RIVERKEEPER®

Comments on the New York State Department of Environmental Conservation 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

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TABLE OF CONTENTS

I. INTRODUCTION

This document and its appendices represent Riverkeeper's comments on the New York State Department of Environmental Conservation 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 ("DSGEIS"). These comments are submitted on behalf of our more than 4,000 members, in addition to the written comments and oral testimony presented on November 10, 2009 and joint comments submitted by Natural Resources Defense Council.

Riverkeeper is an environmental watchdog organization that protects the Hudson River and the New York City Watershed that supplies unfiltered drinking water to more than 9 million New Yorkers. For decades, Riverkeeper has worked with the New York State Department of Environmental Conservation ("NYSDEC," "DEC" or "Department") and other local, state, and federal agencies on a variety of enforcement and permitting issues and looks forward to continuing our work with the Department in furtherance of our shared goals of watershed protection and environmental enforcement.

The more we learn about the risks of horizontal drilling and high-volume hydraulic fracturing, the more skeptical we are that New York State has adequately considered the potential adverse environmental impacts of this activity. Further, we are concerned that NYSDEC lacks adequate resources to fully administer even the existing system of permitting, monitoring, inspection, and enforcement of regulations related to gas drilling in New York State. The prospect that the Department is headed toward approval of a newer, more resource-intensive extraction technology, with an expected dramatic increase in permit applications, alarms us even more.

Principal among our concerns with the DSGEIS are the following:

(1) Failure by NYSDEC to adequately analyze and address the potential establishment of exclusionary zones and permanent protection measures for critically important environmental areas such as the New York City Watershed, the Adirondack and Catskill Mountains, the Hudson River basin, the Mohawk River Basin, the upper Delaware River Basin, the Finger Lakes region, and numerous other state parks, preserves, wetland areas and floodplains that provide critical habitat for fish and wildlife, serve a variety of ecosystem functions such as water filtration, and also contribute extensively to the State's tourism and recreation industries;

(2) Failure by NYSDEC to adequately analyze and address cumulative impacts to the State's air and water resources that would result from the processes used in horizontal drilling and high-volume hydraulic fracturing operations statewide;

(3) Failure by NYSDEC to adequately analyze and address the economic costs associated with environmental contamination from shale gas development and industrial gas drilling including, but not limited to, the potential costs of constructing, operating and

maintaining a filtration system for the Catskill-Delaware drinking water supply system in the event that contamination threatens New York City's current filtration avoidance determination ("FAD");

(4) Failure by NYSDEC to adequately analyze and address the economic value and benefits of intact forest and wetland ecosystems, including the services such ecosystems provide in terms of clean air, clean water, tourism, recreation, and community character;

(5) Failure by NYSDEC to consider the findings and conclusions of state regulators from states that have experience with horizontal drilling and high-volume hydraulic fracturing that demonstrate clear examples of drinking water contamination from this process, in direct contradiction to the statements in the DSGEIS;

(6) Failure by NYSDEC to adequately analyze and address whether the State has the financial and personnel resources necessary to adequately permit, monitor and inspect all aspects of horizontal drilling and high-volume hydraulic fracturing operations and to enforce state regulations and permit conditions in the event of environmental contamination; and if not, the amount of additional funds and resources needed by each division within DEC to properly regulate all aspects of horizontal drilling and hydraulic fracturing operations statewide;

(7) Failure by NYSDEC to propose any new regulations to govern the proposed increase in horizontal drilling and high-volume hydraulic fracturing, and instead propose to process, monitor, mitigate impacts and enforce permits on a well-by-well basis; and

(8) Failure by NYSDEC to adequately analyze and address the ability to handle and dispose of production brine and flowback water containing, among other toxics, naturally occurring radioactive materials (NORMs).

The above referenced concerns, along with other problems in the DSGEIS, are described in detail below with specific references to the chapter, section, and page number provided in the DSGEIS.

Furthermore, to support specific comments we have attached appendices. We incorporate these appendices by reference into each and every comment made below. Appendix 1 contains Case Studies on impacts and incidents involving high-volume hydraulic fracturing from across the country. Included in the hard copy submission of Appendix 1 are copies of all of the documents cited therein. Appendix 2 contains comments from Carpenter Environmental Associates, a consultant Riverkeeper retained in conjunction with Earthjustice. Appendix 3 contains comments the New York State Department of Health, Bureau of Environmental Radiation submitted to DEC on July 21, 2009, as DEC was drafting this DSGEIS. Appendix 4 is an April 18, 2007 letter from DEC to DEP regarding proposed permitting protocols for gas wells near New York City tunnels and aqueducts.

II. RIVERKEEPER SPECIFIC COMMENTS BY CHAPTER[1]

DSGEIS Chapter 1 Introduction

DSGEIS *1.1 Description of the Proposed Action*

DEC states it prepared the Supplemental Draft Generic Environmental Impact Statement ("DSGEIS") for "most" of the anticipated operations.[2]

RIVERKEEPER COMMENT 1.1

> DEC must identify with greater specificity what operations this DSGEIS will and will not cover, rather than relying on the ambiguous term "most" to describe the scope of the document.

DSGEIS *1.2 Regulatory Jurisdiction*

The State of New York's official policy is "to conserve, improve and protect its natural resources and environment…"[3] DEC has "broad authority" to manage natural resources, assure their protection, etc. per Environmental Conservation Law ("ECL") §§ 1-0101(1) and 3-0301(1). The DSGEIS states that "the Department is also required by Article 23 of the ECL to prevent waste of the State's oil and gas resources."[4]

RIVERKEEPER COMMENT 1.2

> Article 23 of the ECL does **not** "require" the Department to prevent waste of oil and gas resources and in no way means DEC must issue drilling permits. The Department misstates Article 23 and ignores the clear mandate of the New York State Constitution and the legislative directive that DEC must conserve, improve and protect the State's natural resources.[5] Furthermore, ECL Article 23 must be read *in pari materia* with the State Constitution, and ECL Article 1 (General Provisions), Article 3 (DEC's powers and duties), and Article 8 (SEQRA).
>
> The New York State Constitution declares that the overarching State policy is to "conserve and protect its natural resources …."[6] The very first section of the Environmental Conservation Law codifies and expands upon this constitutional mandate:

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[1] Riverkeeper's specific comments are extensive in consideration of DEC's key point that "[s]pecific comments tend to be more useful than general comments." *See* NYSDEC, ABOUT SUBMITTING COMMENTS ON THE SGEIS FOR THE MARCELLUS SHALE, *available at:* http://www.dec.ny.gov/energy/59634.html.
[2] DSGEIS at 1-1.
[3] *See id.* at 1-2.
[4] *See id.*
[5] NY CONST. ART. XIV § 4; ECL § 1-0101(1).
[6] NY CONST. ART. XIV § 4.

> The quality of our environment is fundamental to our concern for the quality of life. It is hereby declared to be the policy of the State of New York to conserve, improve and protect its natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well being.[7]

ECL § 3-0301(1) charges DEC with the responsibility of carrying out this policy.[8] Looking to the plain language of the statute, it is apparent that the legislature intended the general provisions regarding the mission of DEC contained in §1-0101 and §03-0301 to inform the application and enforcement of subsequent provisions. The "powers and duties of department and the commissioner" must be exercised to "carry out the environmental policy set forth in section 1-0101."[9] Moreover, this section requires DEC to "[a]ssess new and changing technology and development patterns to identify long-range implications for the environment and *encourage alternatives* which minimize adverse impact" (emphasis added) and to "encourage activities consistent with the purposes of this chapter."[10]

In addition, the State Environmental Quality Review Act ("SEQRA") requires that "to the fullest extent possible" State statutes and regulations must be interpreted and administered in accordance with SEQRA's policies.[11] Pursuant to SEQRA, it is state policy "to promote efforts which will prevent or eliminate damage to the environment and enhance human and community resources"[12]; all agencies "have an obligation to protect the environment for the use and enjoyment of this and future generations"[13]; and all agencies "shall regulate…activities so that due consideration is given to preventing environmental damage."[14]

On the other hand, Article 23 merely states it is "in the public interest to regulate [high-volume hydraulic fracturing] in such a manner as will prevent waste."[15] This doctrine of "waste" does not mean DEC must issue permits to drill.

A review of this constitutional and statutory mandate makes clear that contrary to DEC's unilateral declaration that it is required to prevent waste of oil and gas resources, DEC is instead charged with carrying out the unambiguous state policy of conserving, improving, and protecting New York's great natural resources. Further, "to the fullest extent possible" Article 23 must be interpreted and administered in

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[7] N.Y. ENVTL. CONSERV. LAW § 1-0101(1).
[8] *Id.* § 3-0301(1).
[9] *Id.*
[10] *Id.* §§ 3-0301(1)(s) and (u).
[11] ECL § 8-0103(6).
[12] ECL § 8-0101.
[13] ECL § 8-0103(8).
[14] ECL § 8-0103(9).
[15] ECL § 23-0301.

accordance with SEQRA's policies. As these comments demonstrate, it is readily apparent that DEC chose to ignore this statutory mandate, and instead adopts a policy that encourages drilling.

Therefore, DEC must revise not only this section, but must withdraw the DSGEIS in its entirety and start this SEQRA process anew, with these clear constitutional and statutory mandates guiding DEC's preparation of a re-issued DSGEIS.

DSGEIS *1.4.1 Generic Environmental Impact Statement (GEIS)*

"The 1992 findings were the culmination of a 12-year effort which included extensive public scoping and research by Department staff, followed by public comment and hearings on the Draft GEIS."

RIVERKEEPER COMMENT 1.4.1

Given that it took 12 years to complete the 1992 GEIS, DEC fails to provide any rational basis for its rush to complete the DSGEIS. DEC issued a draft scoping document for this DSGEIS on October 6, 2008. Less than a year later it issued this DSGEIS. Riverkeeper's comments demonstrate that DEC rushed to complete this DSGEIS. In doing so, it failed to identify significant environmental impacts, failed to take a hard look at dozens of significant environmental impacts, and failed to propose reasonable mitigation measures for those impacts it allegedly analyzed.

Indeed, our comments show that in many instances DEC has simply deferred analysis of critical environmental issues, or insulated them from public review by relying on other agencies. More fundamentally, DEC has cobbled together a DSGEIS that is flawed fundamentally. For example, there is not even an Executive Summary section. DEC provides no rational explanation for this rush to issue drilling permits, particularly when the 1992 GEIS was "culmination of a 12-year effort."

DSGEIS *1.4.3 Well Permit Applications and the Environmental Review Process*

"DEC's Oil and Gas staff consults and coordinates with staff in other Department programs when site review and the application documents indicate an environmental concern or potential need for another Department permit."[16]

RIVERKEEPER COMMENT 1.4.3

A revised DSGEIS should describe specifically how DEC Oil and Gas staff consulted and coordinated with staff in other Department programs during the review of comments to the Draft Scope and in development of the DSGEIS. Specific information such as this will help better inform the public.

[16] DSGEIS at 1-4.

DSGEIS Chapter 2 Description of Proposed Action

2.2 Public Need and Benefit

DEC describes in detail in the DSGEIS its analysis of economic projections in total value, jobs, and state and local tax generation and its reliance on studies from areas "where Marcellus Shale development is underway"[17] and other studies that offer predictions of "*potential* economic impacts"[18] in areas that could see increased gas development.

RIVERKEEPER COMMENT 2.2-1

In its analysis of "public need and benefit," the Department fails to offer any analysis of the potential *economic costs* that result from deforestation, road building, erosion and stormwater runoff, chemical contamination, seismic activity, and public health problems, all of which have been documented in other states where high-volume hydraulic fracturing already occurs.

The attached Case Studies on Impacts associated with development of shale gas reservoirs demonstrate that these costs are real and significant. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES.**

In its DSGEIS, DEC also externalizes environmental costs by omitting any analysis on the *economic value and benefits* created by intact forest ecosystems, clean stream and rivers, recreational fisheries, and open space, and the costs associated with environmental damage to such resources.

A revised DSGEIS should include detailed analyses of: (1) potential economic costs that may result from all aspects of hydraulic fracturing operations statewide; (2) economic benefits created and maintained by intact forest ecosystems, clean stream and rivers, recreational fisheries, and open space, in regions currently slated for hydraulic fracturing; and (3) costs associated with potential environmental damage that result from all aspects horizontal drilling and high-volume hydraulic fracturing, including but not limited to, roads, drinking water, environmental cleanup and/or remediation.

By providing one projection of economic benefits while at the same time omitting countless other economic analyses, DEC is not providing the public with sufficient information to assess the potential impacts of high-volume hydraulic fracturing.

RIVERKEEPER COMMENT 2.2-2

[17] *See id.* at 2-4.
[18] *See id.* at 2-5 (emphasis added).

In the DSGEIS, DEC notes that the State's Draft Energy Plan "includes a recommendation to encourage development of the Marcellus Shale natural gas formation with environmental safeguards that are protective of water supplies and natural resources."[19]

DEC should acknowledge in a revised DSGEIS that (1) New York State's Energy Plan is not a legal document and has no bearing on environmental protection measures that are required under federal, state, or local law, and (2) New York State's Draft Energy Plan did not actually include any specific recommendations regarding environmental safeguards other to say that such safeguards were recommended.

Otherwise, DEC's empty assurances regarding supposed protections the State's Draft Energy Plan affords are meaningless and only confuse the public.

