluid so that clear and comprehensive knowledge can be had before the commencement of operations or that a phased permitting approach be adopted where experience can be gained and data collected from sites inside and outside NY (PA).

8.2.2.2 Impoundment Regulation – *recommend that, in cases where the landowner will be the legal owner of the impoundment and subject to NYS dam safety regulations, it be required that the landowner be advised by the Department of the information provided in*

this section and an explanation of the obligation/costs/effort in complying with these regulations as well as the liability incurred.

8.2.3 Enforcement – *recommend that the Department describe the method by which additional revenue will be raised to properly fund the enforcement activities described in this section.*

It is recommended that, when weighing the cost and benefits of the high-volume hydraulic horizontal fracturing process, that greater weight be given to those costs and benefits associated with the preservation of the environment than those associated with mineral resource exploitation. By extension, it is further recommended that the language found within ECL (found throughout) that pertains to cumulative impact, conservation, improvement, protection, prevention of degradation, enhancement of the states soil and water resources and ecosystems, as well as the promotion and regulation of best management practices and all similar language that serves to protect our environment be seen as to supersede and take priority and precedence in every case over the phrase "to provide for greater ultimate recovery of the [oil and gas] resources" as written in Article 23 of the ECL.

8.2.3.2 Enforcement of Article 17 – *recommend State Pollutant Discharge Elimination System (SPDES) permit requirement for every high volume well given the volume of flowback not recovered, i.e. discharged to the depth of the fracture zone.*

8.3.1 Use and Summary of Supplementary Permit Conditions for High-Volume Hydraulic Fracturing *In light of the wide variety of potential impacts due to chemical constituents used and physical conditions likely to be encountered, the invalidity of applying conclusions reached in the 1992 GEIS, as it did not consider the new, high volume nature of the work being proposed here, and the need for additional permits, both from within DEC and from SRBC, it is recommended that a site specific State Environmental Quality Review Act (SEQRA) process be initiated for each well proposed. It is also recommended that the Supplementary Permit Conditions for High-Volume Hydraulic Fracturing be required for all permits.*

CHAPTER 9 – Alternative Actions

9.1 No-Action Alternative – *recommend re-considering the no action alternative relative only to the process being reviewed here which does not preclude another process being employed and therefore would not be contrary to New York State or national interests.*

It is also recommended that, when weighing the cost and benefits of the new, high-volume hydraulic horizontal fracturing process, that greater weight be given to those costs and benefits associated with the preservation of the environment than those associated with mineral resource exploitation. By extension, it is further recommended that the language found within ECL (found throughout) that pertains to cumulative impact, conservation, improvement, protection, prevention of degradation, enhancement of the states soil and water resources and ecosystems, as well as the promotion and regulation of best management practices, and all similar language that serves to protect our environment, be seen as to supersede and take priority and precedence over the phrase "to provide for greater ultimate recovery of the [oil and gas] resources" as written in Article 23 of the ECL. It is also recommended that prohibition of development be used as a management practice in areas of environmental concern and under certain circumstances as described above.

9.2 Phased Permitting Approach - *recommend the Department consider a phased approach as an opportunity to collect and analyze the appropriate number of samples over the appropriate time in order to accurately describe the contents of fracturing fluids and flowback. It is further recommended that this time also be used assessing the performance of the industry and the Department relative to environmental impacts in consideration of potentially using the ' no-action alternative' in the future. It is also recommended that this time be used to begin investigations into the cumulative impacts regarding water quality and the ecosystems that provide their best uses.*

9.2.2 Regional Cumulative Impacts Conclusion/Recommendation –
It is recommended that a phased approach be taken in permitting and that the time gained be used to begin investigations into the cumulative impacts regarding water quality and the ecosystems that provide their best uses. It is also recommended again that the only permits issued for the new, high-volume hydraulic horizontal fracturing process being reviewed here are for multi-well pads using the 640-acre spacing unit. It is also recommended that the SGEIS provide a list of industry specific BMP's for review and comment.

9.2.3.1 Permanent Prohibitions - *recommended that permits not be issued for:* 1) *any proposed high-volume hydraulic fracturing where the top of the target fracture zone is shallower than 2,000 feet along the entire proposed length of the wellbore; 2) Any proposed high-volume hydraulic fracturing where the top of the target fracture zone at any point along the entire proposed length of the wellbore is less than 1,000 feet below the base of a known fresh water supply; 3) Any proposed well pad within 4,000 feet of a municipal reservoir or reservoir tributary; 4) Any proposed well pad within 500 feet of a perennial or intermittent stream; 5) Any proposed surface water withdrawal from any*

source other than the main-stem of the regions rivers; 6) Any proposed groundwater withdrawal 7) Any proposed well pad within 2,000 feet of municipal water supply; 8) Any proposed well pad where topography exceeds a 8% slope; 9) any well pad that does not utilize horizontal, multiple well technique; 10) any proposed well pad located over within a principal or primary aquifer 13) any proposed well within a State or Federally protected wetland and; 14) any proposed well pad where NORM levels are found to be higher than drinking water standards 15) any proposed operation that does not use site specific setbacks from water resources and 16) any pad located within a Forest or Grassland Focus Area.

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9.2.4 Permit Issuance Matched to Department Resources – *recommend permitting fee be set such that the Department has sufficient resources to regulate the industry and assist local and county governments as described above.*

CHAPTER 11 Summary of Potential Impacts and Mitigation Measures

Chapter 11 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES
- recommended that the department consider that Chapter 6 of the SGEIS does not describe the potential environmental impacts from spills, discharges (of either the chemicals involved in the fracturing process in either concentrated or dilute form, chemicals contained in the flowback and brine liquids or other chemicals that may be on-site) on wetland ecosystems, primary and principal aquifers, agricultural fields as well as aquatic ecosystems (rivers, streams, lakes) or the consequences for the best uses of those waterbodies.