DSGEIS *2.4.4.3 New York City Watershed*

NYC's Watershed Rules and Regulations "govern certain land uses and contain specific regulatory requirements intended to ensure water quality protection within the Watershed."[20]

RIVERKEEPER COMMENT 2.4.4.3-1

Nothing in New York City's Watershed regulations ("Watershed Regulations") govern horizontal drilling or high-volume hydraulic fracturing, including all of the surface activity associated with this activity. The Watershed Regulations are a negotiated component of the 1997 New York City Watershed Memorandum of Agreement ("MOA"), to which both Riverkeeper and DEC are signatories. In addition, the Filtration Avoidance Determination ("FAD") does not contemplate and does not discuss the prospect of industrial gas drilling within the New York City Watershed. Therefore, neither the Watershed Regulations, the MOA, nor the FAD is designed to protect and safeguard the New York City Watershed from degradation as a result of industrial gas drilling. DEC must revise the DSGEIS to state this clearly.

DSGEIS *2.4.4.3*

The West-of-Hudson system is approximately 1,549 square miles, exclusive of reservoirs. Approximately 30.5% of this area (472 miles) is protected by City and non-City entities, including the Catskill Forest Preserve – "protected" means shale gas development is prohibited through fee ownership, easements or other means. "Consequently, the 1,077 square miles of the Watershed that are not protected potentially are available for the placement of well pads for the development of shale gas reservoirs."[21]

[19] *See id.*
[20] *See id.* at 2-21.
[21] *See id.* at 2-22.

RIVERKEEPER COMMENT 2.4.4.3-2

> This statement must be revised. As drafted, it demonstrates DEC's "drill, baby, drill" mentality and is unacceptable. DEC rests on the assumption that because one-third of the Watershed is protected, it is somehow permissible to drill in the other areas. There is no basis for this faulty assumption. DEC must take the precautionary approach and place the entire New York City Watershed and other surface water supply watersheds off-limits for the placement of well pads. As detailed in these comments and the appendices hereto the substantial risks outweigh any benefits. Absent an exclusionary zone around these sensitive areas, the DSGEIS must mandate a site-specific SEQRA review for *any* permit application for placement of well pads within the New York City Watershed or other similar sensitive areas.

DSGEIS *2.4.4.3 New York City Watershed*

The DSGEIS states that "[t]he Department…has committed to working with NYCDEP to ensure that activities related to gas development do not compromise the FAD."[22]

RIVERKEEPER COMMENT 2.4.4.3-3

> A revised DSGEIS should include a description of exactly what commitments DEC has made to NYCDEP and how the two agencies plan to resolve the differences between DEC's DSGEIS and NYCDEP's Rapid Impact Assessment.

DSGEIS *2.4.6 History of Drilling and Hydraulic Fracturing in Water Supply Areas*

DEC states in the DSGEIS that "[n]o documented instances of groundwater contamination are recorded in the NYSDEC files from previous horizontal drilling or hydraulic fracturing projects in New York. No documented incidents of groundwater contamination in public water supply systems were reported by the NYSDOH central office and Rochester district office (NYSDOH, 2009a; NYSDOH, 2009b)."[23]

RIVERKEEPER COMMENT 2.4.6-1

> This statement is completely out of place in this ***Supplemental* GEIS**. The very reason DEC is preparing the supplement is because of the increased water volumes, drilling in sensitive areas like the NYC Watershed with zero history of drilling, and the longer duration of disturbance at drill sites. This statement rests on the faulty assumption that high volume hydraulic fracturing in these other areas will have the same impacts as those studied in 1992. If that were the case, then DEC would not have made the determination to conduct this supplemental review.

DSGEIS *2.4.7 Regulated Drainage Basins*

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[22] *See id.* at 2-21.
[23] *See id.* at 2-26.

"Since all of New York State's land area is incorporated into the watersheds, all oil and gas drilling that has occurred since 1821 has occurred within watersheds, specifically, in 13 of the State's 17 watersheds. Mitigation measures presented in the [1992] GEIS are protective of water resources in all watersheds and river basins statewide."[24]

RIVERKEEPER COMMENT 2.4.7-1

A revised DSGEIS should list and describe any gas drilling operation since 1821 that has included horizontal drilling and/or hydraulic fracturing and analyze the effectiveness of each mitigation measure employed at each site.

RIVERKEEPER COMMENT 2.4.7-2

This statement assumes that because drilling has occurred in some watersheds, it can occur in the New York City Watershed. This mistaken assumption ignores the very reason DEC prepared this Supplement – because of possible drilling in the New York City Watershed and other areas with no history of drilling.[25] It also assumes one watershed is like any other and ignores the fact that the New York City Watershed supplies *unfiltered* drinking water to nearly half the state's population. DEC must explain why it believes the 1992 GEIS is protective of the New York City Watershed, when one of the "key reasons" for this supplemental review is the possibility of drilling within the New York City Watershed.

DSGEIS *2.4.7.1 Delaware River Basin*

"The Delaware River Basin Commission (DRBC) was established by a compact among the federal government, New York, New Jersey, Pennsylvania and Delaware to coordinate water resource management activities and the review of projects affecting water resources in the basin. New York is represented on the DRBC by a designee of New York State's Governor, and DEC has the opportunity to provide input on projects requiring DRBC action."[26]

RIVERKEEPER COMMENT 2.4.7.1-1

A revised DSGEIS should provide detail on any and all input DEC has submitted to DRBC concerning horizontal drilling and high-volume hydraulic fracturing.

DSGEIS *2.4.7.1*

"DRBC has identified its areas of concern with respect to natural gas drilling as reduction of flow in streams or aquifers, discharge or release of pollutants into ground water or surface water, and treatment and disposal of hydraulic fracturing fluid. DRBC staff will also review drill site characteristics, fracturing fluid composition and disposal strategy

[24] *See id.* at 2-27.
[25] *See id.* at 3-3.
[26] *See id.* at 2-28.

prior to recommending approval of shale gas development projects in the Delaware River Basin."[27] DRBC staff will also review fracturing fluid composition and disposal strategy.

RIVERKEEPER COMMENT 2.4.7.1-2

> This is irrelevant to DEC's duties as lead agency under SEQRA and is an improper delegation of authority. Matter of Coca-Cola Bottling Co. of N.Y v. Board of Estimate of City of N.Y., 72 N.Y.2d 674, 681-82, 532 N.E.2d 1261, 536 N.Y.S.2d 33 (1988) (lead agency may not defer substantive review to other agencies and shield information from public scrutiny under SEQRA); Matter of Penfield Panorama Area Community v. Town of Penfield Planning Bd., 253 A.D.2d 342, 350, 688 N.Y.S.2d 848 (4th Dep't 1999) (lead agency may not delegate its responsibilities to any other agency). DEC must not delegate review and analysis of critical issues in violation of SEQRA.

DSGEIS *2.4.7.2 Susquehanna River Basin*

"The Susquehanna River Basin Commission (SRBC) was established by a compact among the federal government, New York, Pennsylvania and Maryland to coordinate water resource management activities and review of projects affecting water resources in the basin. New York is represented on the SRBC by a designee of DEC's Commissioner, and DEC has the opportunity to provide input on projects requiring SRBC action."[28]

RIVERKEEPER COMMENT 2.4.7.2-1

> DEC must explain in what capacity it has and will be involved in SRBC matters relating to Marcellus Shale development.

DSGEIS *2.4.7.2*

"The Susquehanna River is the largest tributary to the Chesapeake Bay, with average annual flow to the Bay of over 20 billion gallons per day. Based upon existing consumptive use approvals plus estimates of other uses below the regulatory threshold requiring approval, SRBC estimates current maximum use potential in the Basin to be 882.5 million gallons per day. Projected maximum consumptive use in the Basin for gas drilling, calculated by SRBC based on twice the drilling rate in the Barnett Shale play in Texas, is about 28 million gallons per day as an annual average."[29]

RIVERKEEPER COMMENT 2.4.7.2-2

> DEC must explain why, unlike SRBC, it was unable to project any figures for consumptive use statewide or basin-wide. In addition, DEC must provide these figures in a revised DSGEIS.

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[27] *See id.*
[28] *See id.* at 2-30.
[29] *See id.*

DSGEIS *2.4.7.3 Great Lakes-St. Lawrence River Basin*

"In New York, the Great Lakes-St. Lawrence River Basin is the watershed of the Great Lakes and St. Lawrence River, upstream from Trois Rivieres, Quebec, and includes all or parts of 34 counties, including the Lake Champlain and Finger Lakes sub-watersheds. Approximately 80 percent of New York's fresh surface water, over 700 miles of shoreline, and almost 50% of New York's lands are contained in the drainage basins of Lake Ontario, Lake Erie, and the St. Lawrence River. Jurisdictional authorities in the Great Lakes-St. Lawrence River Basin, in addition to the Department, include the Great Lakes Commission, the Great Lakes Fishery Commission, the International Joint Commission, the Great Lakes-St. Lawrence River Water Resources Compact Council, and the Great Lakes-St. Lawrence Sustainable Water Resources Regional Body."[30]

RIVERKEEPER COMMENT 2.4.7.3

> What recommendations, if any, has DEC made with regard to the Great Lakes-St. Lawrence River Basin?

DSGEIS *2.4.8 Water Resources Replenishment*

The DSGEIS states that the ability of surface water and groundwater to support withdrawals is based upon recharge. "The SRBC and DRBC have established evaluation processes and mitigation measures to assure adequate replenishment of water resources."[31]

RIVERKEEPER COMMENT 2.4.8-1

> This is an improper delegation of DEC's duties as lead agency under SEQRA and defers review of this issue to an outside agency. *See* Matter of Coca-Cola Bottling Co. of N.Y v. Board of Estimate of City of N.Y., 72 N.Y.2d 674, 681-82, 532 N.E.2d 1261, 536 N.Y.S.2d 33 (1988) (lead agency may not defer substantive review to other agencies and shield information from public scrutiny under SEQRA); Matter of Penfield Panorama Area Community v. Town of Penfield Planning Bd., 253 A.D.2d 342, 350, 688 N.Y.S.2d 848 (4th Dep't 1999) (lead agency may not delegate its responsibilities to any other agency). DEC must not delegate this review to the DRBC or SRBC. Further, DEC must establish adequate evaluation processes statewide, not just in these two basins.

RIVERKEEPER COMMENT 2.4.8-2

> Discussion in this section also overlooks the fact that there is no water withdrawal regulation in New York. DEC has proposed such legislation this calendar year and should discuss it.

[30] *See id.*
[31] *See id.* at 2-32.

DSGEIS *2.4.9.1 Analysis of Recent Flood Events*

The increased frequency and magnitude of flooding has raised a concern for unconventional gas drilling in the floodplains of these rivers and tributaries, and the recent flooding has identified concerns regarding the reliability of the existing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) that depict areas that are prone to flooding with a defined probability or recurrence interval. The concern focused on the Susquehanna and Delaware Rivers and associated tributaries in Steuben, Chemung, Tioga, Broome, Chenango, Otsego, Delaware and Sullivan counties, New York.[32]

RIVERKEEPER COMMENT 2.4.9.1-1

What are the specific concerns that have been raised? How does DEC intend to address these in evaluating environmental impacts from industrial gas drilling? The DSGEIS utterly fails to address these pivotal questions. A revised DSGEIS must answer these questions, and DEC must allow the public to comment on them.

RIVERKEEPER COMMENT 2.4.9.1-2

Discussion in this section ignores recent flooding in areas outside of the Delaware and Susquehanna River Basins. DEC cannot simply draw upon information the SRBC and DRBC provided, but must reach out statewide and provide information about all recent flooding events. In particular, there is no discussion of well publicized recent flooding in the Catskill system of the New York City Watershed.

For example, U.S. EPA stated in the 2007 Filtration Avoidance Determination that:

> "The Catskill system is prone to elevated turbidity levels due to the underlying geology. Periodically, storm events result in high turbidity, which triggers NYCDEP's need to treat water in the Catskill Aqueduct with a coagulating agent (alum) in order to meet the [federal] turbidity standard at the Kensico Reservoir effluents (Catskill Lower Effluent Chamber and Delaware Aqueduct Shaft 18)…"

In EPA and NYSDOH's view, significant improvement to New York City's ability to prevent, manage, and control turbidity in the Catskill system is required in order to maintain filtration avoidance for the long-term.[33] A revised DSGEIS must address this issue in the Catskill system and other watersheds statewide.

DSGEIS *2.4.9.2 Flood Zone Mapping*

[32] *See id.* at 2-34.
[33] *See* USEPA, 2007 Filtration Avoidance Determination, at 13-14.

Many of the areas within the Delaware and Susquehanna River Basins that were affected by the recent flooding of 2004 and 2006 lie outside the flood zones noted on the FIRMs (SRBC, 2009; DRBC, 2009; Delaware County 2009).[34]

RIVERKEEPER COMMENT 2.4.9.2-1

DEC must describe how the documented expansion of floodplain areas may impact permitting for future gas development statewide. DEC states that FIRM maps are now inadequate yet the Department offers no remedies to address the inadequacies now present. This is particularly shocking because DEC then relies on these same maps when it attempts to describe mitigation measures for floodplains in Section 7.2. DEC must explain why the DSGEIS relies on the very maps DEC says are inadequate.

DSGEIS *2.4.9.2*

"Flood damage that occurs outside the flood zones often is related to inadequate maintenance or sizing of storm drain systems and is unrelated to streams. The FIRMs (as of July 23, 2009) do not reflect the recent flood data."[35]

RIVERKEEPER COMMENT 2.4.9.2-2

DEC must include analysis of how the "inadequate maintenance or sizing of storm drain systems" will exacerbate potential adverse impacts from all aspects of potential gas development. This should include discussion of any inadequate maintenance or sizing of storm drain systems that has occurred under DEC's jurisdiction.

Also, DEC should explain how flooding in these areas is "unrelated to streams."

RIVERKEEPER COMMENT 2.4.9.2-3

What does DEC suggest applicants refer to if the FIRMs do not reflect recent flood data? A revised DSGEIS must answer this question.

DSGEIS *2.4.9.3 Seasonal Analysis*

"The historic and recent flooding events do not show a seasonal trend. Flooding in Delaware County, which resulted in Presidential declarations of disaster and emergency between 1996 and 2006, occurred during the following months: January 1996, November 1996, July 1998, August 2003, October 2004, August 2004 and April 2005 (Tetra Tech, 2005)."[36]

RIVERKEEPER COMMENT 2.4.9.3-1

[34] DSGEIS at 2-35.
[35] *See id.*
[36] *See id.* at 2-36.

How might future Presidential declarations of disaster and emergency affect horizontal drilling and high-volume hydraulic fracturing operations? Please describe DEC's required response to such declarations, if any.

DSGEIS *2.4.9.3*

"The Delaware River and many of its tributaries in Delaware and Sullivan counties experienced major flooding that caused extensive damage from September 2004 to June 2006 (Schopp and Firda, 2008). These data show that flooding is not limited to any particular season and may occur at any time during the year."[37]

RIVERKEEPER COMMENT 2.4.9.3-2

In light of the description of floods by DEC, Riverkeeper requests that horizontal drilling and high-volume hydraulic fracturing operations be prohibited until existing floodplain boundaries are updated and that any regulation of gas drilling in New York take into account the potential for increased flooding, expansion of flooded areas, and increased frequency and severity of floods. The current DSGEIS is inadequate as DEC presents a major problem such as flooding with virtually no discussion of how the Department intends to mitigate damage and/or how project applicants should use this information to tailor their practices.

DSGEIS *2.4.10 Freshwater Wetlands*

This section of the DSGEIS describes wetlands generally and DEC's regulatory authority in ECL Article 24.

RIVERKEEPER COMMENT 2.4.10-1

Despite the title of this chapter, "Description of the Proposed Action", this section provides no context or relationship of freshwater wetlands to industrial gas drilling. A revised DSGEIS must provide this context.

RIVERKEEPER COMMENT 2.4.10-2

DEC must estimate how many acres of wetlands will potentially be affected by gas drilling operations statewide. Specifically, which of these areas will be exempt from drilling and which will be regulated under various wetlands laws.

DSGEIS *2.4.11 Visual Resources*

The DSGEIS describes that impacts on visual resources are addressed on a case-by-case basis during permit review process.

RIVERKEEPER COMMENT 2.4.11

[37] *See id*.

This proposal ignores cumulative impacts to visual resources in violation of SEQRA. A revised DSGEIS must address these impacts.

DSGEIS Chapter 3 Proposed SEQRA Review Process

3.1.2 Need for a Supplemental GEIS

"*Multi-well pads:* Well operators previously suggested that as many as 16 horizontal wells could be drilled at a single well site, or pad. As stated in the following chapters, current information suggests that 6 to 10 wells per pad is the likely distribution. While this method will result in fewer disturbed surface locations, it will also result in a longer duration of disturbance at each drilling pad than if only one well were to be drilled there."[38]

RIVERKEEPER COMMENT 3.1.2

In its discussion of environmental impacts, the DSGEIS should describe the difference in potential site-specific and cumulative impacts that would result from drilling 16 horizontal wells per pad (the expressed upper limit) and 6 wells per pad (the expressed lower limit).

DSGEIS *3.2 Future SEQRA Compliance*

"Each application to drill a well is an individual project," size defined by surface area. DEC proposes an EAF Addendum for high-volume hydraulic fracturing, and proposes all mitigation measures for this new activity through "existing regulatory programs and permit conditions."[39]

RIVERKEEPER COMMENT 3.2-1

DEC's proposal is unacceptable. There are many problems with this. For example, this process ignores the cumulative impacts from the industrial gas drilling process as a whole. This also results in a significant administrative burden for the Department in trying to process, ensure compliance, and enforce thousands of permits statewide. Instead, DEC must propose new regulations for the extraction processes discussed in this DSGEIS.

RIVERKEEPER COMMENT 3.2-2

DEC must explain whether and how it intends to comply with the State Administrative Procedure Act regarding its proposed permitting process. The DSGEIS makes no attempt to do this.

[38] *See id.* at 3-3.
[39] *See id.*at 3-4.

DSGEIS *3.2.1.1 SGEIS Applicability - Definition of High-Volume Hydraulic Fracturing*

DEC proposes that gas drilling requiring greater than or equal to 300,000 gallons of water "always [be] considered high-volume."[40]

RIVERKEEPER COMMENT 3.2.1.1-1

The DSGEIS fails to describe how this is measured. Is this 300,000 gallons of water per well? Is it 300,000 per each individual time a well is fractured hydraulically? DEC should define this proposal with greater specificity.

RIVERKEEPER COMMENT 3.2.1.1-2

A revised DSGEIS should provide the public with an estimate of what percentage of applications the Department expects to receive under each of the categories discussed in this section: not high-volume, possibly high-volume, and always high-volume.

DSGEIS *3.2.1.2 Project Scope*

"Each application to drill a well will continue to be considered as an individual project with respect to well drilling, construction, hydraulic fracturing (including additive use), and any aspects of water and materials management (source, containment and disposal) that vary between wells on a pad."[41]

RIVERKEEPER COMMENT 3.2.1.2-1

This is unacceptable. To view each well permit in isolation ignores the cumulative impact of multiple wells on one pad, and thousands of wells and pads across the state. This invites a tragedy of the commons. The tragedy of the commons exemplifies the cumulative impacts issue and is particularly relevant to industrial gas drilling. While even one industrial gas drilling well may pose problems in and of itself, hundreds or thousands of wells only compound the problem. For example, one well may use 5 million gallons of water in the fracking process, while one thousand wells would use 5 *billion* gallons of water and would present substantial issues regarding water withdrawal and disposal of wastewater from these wells. DEC must abandon this approach.

Viewing each well in isolation also ignores the broad range of impacts associated with shale gas development from cradle to grave. These include, among other things, truck traffic, water consumption, wastewater disposal, air pollution, and viewshed impacts. **SEE RIVERKEEPER APPENDIX 2: COMMENTS ON THE DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT, CEA ENGINEERS, December 28, 2009 ("CEA REPORT")**.

[40] *See id.* at 3-6.
[41] *See id.*

DSGEIS *3.2.1.2*

Gathering lines, compressor stations and pipelines are not within the scope of project review for well permit applications.[42]

RIVERKEEPER COMMENT 3.2.1.2-1-2

> This is unacceptable. DEC must include gathering lines, compressor stations and pipelines as part of the project review. Even though SEQRA ostensibly exempts actions requiring a certificate of compliance under Article VII of the Public Service Law, Article VII does not govern many of the activities described. For example, Article VII expressly exempts gas lines less than 1,000 feet, gas transmitted at a certain pressure, underground gas lines, and all appurtenant facilities.[43] At the very least, the DSGEIS must address those activities and impacts that Article VII does not exempt. In addition, DEC must analyze the high-volume hydraulic fracturing process as a whole and study impacts from compressor stations, pipelines and gathering lines because, as DEC states, these "facilities [and others are] likely to be associated with multi-well shale gas production."[44]
>
> Furthermore, DEC may not delegate the environmental review of these significant adverse impacts in violation of SEQRA.

DSGEIS *3.2.1.3 Size of Project*

The DSGEIS states that the project's size will continue to be defined as "surface acreage affected by development, including the well pad, the access roads, and any other physical alteration necessary."[45]

RIVERKEEPER COMMENT 3.2.1.3

> Project size also should include water withdrawal sites, wastewater treatment and disposal, estimated truck traffic for that well, and an analysis of cumulative impacts.

DSGEIS *3.2.2.3 Distances*

The DSGEIS states that "[d]istances to the following resources or cultural features will be required, along with a topographic map of the area showing the well pad, well location, and scaled distances to the relevant resources and features."[46]

RIVERKEEPER COMMENT 3.2.2.3

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[42] *See id.*
[43] N.Y. Pub. Service Law, § 7-120.
[44] DSGEIS at 3-6.
[45] *See id.* at 3-7.
[46] *See id.* at 3-9.

DEC should describe the methodology used to arrive at the distance measurements described here and in various sections throughout the DSGEIS.

DSGEIS *3.2.2.5 Fluid Disposal Plan*

The Department's oil and gas regulations, specifically 6 NYCRR 554.1(c)(1), require a fluid disposal plan to be approved by the Department prior to well permit issuance for "any operation in which the probability exists that brine, salt water or other polluting fluids will be produced or obtained during drilling operations in sufficient quantities to be deleterious to the surrounding environment . . ." To fulfill this obligation, the EAF Addendum will require information about flowback water disposition, including: Planned transport off of well pad (truck or piping), and information about any proposed piping; Planned disposition (e.g., treatment facility, disposal well, reuse, centralized surface impoundment or centralized tank facility); Identification and permit numbers for any proposed treatment facility or disposal well located in New York; and Location and detailed construction and operational information for any proposed centralized flowback water surface impoundment located in New York.[47]

RIVERKEEPER COMMENT 3.2.2.5

Does DEC envision scenarios when a fluid disposal plan will not be required? In other words, would a company not be required to submit a plan if it felt that there was no probability of fluids being present in sufficient quantities to be deleterious to the surrounding environment?

DSGEIS Chapter 4 Geology

4.5.4 Seismic Events

"Table 4.2 summarizes the recorded seismic events in New York State by county between December 1970 and July 2009. There were a total of 813 seismic events recorded in New York State during that period."[48]

RIVERKEEPER COMMENT 4.5.4-1

DSGEIS Table 4.2 documents recent seismic events in Delaware, Greene, and Schoharie Counties, all of which overlie Marcellus shale. Some of these seismic events "are known or suspected to be triggered by human activity…" including "test injections for brine disposal at the New Avoca Natural Gas Storage (NANGS) facility in Steuben County."[49] "Seismic energy released during testing can range from 2,000 to over 100,000 foot-pounds and could potentially be a threat to nearby shallow infrastructure."[50] **SEE RIVERKEEPER COMMENT 6.14.** The DSGEIS must require

[47] *See id.* at 3-11.
[48] *See id.*at 4-29.
[49] *See id.* at 4-33.
[50] NYCDEP, RAPID IMPACT ASSESSMENT REPORT (hereinafter "DEP REPORT") (2009), at 66.

greater setback distances between drilling sites and water supply infrastructure to ensure the integrity of such infrastructure during induced seismic events that may occur as a result of drilling operations.

RIVERKEEPER COMMENT 4.5.4-2

The DSGEIS should include an analysis of how high-volume hydraulic fracturing and the use of multi-well pads may increase seismicity on local and statewide levels and whether this increase will have an affect on historical trends. Simply saying that proposed operations will not affect seismicity, and drawing parallels only to historic drilling operations which are not similar to the proposed operations described herein is insufficient.

RIVERKEEPER COMMENT 4.5.4-3

The DSGEIS must include a comprehensive discussion on industry best practices that will be mandated in order to decrease the likelihood of human-induced seismic activity.

RIVERKEEPER COMMENT 4.5.4-4

The DSGEIS should include discussion of New York's current emergency response procedures for earthquakes and/or other seismic events and discuss the impact that increased gas development may have on emergency preparedness on local and statewide levels.

RIVERKEEPER COMMENT 4.5.4-5

A revised DSGEIS should describe recent document seismic activity in the Barnett Shale and whether DEC expects a similar reaction in New York, given the similar geology of the two shale reserves. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

DSGEIS 4.*6 Naturally Occurring Radioactive Materials (NORM) in Marcellus Shale*

"Normal disturbance of NORM-bearing rock formations by activities such as mining or drilling do not generally pose a threat to workers, the general public or the environment."[51]

RIVERKEEPER COMMENT 4.6-1

"The Marcellus Shale is a radioactive formation, and during drilling and stimulation operations naturally occurring radioactive material (NORM) may be brought to the surface."[52] In addition, "[t]he depths of gas wells in the Marcellus Shale are expected

[51] DSGEIS at 4-36.
[52] DEP REPORT at 32.

to require drilling through the fresh water aquifer, and may result in contact with saline aquifers or formations that contain hydrocarbons, heavy metals, radionuclides or other potential contaminants."[53]

Appendix 13, "NYS Marcellus Radiological Data from Production Brine," lists recovered concentrations of gross alpha as high as 123,000 picocuries per liter (pCi/L) in produced water. The EPA Maximum Contaminant Level (MCL) for gross alpha in drinking water is 15 pCi/L, meaning produced water can contain 8,200 times the amount of gross alpha radiation allowed in drinking water supplies. Contrary to DEC's claim, concentrations of this magnitude undoubtedly "pose a threat to workers, the general public [and] the environment" if exposed to produced water from drilling operations in NORM-bearing rock formations.

DEC acknowledges that "activities that have the potential to concentrate NORM need to come under government scrutiny to ensure adequate protection."[54] Unfortunately, DEC's discussion and analysis of NORM levels in the current DSGEIS hardly rises to the level of "government scrutiny," especially given the Department's failure to adequately address the elevated NORM levels it has found in its own studies.

The DSGEIS must include a discussion of potential health and environmental effects that result from an exposure to increased NORM levels and address the mitigation of this health/environmental hazard. In addition, the DSGEIS should be revised to provide the public with a point of reference from which to evaluate the levels observed by DEC in past studies, as that information is not provided in this section or in Appendix 13.

RIVERKEEPER COMMENT 4.6-2

Comments from the NYSDOH Department of Radiation to DEC indicate that "handling and disposal of [production brine] could be a public health concern."[55] The NYSDOH reached this grave conclusion after analysis of production brine samples DEC provided to NYSDOH showing high levels of NORMS in production brine. Moreover, NYSDOH recommended more radiological sampling and analysis of flowback water, not just production brine. DEC must explain how it treats this expert agency's conclusion that NORMs could be a public health concern. Nothing in the DSGEIS addresses this concern.

[53] *See id.* at 33.
[54] DSGEIS at 4-36.
[55] RIVERKEEPER APPENDIX 3: NYSDOH Bureau of Environmental Radiation Comments to DEC, July 21, 2009. (hereinafter "NYSDOH COMMENTS").

DSGEIS Chapter 5 Natural Gas Development and High Volume Hydraulic Fracturing

RIVERKEEPER COMMENT 5

The addition of impervious surfaces to watershed lands adversely impacts water quality, aquatic ecosystems, stormwater control, streambank stabilization, soils, vegetation, and human health. "The most dramatic rates of decline in physical habitat and ecological function with the [New York City] watershed occur at the lowest levels of imperviousness up to approximately 10% [impervious cover]... The steepest rates of decline in biological and physical indicators occur in the 0-5% impervious range, as a watershed undergoes initial urbanization."[56]

Although DSGEIS Chapter 6 acknowledges that impervious surfaces are associated with stormwater pollution of surface waters, the DSGEIS remains silent regarding the impacts of increased impervious surfaces associated with the proposed gas drilling operations. The 1992 Final GEIS acknowledges that erosion and sedimentation are serious water quality concerns during the gas well construction phase,[57] but there is no discussion of stormwater impacts associated with the addition of impervious surfaces for well pads, access roads, and appurtenances. This omission is irresponsible in light of the proposed disturbance and increased imperviousness proposed for the construction of access roads and well pads and must be addressed.

Increased impervious surfaces increase dramatically the amount of stormwater runoff. The DSGEIS fails to account for this increase and the attendant significant adverse impacts. **SEE RIVERKEEPER APPENDIX 2: CEA REPORT**.

DSGEIS *5.1.1 Access Roads*

"Each 150 feet of a 30-foot wide access road adds about one-tenth of an acre to the total surface acreage disturbance attributed to the well site."[58]

RIVERKEEPER COMMENT 5.1.1

This statement fails to consider the attendant increase in impervious surfaces associated with gas development, particularly in surface water supply areas such as the New York City Watershed. The DSGEIS must address stormwater impacts related to increased imperviousness on a build-out scale that considers cumulative impacts. **SEE RIVERKEEPER COMMENT 5 and RIVERKEEPER APPENDIX 2: CEA REPORT**.

DSGEIS *5.1.2 Well Pads*

[56] HORSELY & WITTEN, INC., AN EVALUATION OF IMPERVIOUS SURFACE COVER THRESHOLDS IN THE NEW YORK CITY WATER SUPPLY SYSTEM EAST OF HUDSON (2002), 2.
[57] 1992 FGEIS at 16-13.
[58] DSGEIS at 5-6.

"Proposed well pad sizes range from 2.2 acres to 5.5 acres during the drilling and fracturing phase of operations, and from 0.5 to 2 acres after partial reclamation during the production phase."[59]

SEE RIVERKEEPER COMMENTS 5 and 5.1.1

DSGEIS *5.1.2*

"… an average multi-well pad is likely to be between four and five acres in size during the drilling and fracturing phase, with well pads of over five acres possible. Average production pad size, after partial reclamation, is likely to average between 1 and 3 acres."[60]

SEE RIVERKEEPER COMMENTS 5 and 5.1.1

DSGEIS *5.1.3 Well Pad Density*

"Location and design of pits, impoundments, tanks, hydraulic fracturing equipment, reduced emission completion equipment, dehydrators and production equipment such as separators, brine tanks and associated control monitoring, as well as office and vehicle parking requirements, can increase square footage."[61]

SEE RIVERKEEPER COMMENTS 5 and 5.1.1

"[NYSDEC] issued 5,374 permits to drill in Chautauqua County between 1962 and 2008, or five permits per square mile. In Chautauqua County, NY in 2008, 3,456 reported producing wells equates to at least three producing wells per square mile."[62]

SEE RIVERKEEPER COMMENTS 5 and 5.1.1

DSGEIS 5*.1.3.2 Anticipated Well Pad Density*

"Statewide spacing for horizontal wells where only one well will be drilled at the surface site provides for one well per 40 acres plus the necessary and sufficient acreage to maintain a 330-foot setback between the wellbore in the target formation and the spacing unit boundary."[63]

SEE RIVERKEEPER COMMENTS 5 and 5.1.1

DSGEIS 5*.1.3.2*

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[59] *See id.* at 5-9.
[60] *See id.*
[61] *See id.* at 5-10.
[62] *See id.* at 5-13.
[63] *See id.* at 5-19.

"The statute has always provided for variances from statewide spacing or non-conforming spacing units, with justification, which could result in a greater well density for any of the above options."[64]

RIVERKEEPER COMMENT 5.1.3.2

By negating limits on well density, this provision renders it impossible to assess potential stormwater impacts. As NYCDEP found, "[t]he rate and density of natural gas well construction is a critical factor in evaluating potential impacts to the NYC water supply. Based on available data from the Barnett and Fayetteville shale plays… a similar pace of development in the NYC watershed would translate to well completion rates on the order of 50 to 500 wells per year."[65] DEC must regulate well density responsibly and prohibit variances for increased densities throughout New York State, and establish exclusionary zones in the New York City Watershed and other sensitive ecological areas.

The risk of contamination of the New York City Watershed and other surface drinking water supplies is too great to allow this activity within these sensitive areas. **SEE RIVERKEEPER APPENDIX 2: CEA REPORT**.

Evidence from states where Marcellus drilling is underway as well as from the Barnett Shale and other shale reserves demonstrates that the risk of contamination through spills is very real. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

DSGEIS *5.2.2 Multi-Well Pad Density*

"Environmental Conservation Law requires that all horizontal wells in a multi-well shale unit be drilled within three years of the date the first well in the unit commences drilling."[66]

RIVERKEEPER COMMENT 5.2.2

The DSGEIS cites to ECL § 23-0501 to support this assertion, however nothing in ECL § 23-0501 supports DEC's claim that all horizontal wells must be drilled within three years the first well in the unit commences drilling. DEC must provide proper authority for this assertion.

Further, it is unclear whether "within three years" means the well site can lie dormant for 3 years or that the ECL allows for 3 years of continuous site disturbance, e.g., truck traffic, waste accumulation/disposal. The DSGEIS must clarify this issue.

DSGEIS *5.2.4 Cuttings*

[64] *See id.* at 5-20.
[65] DEP REPORT at 69.
[66] DSGEIS at 5-26.

"The very fine-grained rock fragments removed by the drilling process are returned to the surface in the drilling fluid and managed either within a closed-loop tank system or a lined on-site reserve pit. As described in Section 5.13.1, the proper disposal method for cuttings is determined by the composition of drilling fluids used to return them to the surface."[67]

RIVERKEEPER COMMENT 5.2.4

> If the proper disposal method for cuttings is determined by the composition of drilling fluids used to return the cuttings to the surface, and DEC has failed to provide the public with the composition of those fluids, then the DSGEIS is deficient in failing to properly assess the potential impacts of cuttings.

DSGEIS 5*.2.4.1 Cuttings Volume*

"… [A] vertical well drilled to a total depth of 7,000 feet produces approximately 125 cubic yards of cuttings, while a horizontally drilled well to the same target depth with a 3,000 foot lateral section produces approximately 165 cubic yards of cuttings (i.e., about one-third more). A multi-well site would produce that volume of cuttings from each well."[68]

SEE RIVERKEEPER COMMENTS 4.6-1 and 4.6-2.

DSGEIS *5.2.4.2 Naturally Occurring Radioactive Materials in Marcellus Cuttings*

Radioactivity levels are essentially background values and do not indicate an exposure concern for workers or the general public associated with Marcellus cuttings.[69]

SEE RIVERKEEPER COMMENTS 4.6-1 and 4.6-2.

RIVERKEEPER COMMENT 5.2.4.2

> This statement directly contradicts NYSDOH's conclusion that handling and disposing of NORMs in production brine "could be a public health concern."[70] Furthermore, DEC's comments in section 5.2.4.2 of the DSGEIS are misleading and need to be amended. In a revised DSGEIS, the Department should define the term "essentially" and explain the actual scientific basis for its findings in section 5.2.4.2. As drafted, there is nothing to advise the public of DEC's generalized conclusion which contradicts NYSDOH's findings.

DSGEIS *5.4 Fracturing Fluid*

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[67] *See id.*at 5-29.
[68] *See id.* at 5-29.
[69] *See id.* at 5-30.
[70] RIVERKEEPER APPENDIX 3: NYSDOH COMMENTS.

"Within these [fracturing fluid] products are approximately 260 unique chemicals whose CAS Numbers have been disclosed to the Department and an additional 40 compounds which require further disclosure since many are mixtures."[71]

RIVERKEEPER COMMENT 5.4

> "Many of the constituents that have been identified are recognized as hazardous to water quality and health (e.g., benzene, xylene, ethylene glycol, diesel fuel). While a single chemical/fracturing waste spill or subsurface contamination incident is not expected to cause an imminent public health threat via the water supply system, such an occurrence could be expected to have a negative impact on the perceived quality and integrity of New York's unfiltered drinking water supply."[72]
>
> The Department should expect and account for unavoidable spills, such as those that have occurred in high-volume hydraulic fracturing operations in Pennsylvania and elsewhere. **SEE RIVERKEEPER COMMENT 7.1.4 and RIVERKEEPER APPENDIX 1: CASE STUDIES**.
>
> Multiple contamination incidents over time will in fact negatively impact the quality and integrity of New York's unfiltered drinking water supply. Prohibiting gas development in the New York City Watershed is DEC's only responsible recourse to avert unintentional spills and contaminations in this sensitive and critically important area. **SEE RIVERKEEPER APPENDIX 2: CEA REPORT**.

DSGEIS *5.4.3 Composition of Fracturing Fluids*

RIVERKEEPER COMMENT 5.4.3-1

> The tables following DSGEIS page 5-35 list 218 fracturing fluid compounds. Table 5-6 following p. 5-45 lists 276 chemical constituents in additives. **SEE RIVERKEEPER COMMENT 5.4**.

DSGEIS *5.4.3.1 Chemical Categories and Health Information*

"The total amount of fracturing additives and water used in hydraulic fracturing of horizontal wells is considerably larger than for traditional vertical wells. This suggests the potential environmental consequences of an upset condition could be proportionally larger for horizontal well drilling and fracturing operations."[73]

SEE RIVERKEEPER COMMENT 5.4.

DSGEIS *5.4.3.1*

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[71] DSGEIS at 5-35.
[72] DEP REPORT at ES-5, 36.
[73] DSGEIS at 5-65.

"Compound-specific toxicity data are very limited for many chemical additives to fracturing fluids, so chemicals potentially present in fracturing fluids were grouped together into categories according to their chemical structure (or function in the case of microbiocides) in Table 5.7."[74]

RIVERKEEPER COMMENT 5.4.3.1-1

The DSGEIS must quantify the generic term "very limited." As drafted, the public has no understanding what this means.

DSGEIS *5.4.3.1*

"The remaining chemicals listed in MSDSs and confidential product composition disclosures provided to DEC are included in Table 5.7 under the following categories: polymers, miscellaneous chemicals that did not fit another chemical category and product constituents that were not identified by a Chemical Abstract Service (CAS) number. Readily available health effects information is lacking for many of these constituents, but two that are relatively well studied are discussed here. In the event of environmental contamination involving chemicals lacking readily available health effects information," the toxicology literature would have to be researched for chemical-specific toxicity data.[75]

RIVERKEEPER COMMENT 5.4.3.1-2

DEC's proposal to conduct a literature review in the event of environmental contamination is insufficient and shows the Department's inability and unwillingness to actually plan for, and respond to, problems that may occur from horizontal drilling and high volume hydraulic fracturing operations statewide. The very purpose of SEQRA and this DESGIS in particular is to identify significant environmental impacts and propose mitigation measures *before* they occur. DEC's proposal turns this SEQRA process into a mockery and exemplifies why DEC should withdraw this DSGEIS and begin the process anew.

DSGEIS *5.4.3.1*

"The 1992 GEIS addressed hydraulic fracturing in Chapter 9, and NYSDOH's review did not identify any potential exposure situations associated with horizontal drilling and high-volume hydraulic fracturing that are qualitatively different from those addressed in the GEIS."[76]

RIVERKEEPER COMMENT 5.4.3.1-3

[74] *See id.*at 5-52.
[75] *See id.*at 5-64
[76] *See id.*at 5-65.

NYSDOH documents belie this assertion. In fact, NYSDOH concluded that handling and disposal of production brine from horizontal drilling and high-volume hydraulic fracturing "could be a public health concern."[77] DEC must explain why this conclusion is not qualitatively different from exposure situations studied in the 1992 GEIS. The clear evidence contradicts DEC's empty claim.

The DSGEIS should describe all material NYSDOH reviewed in preparation of the DSGEIS and specify whether this review was separate from, and in any way different from, any studies NYSDOH conducted prior to 1992.

The evidence contradicting DEC's assertion here exemplifies why DEC must withdraw the DSGEIS and begin the process anew.

DSGEIS *5.5.1 USDOT Transportation Regulations*

RIVERKEEPER COMMENT 5.5.1-1

Absent from the Transportation section is an estimate of how many trucks with hazardous materials will be traveling through which portions of the state and whether they will be traveling in proximity to streams, rivers, wetlands, floodplains or reservoirs where further mitigation measures and emergency response protocols may be implicated. DEC must include such an analysis in a revised DSGEIS.

DSGEIS *5.5.1*

"Regulatory functions are carried out by the following USDOT agencies: Pipeline and Hazardous Materials Safety Administration (PHMSA); Federal Motor Carrier Safety Administration (FMCSA); Federal Aviation Administration (FAA); United States Coast Guard (USCG)."[78]

RIVERKEEPER COMMENT 5.5.1-2

DEC should describe what analysis, if any, the above-referenced federal agencies have conducted regarding the transportation of hydraulic fracturing fluid and/or produced water and flowback water from high-volume hydraulic fracturing sites. DEC should also describe any past, present, and expected future coordination with the above-referenced agencies.

DSGEIS *5.7 Source Water for High-Volume Hydraulic Fracturing*

"2.4 million to 7.8 million gallons of water may be used for a multi-stage hydraulic fracturing procedure in a 4,000-foot lateral wellbore."[79]

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[77] RIVERKEEPER APPENDIX 3: NYSDOH COMMENTS.
[78] DSGEIS at 5-57.
[79] *See id.* at 5-74.

RIVERKEEPER COMMENT 5.7

"Water withdrawals for fracturing could impact DEP by directly reducing inflows to NYC reservoirs, and/or by requiring additional reservoir releases to meet downstream flow targets. The Delaware River Basin Commission has the authority to permit water withdrawals from the Delaware River watershed, which also has an established basin-level planning framework. The Catskill watershed lacks such protection and is more vulnerable to excessive withdrawals. Further, DEC currently only regulates water withdrawals and diversions related to community water supply use. As such, water withdrawals associated with gas well drilling and hydraulic fracturing are not regulated by the state." [80] DEC must ensure that water withdrawals for fracturing operations do not impact reservoir inflows and releases. **SEE RIVERKEEPER COMMENT 6.1.1.5**. As drafted, the DSGEIS does not address this issue.

DSGEIS *5.7.2.1 Impoundment Regulation*

"All impoundment structures, regardless of assigned Hazard Classification or permitting requirements, are subject to field inspections by the Department *at its discretion* and without prior notice. During such an inspection, the Department *may* document existing conditions through the use of photographs or videos without limitation. Based on the Field Inspection, the Department *may* create a Field Inspection Report..."[81]

RIVERKEEPER COMMENT 5.7.2.1-1

DEC should describe its current system for determining whether to conduct inspections of impoundment structures. How many such inspections has Department staff conducted to date? How many inspections does Department staff envision conducting should industrial gas development operations increase statewide? A revised DSGEIS should state how frequently the Department intends to inspect impoundment structures.

DSGEIS *5.7.2.1*

"To further ensure the safe operation and maintenance of all impoundments, 6 NYCRR §673.17 allows the Department to direct an impoundment owner to conduct studies, investigations and analyses necessary to evaluate the safety of the impoundment, or to remove, reconstruct or repair the impoundment within a reasonable time and in a manner specified by the Department."[82]

RIVERKEEPER COMMENT 5.7.2.1-2

Under what circumstances will DEC exercise its authority to direct an impoundment owner to conduct studies, investigations, and analyses?

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[80] DEP REPORT at ES-5, 37.
[81] DSGEIS at 5-86 (emphasis added).
[82] *See id.* at 5-86.

Under what circumstances will DEC exercise its authority to remove, reconstruct, or repair the impoundment?

A revised DSGEIS must address these questions.

DSGEIS *5.10 Re-Fracturing*

"It is too early in the development of shale reservoirs in New York to predict the frequency with which re-fracturing of horizontal wells, using the slickwater method, may occur."[83]

"Regardless of how often it occurs, if the high-volume hydraulic fracturing procedure is repeated it will entail the same type and duration of surface activity at the well pad as the initial procedure. The rate of subsurface fluid movement during pumping operations would be the same as discussed above. It is important to note, however, that between fracturing operations, while the well is producing, flow direction is towards the fracture zone and the wellbore. "[84]

RIVERKEEPER COMMENT 5.10-1

A revised DSGEIS must account for the amount of re-fracturing that would trigger an additional site-specific SEQRA review. As drafted, the DSGEIS does not review the cumulative impacts from this activity. Although refracturing may involve the same type and duration of surface activity, DEC must acknowledge in the DSGEIS that refracturing involves an increase in site-specific and cumulative impacts due to, among other things, the need for additional water for each separate fracture, the amount of produced water generated for each fracture, and the accompanying truck traffic, noise, and air impacts that are associated with each fracture.

DSGEIS *5.10 Re-Fracturing*

"Therefore, total fluid movement away from the wellbore as a result of repeated fracture treatments would be less than the sum of the distance moved during each fracture treatment."

RIVERKEEPER COMMENT 5.10-2

DEC must provide a better explanation for this statement. As drafted, the public is unable to provide comment on it.

DSGEIS *5.11.1 Flowback Water Recovery*

[83] *See id.* at 5-97.
[84] *See id.* at 5-98.

Flowback water could be 216,000 to 2.7 million gallons per well and approximately 60 percent of the total flowback occurs in the first four days after fracturing.[85]

SEE RIVERKEEPER COMMENT 5.7.

5.11.1.1 Subsurface Mobility of Fracturing Fluids

ICF's conclusion is that "hydraulic fracturing does not present a reasonably foreseeable risk of significant adverse environmental impacts to potential freshwater aquifers."[86]

RIVERKEEPER COMMENT 5.11.1.1-1

> "Groundwater occurring within very deep formations is generally not potable and does not typically mix directly with shallow, fresh groundwater and surface water bodies. This is due to the barrier provided by approximately 2,000 to 7,000 feet of rock between fresh water aquifers and the Marcellus Shale. This protection may be compromised during gas well drilling and stimulation. Casing or grouting failures, existing subsurface fractures, and fractures created during stimulation that propagate beyond the target formation can create or enhance hydraulic pathways between previously isolated formations. These pathways can allow drilling and fracturing chemicals or formation material (e.g., hydrocarbons or saline water) to contaminate shallow groundwater and surface water resources."[87]
>
> A revised DSGEIS must discuss how IFC's conclusions differ from NYCDEP's conclusions. The DEC, as lead agency, must then make its own determination and not defer this issue to another agency or consultant.

RIVERKEEPER COMMENT 5.11.1.1-2

> "Because of its relative depth and related geologic conditions, any groundwater that has contacted the Marcellus Shale occurring in the Region is likely to exhibit high salinity and potentially contain dissolved natural gas. Upward vertical migration through extensive, open fractures or an improperly sealed gas well can allow for the cross-formational migration of groundwater between flow regimes (i.e., shortcircuiting). Such a migration can allow for the discharge of high salinity and gas enriched groundwater directly to the ground surface or into shallower (local or intermediate) flow regimes. Under these conditions, the discharged groundwater could occur at a considerable distance from the corresponding source area and formation."[88] This conclusion refutes the DSGEIS's general statement.

RIVERKEEPER COMMENT 5.11.1.1-3

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[85] *See id.* at 5-98, 99.
[86] *See id.*
[87] DEP REPORT at ES-3.
[88] *See id.* at 18.

"Fractures created during stimulation could potentially propagate beyond the target formation or enhance the permeability of an existing feature (such as a fault), resulting in communication between the target formation and other formations and subsequent contamination of groundwater and surface water. Changes in subsurface geologic characteristics may also impact the structural integrity of water supply infrastructure (e.g., dams, tunnels, and aqueducts) and could potentially allow contamination of tunnels or aqueducts."[89] Hydraulic fracturing therefore does "present a reasonably foreseeable risk" to freshwater aquifers. In a revised and reissued DSGEIS, DEC must assess and address this risk and identify appropriate mitigation measures.

RIVERKEEPER COMMENT 5.11.1.1-4

Numerous case studies from areas experiencing high-volume hydraulic fracturing belie ICF's conclusions. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES.**

DSGEIS *5.11.3 Flowback Water Characteristics*

"Most fracturing fluid components are not included as analytes in standard chemical scans of flowback samples that were provided to DEC, so little information is available to document whether and at what concentrations most fracturing chemicals occur in flowback water."[90]

RIVERKEEPER COMMENT 5.11.3-1

Because some known components are toxic and/or carcinogenic in low concentrations, DEC cannot justify approving their use in areas such as the New York City Watershed when their concentrations in flowback water are unknown. DSGEIS Table 5-8[91] lists 106 chemicals detected in flowback. Typical classes of parameters present in flowback fluid include:

- Dissolved Solids (chlorides, sulfates, and calcium)
- Metals (calcium, magnesium, barium, strontium)
- Suspended solids
- Mineral scales (calcium carbonate and barium sulfate)
- Bacteria - acid producing bacteria and sulfate reducing bacteria
- Friction Reducers
- Iron solids (iron oxide and iron sulfide)
- Dispersed clay fines, colloids & silts
- Acid Gases (carbon dioxide, hydrogen sulfide.[92]

[89] *See id.* at 35.
[90] RIVERKEEPER APPENDIX 3: NYSDOH COMMENTS.
[91] *See id.* at 5-101.
[92] *See id.* at 5-102.

Because spills and leaks are foreseeable and anticipated, chemicals that all under these parameters have no place in New York City's unfiltered drinking water supply for nine million consumers or any other surface or groundwater drinking water supplies. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES and RIVERKEEPER APPENDIX 2: CEA REPORT**.

DSGEIS *5.11.3 Flowback Water Characteristics*

The following description of flowback water characteristics was provided by URS Corporation, under contract to NYSERDA. This discussion is based on a limited number of analyses from out-of-state operations, without corresponding complete compositional information on the fracturing additives that were used at the source wells.[93]

RIVERKEEPER COMMENT 5.11.3-2

DEC's ultimate analysis of flowback water, one of the most environmentally dangerous aspects of the high-volume hydraulic fracturing process, should be based on more than just a limited number of analyses without corresponding complete compositional information. DEC's current analysis is inadequate because, among other things, it does not rely on comprehensive scientific data.

DSGEIS *5.11.3*

"The Department anticipates that, by the time the final SGEIS is published, additional data and analyses will be made public by the Marcellus Shale Committee and the Appalachian Shale Water Conservation and Management Committee. Because of the limited availability at this time of flowback water quality data…additional data will be required for alternative proposals." [94]

RIVERKEEPER COMMENT 5.11.3-2

DEC should have waited until further data were collected and analyzed before rushing to issue the DSGEIS. Any information DEC proposes to include in the FSGEIS that was not included in the DSGEIS is not subject to public review as mandated by SEQRA. This further evidences the need for DEC to reissue a revised DSGEIS.

DSGEIS *5.11.3.3 Naturally Occurring Radioactive Materials in Flowback Water*

RIVERKEEPER COMMENT 5.11.3.3-1

DEC fails to offer any explanation regarding what the studies highlighted in Table 5-10 indicate. Simply presenting radiological data without explanation as to what such levels indicate is insufficient to properly inform public comment. NYSDOH reports

[93] [93] *See id.* at 5-99.
[94] *See id.* at 5-99, 100.

that these levels of gross alpha and gross beta "could be a public health concern" when handling and disposing of production brine.[95] A revised DSGEIS must provide further elaboration on the levels shown in this section.

DSGEIS *5.12 Flowback Water Treatment, Recycling and Reuse*

RIVERKEEPER COMMENT 5.12

SEE RIVERKEEPER APPENDIX 2: CEA REPORT.

DSGEIS *Waste Disposal*

RIVERKEEPER COMMENT 5.13

A revised DSGEIS must account for how DEC intends to dispose of flowback water containing NORMs. The NYSDOH found that handling and disposing of production brine "could be a public health concern".[96] The DSGEIS fails to account for this grave concern regarding disposal of flowback water.

DSGEIS *5.13.3 Waste Disposal – Flowback Water*

Potential flowback water disposal options discussed in the 1992 GEIS include municipal sewage treatment facilities.

RIVERKEEPER COMMENT 5.13.3-1

DEC must identify in the DSGEIS which POTWs, if any, can and will accept flowback wastewater in New York State and in what capacity. Appendix 21 does not identify which facilities are willing to accept flowback water, nor does Appendix 21 address which facilities have performed the required headworks analysis.

DSGEIS *5.13.3 Waste Disposal – Flowback Water*

"Factors which could result in a need for disposal instead of reuse include lack of reuse opportunity (i.e., no other wells being fractured within reasonable time frames or a reasonable distance), prohibitively high contaminant concentrations which render the water untreatable to usable quality, or unavailability or infeasibility of treatment options for other reasons."[97]

RIVERKEEPER COMMENT 5.13.3-2

DEC should further describe how often it expects such factors to be triggered.

[95] RIVERKEEPER APPENDIX 3: NYSDOH COMMENTS.
[96] *Id*.
[97] DSGEIS at 5-119.

DSGEIS *5.13.3 Waste Disposal – Flowback Water*

"SPDES permits are issued to wastewater dischargers, including POTW's, and include specific discharge limitations and monitoring requirements. The effluent limitations are the maximum allowable concentrations or ranges for various physical, chemical, and/or biological parameters to ensure that there are no impacts to the receiving water body."[98]

RIVERKEEPER COMMENT 5.13.3-3

SPDES permits may issue only when they ensure that every discharge of pollutants will comply with all applicable effluent limitations and standards. DEC should describe whether it has developed effluent limitations for the wide range of pollutants that may be present in high-volume hydraulic fracturing wastewater. If the Department has not, the DSGEIS should include a discussion of how and when staff will appropriately establish such limitations.

DEC should also discuss whether any of the chemicals associated with the proposed action would be pollutants of concern triggering the need for development of a Total Maximum Daily Load (TMDL) allocation for each chemical.

SEE RIVERKEEPER APPENDIX 2: CEA REPORT.

DSGEIS *5.13.3.1 Waste Disposal – Flowback Water –Injection Wells*

Subsurface injection wells for disposal of brine are allowed by federal and SPDES permits.[99]

RIVERKEEPER COMMENT 5.13.3.1

"The primary subsurface risk to DEP infrastructure is considered to be the potential for the inadvertent establishment of flow pathways between natural gas wells (or underground injection wells) and the water supply structures."[100]

In addition, "[i]nduced seismicity is known to be associated with injection wells, and has reportedly been linked with hydrofracturing operations. Given the widespread use of injection wells for disposal of wastes in other regions, the possibility of causing or accelerating changes in subsurface faults and fractures, and the creation of new or enhanced flow paths, is considered a potential risk to water supply infrastructure."[101] DEC must assess and address this risk and identify appropriate mitigation measures.

DSGEIS *5.13.3.4 Waste Disposal – Flowback Water –Out-of-State Treatment Plants*

[98] *See id.*
[99] *See id.* at 5-120.
[100] DEP REPORT at ES-4.
[101] *See id.*

Table 5-14 lists "for informational purposes" certain out-of-state treatment plants "that have been proposed for disposition of flowback water recovered in New York."

RIVERKEEPER COMMENT 5.13.3.4

A revised DSGEIS must indicate whether each of these out-of-state treatments plants is willing and able to accept flowback water recovered in New York. Otherwise, the DSGEIS does not accurately and adequately address how DEC plans to dispose of flowback water.

DSGEIS *5.16.2.1 Hydrocarbons*

The Department notes in this section that most of the Utica Shale and most of the Marcellus Shale fairway are in the "dry gas window" and "the shales would not be expected to produce liquid hydrocarbons such as oil or condensate."[102] DEC then cites ICF International data to conclude that "based on the low VOC content of these compositions, pollutants such as BTEX are not expected."[103]

DEC also notes that "Fortuna Energy reports that it has sampled for benzene, toluene, and xylene and has not detected it in its gas samples or water analyses." [104]

RIVERKEEPER COMMENT 5.16.2.1

Despite the fact that DEC does not expect "most" of the shales *themselves* to produce liquid hydrocarbons, the Department acknowledges throughout the DSGEIS that liquid hydrocarbons may be present throughout the high-volume hydraulic fracturing process. The characterization in this section is therefore misleading and should be corrected.

DEC's reliance on reports from one energy company that it has not detected BTEX in its water analysis is also misleading as it is not sufficient to support any scientific conclusion regarding the possible presence of liquid hydrocarbons in water analyses, especially when DEC does not describe where and what type of water was sampled during which part of the gas drilling process.

DSGEIS *5.16.8 Gas Gathering and Compression*

"Siting of gas gathering and pipeline systems, including the centralized compressor stations [] is not subject to SEQRA review."[105]

RIVERKEEPER COMMENT 5.16.8

[102] DSGEIS at 5-125.
[103] *See id.* at 5-126.
[104] *See id.*
[105] *See id.* at 5-130.

This is unacceptable. DEC must include gathering lines, compressor stations and pipelines as part of the project review. Even though SEQRA ostensibly exempts actions requiring a certificate of compliance under Article VII of the Public Service Law, Article VII does not govern many of the activities described. For example, Article VII expressly exempts gas lines less than 1,000 feet, gas transmitted at a certain pressure, underground gas lines, and all appurtenant facilities.[106] At the very least, the DSGEIS must address those activities and impacts that Article VII does not exempt. In addition, DEC must analyze the high-volume hydraulic fracturing process as a whole and study impacts from compressor stations, pipelines and gathering lines because, as DEC states, these "facilities [and others are] likely to be associated with multi-well shale gas production."[107]

Furthermore, DEC may not delegate the environmental review of these significant adverse impacts in violation of SEQRA.

Siting of gas gathering and pipeline systems therefore must be subject to public review so that the public can exercise some oversight over proposed siting activities.

DSGEIS *5.16.8.1 Regulation of Gas Gathering and Pipeline Systems*

Regarding pipeline systems, "… DEC either directly imposes mitigation measures through its permits or provides comments to the PSC which, in turn, routinely requires mitigation measures to protect environmentally sensitive areas."[108]

SEE RIVERKEEPER COMMENT 5.16.8.

DSGEIS *5.16.8.1*

"Department of Public Service staff monitor construction activities to help ensure compliance with the Commission's orders. After installation and pressure testing of a pipeline, its operation, monitoring, maintenance and eventual abandonment must also be conducted in accordance with and adhere to the provisions of the Certificate and New York State law and regulations." [109]

RIVERKEEPER COMMENT 5.16.8.1

The DSGEIS should describe how many PSC staff currently monitor pipeline operations, maintenance and eventual abandonment and whether PSC foresees any increase in staffing needs as a result of certifying new pipelines associated with increased gas development in New York.

DSGEIS *5.18 Other States' Regulations*

[106] N.Y. Pub. Service Law, § 7-120.
[107] DSGEIS at 3-6.
[108] DSGEIS at 5-134.
[109] *See id.* at 5-143.

The Department committed in Section 2.1.2 of the Final Scope for this DSGEIS to evaluate the effectiveness of other states' regulations with respect to hydraulic fracturing and to consider the advisability of adopting additional protective measures based on those that have proven successful in other states for similar activities.

RIVERKEEPER COMMENT 5.18

> The Department failed to meet its commitment to properly and adequately evaluate the effectiveness of other states' regulations.
>
> DEC notes that officials unanimously stated that no instances of ground water contamination attributable to hydraulic fracturing had been documented in their states. However, many recent events and accidents contradict the statements of these officials. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES and RIVERKEEPER COMMENT APPENDIX 15 Part A-2**.

DSGEIS *5.18.1 Summary of GWPC's Review*

"GWPC's overall conclusion, based on its review of 27 states' regulations, including New York's, is that state oil and gas regulations are adequately designed to directly protect water resources."[110]

RIVERKEEPER COMMENT 5.18.1-1

> This finding is belied by a plethora of case studies documenting groundwater contamination and other environmental impacts associated with oil and gas drilling operations across the country. For example, in Texas "[s]ince 1990, there have been on average 6,000 cases of alleged groundwater contamination under investigation in any given year, with approximately 500 to 1,400 new cases added annually. Additionally, there are approximately 1,500 cases of confirmed contamination being remediated in any given year. The most recent data indicate there are 5,267 cases currently being investigated for 2007. Of these investigations, 373 (~7%) are related to oil and gas development, which includes oil and gas well development, production, and waste disposal."[111] **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

RIVERKEEPER COMMENT 5.18.1-2

> Numerous additional incidents of the failure of oil and gas regulations to protect water and other resources throughout the nation are documented in the Case Studies appendix following these comments. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**. The DSGEIS must consider alternatives to DEC's reliance on existing regulatory framework to protect water resources in the New York City Watershed. These alternatives should include a regulatory ban on gas drilling in the New York

[110] *See id.* at 5-45.
[111] DEP REPORT at 61.

Watershed and all other surface water supply watersheds, as contemplated in the 1992 FSGEIS.[112] **SEE RIVERKEEPER COMMENT 9.1-3**

DSGEIS *5.18.2 ICF Findings*

"ICF concluded that regulatory procedures in all of the states reviewed, including New York, are sufficient to prevent fracturing fluid from flowing upward along the wellbore and contacting water-bearing strata adjacent to the borehole. ICF also concluded that, under specific conditions, 'currently proposed approaches to hydraulic fracturing will not have reasonably foreseeable adverse environmental impacts on potential freshwater aquifers due to subsurface migration of fracturing fluids.'"[113]

RIVERKEEPER COMMENT 5.18.2-1

"During or after fracturing, chemicals in fracturing fluid may contaminate groundwater supplies by migrating beyond the fracture zone via a number of pathways (e.g. naturally occurring existing fractures, propagation of induced fractures beyond the target formation, casing failures). Chemicals that reach shallow groundwater supplies could ultimately enter surface waters flowing into NYC reservoirs, thereby introducing toxic chemicals into the NYC water supply."[114]

In addition, "[p]roduced water is often high in naturally occurring total dissolved solids (TDS), chloride, sulfate and metals (e.g., iron) related to the marine depositional environment responsible for the geologic formation's development. Produced water may also contain naturally occurring formation-related radioactive material or petroleum compounds (e.g., benzene, toluene, and xylene). Furthermore, remnants of the fracturing fluids used during stimulation may also be present in the produced water. The volume of produced water from an individual well in the Marcellus Shale has been estimated to be on the order of 15,000 gallons per year."[115] For these reasons, in addition to DEC's documented failure to meaningfully enforce existing permits, ICF's conclusion that New York State's regulations regarding fracturing fluid are sufficient is inaccurate. Because fluid migration poses a realistic potential to contaminate freshwater aquifers, DEC must assess and address this risk and identify appropriate mitigation measures. This issue exemplifies why DEC must withdraw this DSGEIS, revisit this topic as a whole, and present a revised DSGEIS for public comment.

DSGEIS *5.18.3.2 Reclamation and Waste Disposal*

In addition to its regulatory survey, Alpha also reviewed and discussed best management practices directly observed in the northern tier of Pennsylvania and noted that "[t]he

[112] 1992 FEIS at 21-3.
[113] DSGEIS at 5-148.
[114] DEP REPORT, at 35.
[115] *See id.* at 38.

reclamation approach and regulations being applied in PA may be an effective analogue going forward in New York."[116]

RIVERKEEPER COMMENT 5.18.2-2

Many recent spills, accidents, and contamination in Pennsylvania demonstrate that this assertion is ridiculous and without merit. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

DSGEIS Chapter 6 Potential Environmental Impacts

6.1 Water Resources

"*Reasonably anticipated* water resources impacts relate to water withdrawals for hydraulic fracturing; stormwater runoff; surface spills, leaks and pit or surface impoundment failures; groundwater impacts associated with well drilling and construction; waste disposal and New York City's subsurface water supply infrastructure."[117]

"As presented and summarized in Section 6.1 of this chapter, and in Chapters 7 and 8 and in Appendix 11, *neither potential impact [to surface water or groundwater resources] is reasonably anticipated*."[118]

RIVERKEEPER COMMENT 6.1

DEC must explain the above contradictory language in a revised DSGEIS.

DSGEIS *6.1.1 Water Withdrawals*

"Without proper controls on the rate, timing and location of withdrawals, stream flow modifications could result in negative impacts to a stream's best uses, including but not limited to the aquatic ecosystem, downstream riverine and riparian resources, wetlands, and aquifer supplies." [119]

RIVERKEEPER COMMENT 6.1.1

In fact, "[w]ater withdrawals for fracturing could impact DEP by directly reducing inflows to NYC reservoirs, and/or by requiring additional reservoir releases to meet downstream flow targets."[120] DEC must assess and address this risk and identify appropriate mitigation measures.

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[116] DSGEIS at 5-150.
[117] *See id.* at 6-3 (emphasis added).
[118] *See id.* at 6-4 (emphasis added).
[119] DSGEIS at 6-4.
[120] DEP REPORT, at ES-5, 37.

DSGEIS *6.1.1.4 Impacts to Aquatic Ecosystems*

"Aquatic ecosystems could be adversely impacted… "[121]

RIVERKEEPER COMMENT 6.1.1.4

> "By artificially introducing water into the target formation, naturally occurring vertical and horizontal groundwater flow directions may be modified, resulting in subsurface changes to local groundwater quality and pressures. Water flooding may also contribute to groundwater contamination if intra-formational conduits exist, or are formed as a result of improperly cased water-injection wells or drilling-enhanced fractures."[122] DEC must assess and address this risk and identify appropriate mitigation measures.

DSGEIS 6*.1.1.5 Impacts to Downstream Wetlands*

"… withdrawal of surface water or groundwater for high volume hydraulic fracturing could impact wetland resources."[123]

RIVERKEEPER COMMENT 6.1.1.5

> "Certain aquifers in the region are heavily utilized for drinking water, have limited recharge, and are somewhat stressed due to demands. There are concerns that mechanisms for protection of these aquifers are insufficient."[124]
>
> "New York ranks as one of the top states with respect to the total amount of water withdrawals… 9 to 10 billion gallons per day."[125] In addition, "the scale of the resources required and the resulting waste generated has the potential to result in impacts to water supply, water quality, and infrastructure, posing numerous risks to the New York City water supply system."[126] "Given the importance of watershed protection for unfiltered water supply systems, major changes in land use or the level of industrial activity in the watershed could be considered as a potential adverse impact for the NYC system."[127] DEC must assess and address this risk and identify appropriate mitigation measures.

DSGEIS *6.1.1.6 Aquifer Depletion*

"The primary concern regarding groundwater withdrawal is aquifer depletion that could affect other uses, including nearby public and private water supply wells."[128]

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[121] DSGEIS at 6-5.
[122] DEP REPORT, at 45.
[123] DSGEIS at 6-6.
[124] DEP REPORT at 62.
[125] *See id.* at 6-9.
[126] DEP REPORT at 46.
[127] *See id.* at 48.
[128] DSGEIS at 6-6.

RIVERKEEPER COMMENT 6.1.1.6-1

"Aquifer depletion can lead to reduced discharge of groundwater to streams and lakes…" "In fact, many New York headwater streams rely entirely on groundwater to provide flows in the hot summer months. It is therefore important to understand the hydrologic relationship between the surface water, groundwater, and wetlands within a watershed to appropriately manage rates and quantities of water withdrawal."[129]

RIVERKEEPER COMMENT 6.1.1.6-2

The DSGEIS does *not* contain any analysis of the hydrologic relationship discussed above, even though the draft expressly states it is "important to understand" this relationship. In particular, DEC must detail the hydrologic relationship between surface water, groundwater and wetlands within all watersheds where drilling may occur, including the New York City Watershed, to understand how aquifer depletion may impact the quantity of water a given watershed supplies. The DSGEIS fails to contain this analysis. Rather, the corresponding section in Chapter 7 (Mitigation Measures) simply discusses the regulatory framework already in place, but contains no discussion of the hydrologic relationship. The DSGEIS must be revised to include a discussion of aquifer depletion. **SEE RIVERKEEPER COMMENT 6.1.1.5**.

DSGEIS *6.1.1.6*

"Depletion of both groundwater and surface water can occur when water withdrawals are transported out of the basin from which they originated."[130]

SEE RIVERKEEPER COMMENT 6.1.1.5.

6.1.1.7 Cumulative Water Withdrawal Impacts

"There are several potential cumulative impacts from existing water use and new withdrawals associated with natural gas development… "[131]

"Evaluation of cumulative impacts of multiple water withdrawals must consider the existing water usage, the non-continuous nature of withdrawals and the natural replenishment of water resources."[132]

"Review of the requirements of the DRBC and SRBC indicates that the operators and the reviewing authority will perform evaluations to assess the potential impacts of water withdrawal for well drilling, and consider the following issues and information…"[133]

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[129] *See id.* at 6-7.
[130] *See id.*
[131] *See id.*
[132] *See id.* at 6-8.

"The DRBC and SRBC currently each use a permit system and approval process to regulate existing water usage in their respective basins."[134]

RIVERKEEPER COMMENT 6.1.1.7-1

The DSGEIS discusses the DRBC and SRBC regulations generally, but fails to acknowledge that there are significant portions of New York that fall outside the regulatory authority of these agencies. Significantly, the entire Catskill System of the New York City Watershed lies outside the DRBC's jurisdictional reach. The DSGEIS fails to account for cumulative impacts in these and other areas outside the DRBC and SRBC.

This lack of analysis highlights one of the fundamental flaws of the current DSGEIS. Rather than conduct its own thorough analysis of many potential water withdrawal impacts, DEC merely borrows from DRBC and SRBC, and contends that "the reviewing authority will perform evaluations to assess the potential impacts…" This is unacceptable for at least two main reasons.

First, DRCB and SRBC regulations do not cover the entire state of New York and yet DEC bases its entire discussion on those agencies' regulations. Second, for purposes of the proposed action that is the subject of this DSGEIS, the Department is, by definition, the reviewing authority. By essentially punting the later review of potential impacts to other authorities, DEC has not met its requirement under SEQRA and the DSGEIS must be re-drafted to include proper analysis.

SEE RIVERKEEPER COMMENT 6.1.1.5.

DSGEIS *6.1.1.7*

"Comparison of the water withdrawal statistics with typical withdrawal volumes for natural gas drilling indicates that the historical percentage of water withdrawal for natural gas drilling is very low. The percentage of water withdrawal specifically for horizontal well drilling and high volume hydraulic fracturing also is expected to be relatively low, compared with existing everyday consumptive water losses. Figure 6.2 shows that the 'current estimate' of water use for gas drilling is approximately 30 MGD in the Susquehanna River Basin, or less than 6 percent of the total use for water supply, power, and recreation."[135]

RIVERKEEPER COMMENT 6.1.1.7-2

There are several problems with this analysis.

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[133] *See id.* at 6-7.
[134] *See id.* at 6-9.
[135] *See id.* At 6-10.

First, the historical percentage of water withdrawal for natural gas drilling is entirely irrelevant. As DEC admits, one of the "key factors" for this *supplemental* GEIS is the large increase in water volumes analyzed in the 1992 GEIS.[136] Indeed, DEC uses the term "high-volume hydraulic fracturing" again and again throughout the entire DSGEIS. Therefore, any reference to water used in traditional gas drilling is irrelevant and establishes a false assumption. This statement is also intentionally misleading because it tricks the reader into thinking that water withdrawals for high-volume hydraulic fracturing will also be low – this flies in the face of the entire reason for the supplement. This should be omitted and DEC should acknowledge the misleading nature of this comment in its revised DSGEIS.

Second, the DSGEIS statement that the percentage of water to be used "is expected" to be low compared with other uses is illogical and without any support. DEC should not be comparing apples to oranges; rather, DEC should be analyzing the cumulative effect of water withdrawals for high-volume hydraulic fracturing. The DSGEIS does not do this. Whether water withdrawals for high volume hydraulic fracturing are expected to be low compared with existing consumptive uses is particularly irrelevant where DEC does not differentiate between, or compare, the water withdrawals necessary for a single fracturing operation, the water needed for multiple fractures on a multi-well pad, and the cumulative water withdrawal needs expected statewide. DEC should elaborate on the above comment in a revised DSGEIS and refrain from making general statements about water withdrawals that mislead the public.

Third, DEC states that the "current estimate" of water use in the Susquehanna River Basins is 30 MGD. DEC provides absolutely no data to support this statement. Further, DEC provides no discussion of water withdrawals in any other river basins (e.g. the Delaware River and Hudson River, among others). DEC must revise this section substantially.

SEE RIVERKEEPER COMMENT 6.1.1.5.

DSGEIS *6.1.2 Stormwater Runoff*

"Stormwater runoff, whether as a result of rain fall or snow melt, is a valuable resource. It is the source water for lakes and streams, as well as groundwater aquifers."[137] "On an undisturbed landscape, runoff is retarded by vegetation and top soil, allowing it to slowly filter into the ground. This benefits water resources by using natural filtering properties, replenishing groundwater aquifers and feeding lakes and streams during dry periods."[138]

"All phases of natural gas well development, from initial land clearing for access roads, equipment staging areas and well pads, to drilling and fracturing operations, production

[136] *See* DSGEIS Section 1.4.2.
[137] DSGEIS at 6-15.
[138] *See id.*

and final reclamation, have the potential to cause water resource impacts during rain and snow melt events if stormwater is not properly managed."[139]

"There is a greater potential for stormwater impacts from a larger well pad during the production phase, compared with a smaller well pad for a single vertical well."[140]

RIVERKEEPER COMMENT 6.1.2

This section of the DSGEIS gives surprisingly short shrift to an important environmental problem of which DEC is well aware. Stormwater that properly infiltrates into soils can be a valuable resource in terms of groundwater recharge, but stormwater runoff is generally not considered a valuable resource. The DSGEIS should be revised to reflect this.

While stormwater runoff can be utilized to mitigate its impacts, particularly with the use of green infrastructure technologies in urban and suburban environments, stormwater runoff should be prevented wherever possible. The DSGEIS properly notes that stormwater runoff is a pathway for contamination and that all phases of industrial gas drilling "have the potential to cause water resource impacts during rain and snow melt events if stormwater is not properly managed." But there are myriad other problems with stormwater that this section glosses over, including, but not limited to, possible problems from open pits as well as from pipeline and facility construction, discussed below. DEC should provide a comprehensive analysis of all of these potential impacts in this section of the DSGEIS.

"In New York open pits are not subject to stringent design specifications and are therefore potentially susceptible to a number of failure modes, including embankment failure, punctured or torn liners, insufficient/improper maintenance, overtopping due to rainfall or surface runoff, etc. Any of these failures could release potentially hazardous chemicals into surface or ground waters that feed the NYC West of Hudson reservoirs."[141]

"Pipeline and facility construction requires surface disturbance which could result in erosion and stream impacts. Pipeline failures could result in gas leaks causing explosions or fires. Pipeline maintenance may include herbicide treatment at the surface to prevent vegetation growth along the pipeline right-of-way. Improper herbicide use could result in surface water or groundwater contamination. Gas treatment at compressor stations and/or refineries may require chemicals and create liquid wastes that if handled improperly could lead to surface water or groundwater contamination."[142]

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[139] *See id.*
[140] *See id.* at 6-16.
[141] DEP REPORT at 42.
[142] *See id.* at 44.

DEC must assess and analyze all of these potential risks and impacts as they relate to stormwater and identify appropriate mitigation measures that will be enforceable by the Department. **SEE RIVERKEEPER APPENDIX 2: CEA REPORT**.

DSGEIS *6.1.3 Surface Spills and Releases at the Well Pad*

"Spills or releases can occur as a result of tank ruptures, equipment or surface impoundment failures, overfills, vandalism, accidents (including vehicle collisions), ground fires, or improper operations. Spilled, leaked or released fluids could flow to a surface water body or infiltrate the ground, reaching subsurface soils and aquifers."[143]

RIVERKEEPER COMMENT 6.1.3

The DSGEIS should include an analysis of how many such spills and releases DEC envisions statewide as a result of gas drilling operations and what regulations the Department is prepared to implement and enforce in order to minimize such spills and releases to the greatest extent practicable. **SEE RIVERKEEPER APPENDIX 2: CEA REPORT**.

DSGEIS *6.1.3.1 Drilling*

"Contamination of surface water bodies and groundwater resources during well drilling could occur as a result of failure to maintain stormwater controls, ineffective site management and surface and subsurface fluid containment practices, poor casing construction, or accidental spills and releases."[144]

RIVERKEEPER COMMENT 6.1.3.1

This section makes no mention of heightened concerns if these surface activities occur within the New York City Watershed. The DSGEIS must reflect this concern here.

"Though the proportion of chemicals in fracturing fluid is low, it is nonetheless significant due to the potential toxicity of the constituents it may contain. As a point of reference, raw wastewater entering a wastewater treatment plant is also approximately 99% water."[145] Therefore, contamination of surface and groundwater supplies via any of these vectors could have significant consequences to water quality. DEC must assess and address these risks and identify appropriate mitigation measures.

DSGEIS *6.1.3.2 Surface Spills and Releases – Hydraulic Fracturing Additives*

[143] DSGEIS at 6-16.
[144] *See id.*
[145] DEP REPORT at 35.

The DSGEIS merely "acknowledges" the possibility of contamination of surface water bodies and groundwater resources during well construction and operation.

RIVERKEEPER COMMENT 6.1.3.2-1

> Given DEC's expressed reasons for conducting this supplemental GEIS, this discussion is completely inadequate. As DEC admits, one of the "key factors" for this *supplemental* GEIS is the possibility for drilling in the New York City Watershed.[146] Despite this clear admission, this section makes no mention of the six large Reservoirs, Watercourses, Reservoir Stems, and feeder streams that encompass the West-of-Hudson New York City Watershed. These are all surface water bodies that could easily become contaminated as a result of industrial gas drilling activity. The DSGEIS must be re-written to reflect this fact.

RIVERKEEPER COMMENT 6.1.3.2-2

> This section also states that "potential contaminants" are listed in Table 5.6 and that URS compared "the list of additive chemicals" to certain parameters. DEC must explain whether the "potential contaminants" of Table 5.6 are the same as the "list of additive chemicals." Furthermore, DEC must compare potential contaminants against any and all parameters regulated pursuant to U.S. EPA's Surface Water Treatment Rule, the rule under which New York City has a waiver from filtration requirements.

DSGEIS *6.1.3.3 Flowback Water*

Tables 6.1 and 6.2 lists detected flowback parameters found in Marcellus operations in PA and WV. "Gelling agents, surfactants and chlorides are identified in the GEIS as the flowback water components of greatest environmental concern. Other flow back components can include other dissolved solids, metals, biocides, lubricants, organics and radionuclides."[147]

RIVERKEEPER COMMENT 6.1.3.3-1

> Tables 6.1 and 6.2 reveal that BTEX is present in half the samples. BTEX are highly toxic chemicals and have no place in anyone's drinking water, whether from the New York City Watershed or elsewhere. Section 6.1.3.3 contains no discussion of flowback water entering surface water drinking water supplies, but merely acknowledges that harmful chemicals have been found in WV and PA. Again, this is particularly troubling given DEC's admission that the very reason for this supplement is the water volumes in excess of the 1992 GEIS and the prospect of drilling in the New York City Watershed. [148]

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[146] DSGEIS at 1-4.
[147] *See id.*at 6-17.
[148] DSGEIS at 1-4.

DEC acknowledges that opportunities exist for flowback water to spill and release from hoses, pipes or trucks used to convey flowback water, or from pits or other impoundments.[149] However, the DSGEIS contains no discussion of the volume of flowback water involved in the management of flowback water.

The United States Geological Survey explains that while the concentration of toxic chemicals used in hydraulic fracturing can be less than 0.5 percent by volume, "the quantity of fluid used in these hydrofracs is so large that the additives in a three million gallon hydrofrac job, for example, would result in about 15,000 gallons of chemicals in the waste."[150] DEC must rewrite this section to account for the significant volume of toxic chemicals expected in the flowback. The section must also detail the impacts of spills entering Watercourses, Reservoirs, and Reservoir Stems within the New York City Watershed.

RIVERKEEPER COMMENT 6.1.3.3-2

SEE RIVERKEEPER APPENDIX 1: CASE STUDIES.

RIVERKEEPER COMMENT 6.1.3.3-3

This section also explains that the data used in Tables 6.1 and 6.2 "came from several sources, with likely varying degrees of reliability."[151] The DSGEIS also explains that there are many variables in this data such as different methodology used and varying levels of accuracy. In DEC's rush to release the DSGEIS it apparently gathered this data quickly, without stopping to assess its reliability. Flowback water contains all of the toxics and carcinogens that comprise fracturing fluid and therefore should be considered and treated as toxic waste. Treatment and disposal of flowback water in the NYC Watershed is problematic: **SEE RIVERKEEPER COMMENT 6.1.8.1**. Given the high stakes of toxic chemicals spilling into drinking water, DEC must reassess the data in these tables and allow the public adequate time to review reliable data.

Moreover, the DSGEIS makes no analysis of whether the flowback chemicals listed in Tables 6.1 and 6.2 will be the same for other shale reserves besides the Marcellus Shale. This is particularly troubling because the very title of this DSGEIS is industrial gas drilling into "the Marcellus Shale *and Other Low-Permeability Shale Reserves*." Rather, DEC limits Tables 6.1 and 6.2 explicitly to expected flowback "from the Marcellus Shale in New York."[152] This section must explain whether the chemicals listed in Tables 6.1 and 6.2 can be expected in other shale reserves.

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[149] *See id.* at 6-17.
[150] USGS Fact Sheet, Water Resources and Natural Gas Production from the Marcellus Shale, May 2009, by Daniel Soeder and William M. Kappel, at 4, *available at*, http://pubs.usgs.gov/fs/2009/3032/pdf/FS2009-3032.pdf (last visited Nov. 23, 2009).
[151] DSGEIS at 6-18.
[152] *See id.*

DSGEIS *6.1.1.3*

"The quality and composition of flowback from a single well can also change within a few days after the well is fractured. This data does not control for any of these variables."[153]

SEE RIVERKEEPER COMMENT 6.1.1.3.

DSGEIS *6.1.4 Groundwater Impacts Associated With Well Drilling and Construction*

"The wellbore being drilled, completed or produced, or a nearby wellbore that is ineffectively sealed, could provide subsurface pathways for groundwater pollution from well drilling, flowback or production operations."[154]

RIVERKEEPER COMMENT 6.1.4

> "Improper plugging may fail to isolate geologic strata, resulting in communication pathways that may lead to contamination,"[155] and "[p]oorly designed injection wells can result in movement of wastes into the groundwater or to the surface. Additionally, underground injection can trigger increased seismic activity due to hydroactivation of faults."[156] **SEE RIVERKEEPER COMMENT 5.11.1.1**.

DSGEIS *6.1.4.1 Turbidity*

The DSGEIS states that the most common impact on private water supplies is turbidity. Specifically, DEC quotes the 1992 GEIS and then states, "[t]his remains the case today."[157]

RIVERKEEPER COMMENT 6.1.4.1

> This statement requires more analysis and explanation. DEC conducts no analysis as to how high-volume hydraulic fracturing will impact turbidity. Reducing turbidity is the most important factor in maintaining New York City's filtration avoidance determination ("FAD"). Even "short-term" turbidity on a large scale with multiple well sites in a reservoir basin can impair water quality and threaten continuation of the FAD. In addition, DEC fails to mention here that turbidity is also associated with other contamination as noted in Table 7.3 of DSGEIS.[158]
>
> DEC must redraft this section and allow the public another opportunity to review the revised DSGEIS.

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[153] *See id.*
[154] *See id.* at 6-34.
[155] DEP REPORT at ES-3, 46.
[156] *See id.* at 43.
[157] DSGEIS at 6-35.
[158] *See id*. at Table 7.3, 7-40 (turbidity of concern because of "piggybacking" of contaminants).

DSGEIS *6.1.4.2 Fluids Pumped Into the Well*

The DSGEIS relies upon analysis from the gas drilling industry, specifically the American Petroleum Institute, to discuss probability of fracture fluids reaching groundwater.

RIVERKEEPER COMMENT 6.1.4.2-1

> This biased assessment from the very industry DEC is attempting to regulate is shocking, inexcusable, and runs counter to SEQRA's policies and intent. DEC must conduct an unbiased analysis of this issue, redraft this section, and allow the public the opportunity to review an unbiased assessment.
>
> Among other problems, the analysis downplays the "short time when fracturing occurs." According to NYCDEP, drilling and fracturing "typically occurs 24 hours a day until the well is finished, which may take on the order of four to eight weeks."[159] This is hardly a "short time."

DSGEIS *6.1.4.2*

"Using the API analysis as an upper bound for the risk associated with the injection of hydraulic fracturing fluids, the probability of fracture fluids reaching a USDW due to failures in the casing or casing cement is estimated at less than 2 x 10-8 (fewer than 1 in 50 million wells)."[160]

RIVERKEEPER COMMENT 6.1.4.2-2

> "Casing and/or grouting failures can result in contamination of shallow groundwater or surface water resources with drilling/fracing fluids and formation material."[161] **SEE RIVERKEEPER COMMENT 5.11.1.1**.

DSGEIS *6.1.4.3 Natural Gas Migration*

"Natural gas migration is a more reasonably anticipated concern with respect to potential significant adverse impacts."[162]

RIVERKEEPER COMMENT 6.1.4.3-1

> "… fractures may provide a major route for groundwater discharge from the bedrock into the overlying surface waters."[163] **SEE RIVERKEEPER COMMENT 5.11.1.1**.

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[159] *See id.* at ES-3.
[160] *See* DSGEIS at 6-35.
[161] DEP REPORT at ES-2, 33.
[162] DSGEIS at 6-35.
[163] DEP REPORT at 12.

DSGEIS *6.1.4.3*

"As explained in the GEIS, potential migration of natural gas to a water well presents a safety hazard because of its combustible and asphyxiant nature, especially if the natural gas builds up in an enclosed space such as a well shed, house or garage… The GEIS acknowledges that migration of naturally-occurring methane from wetlands, landfills and shallow bedrock can also contaminate water supplies independently or in the absence of any nearby oil and gas activities."[164]

RIVERKEEPER COMMENT 6.1.4.3-2

DEC should describe how and where methane migration has occurred in New York in the absence of oil and gas activities and whether gas drilling activities may further compound already existing problems. In order to describe this properly, DEC must explain its protocols for investigating methane migration and document how and where it has investigated methane migration statewide and describe its findings in each instance. DEC must also propose how it intends to monitor and investigate methane migration that may result from increased gas development operations statewide.

SEE RIVERKEEPER COMMENTS 5.11.1.1, RIVERKEEPER COMMENT 6.1.4.3, and RIVERKEEPER APPENDIX 1: CASE STUDIES.

DSGEIS *6.1.5.1 Hydraulic Fracturing Procedure – Wellbore Failure*

The DSGEIS again relies upon analysis from the gas drilling industry, specifically the American Petroleum Institute, to discuss probability of fracture fluids reaching groundwater.

RIVERKEEPER COMMENT 6.1.5.1

This biased assessment from the very industry DEC is attempting to regulate is inexcusable, and runs counter to SEQRA's policies and intent that agencies conduct independent assessments of a proposed action. DEC must conduct an unbiased analysis of this issue, redraft this section, and allow the public the opportunity to review an unbiased assessment.

This section also ignores the findings of state regulators in Pennsylvania and Ohio. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

DSGEIS *6.1.5.2 Subsurface Pathways*

[164] DSGEIS at 6-36.

The DSGEIS states that "certain natural conditions" to analyze when considering this issue include a "minimum depth" of the target fracture zone of greater than or equal to "2,000 feet."[165]

RIVERKEEPER COMMENT 6.1.5.2-1

In the very next paragraph the DSGEIS states that "most of the extent of [the Marcellus and Utica Shales] are found at depths greater than 1,000 feet in New York." Therefore, DEC's assumption of a minimum depth of 2,000 feet may be too deep. The Department should therefore revise this analysis to reflect the natural conditions of "most" of the Marcellus and Utica Shales found at depths as shallow as 1,000 feet and not 2,000 feet.

This is particularly important considering that DEC notes that a depth of 850 feet to the base of potable water "is a commonly used and practical generalization for the maximum depth of potable water in New York."[166] Thus, NYSERDA's consultant (Alpha Environmental) found that the depths of the Marcellus and Utica Shales are within 150 feet of underground sources of drinking water. This is very troubling and undermines DEC's conclusion that hydraulic fracturing does not present a reasonably foreseeable risk of significant adverse impacts to freshwater aquifers when natural conditions exist. DEC must revisit this issue, redraft this section, and present it again for public comment.

Furthermore, this section limits itself to the Marcellus and Utica Shale Reserves, without any mention of "Other Low-Permeability Gas Reservoirs."[167]

DSGEIS *6.1.5.2*

DEC states in this section that: there is no documented contamination of groundwater from hydraulic fracturing; no "reasonably foreseeable risk of significant adverse environmental impacts to potential freshwater aquifers;" and that the probability of fracturing fluid reaching wells is less than 1 in 50 million.[168]

RIVERKEEPER COMMENT 6.1.5.2-2

"Documented cases from other states indicate that drilling and fracturing operations have been associated with the movement of natural gas and contaminants into aquifers or surface water bodies."[169] **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

DSGEIS *6.1.6 Waste Transport*

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[165] *See id.* at 6-37.
[166] *See id.* (citing DSGEIS Section 2.4.6).
[167] Title of DSGEIS.
[168] DSGEIS at 6-37.
[169] DEP REPORT at ES-4.

The DSGEIS states, without any explanation or citation, that fracturing fluids, flowback water, produced brine and other materials "are classified as non-hazardous industrial waste."[170]

RIVERKEEPER COMMENT 6.1.6

DEC must explain why it considers these materials non-hazardous industrial waste. For example, Tables 6.1 and 6.2 identify highly toxic chemicals found in flowback water in West Virginia and Pennsylvania. DEC must revisit this analysis.

DSGEIS *6.1.7 Centralized Flowback Water Surface Impoundments*

"Adverse impacts to groundwater quality are also a concern relative to large geomembrane-lined surface impoundments. Controlling leakage is a difficult task."[171]

RIVERKEEPER COMMENT 6.1.7-1

If leakage control is a difficult task, then leaks should be anticipated. The DSGEIS must address the impacts of said anticipated leaks into aquifers and surface waters rather than relying on regulations that prohibit the discharge of flowback water.

DSGEIS *6.1.7*

"Conveyances to and from centralized impoundments are also potential pathways for contaminants to reach the environment."[172]

RIVERKEEPER COMMENT 6.1.7-2

The DSGEIS should include specific actions that DEC plans on taking to monitor the above-mentioned pathways of contamination.

SEE RIVERKEEPER APPENDIX 1: CASE STUDIES.

DSGEIS *6.1.8.1 Treatment Facilities*

"Treatability of flowback water is a further concern. Residual fracturing chemicals and naturally-occurring constituents from the rock formation could be present in flowback water and have treatment, sludge disposal, and receiving-water impacts."[173]

RIVERKEEPER COMMENT 6.1.8.1-1

[170] DSGEIS at 6-38.
[171] *See id.*
[172] *See id.* at 6-39.
[173] *See id.* at 6-39.

"Treatment and disposal of fracturing wastewater is complicated by the presence of constituents that are not amenable to conventional treatment (e.g. high salinity, chemical residues, radionuclides). In New York, the wastes can only be accepted at conventional treatment plants with approved pretreatment programs. *There are currently no specialized treatment plants in the region designed to treat these wastes*."[174]

"Limited disposal options and/or high costs may lead to illicit disposal of wastes… Improper waste management can lead to water quality problems at local or regional scales… Incidents of both localized and widespread contamination have been documented in other states… Overall, waste management failures were responsible for the majority of documented water contamination incidents related to natural gas development."[175]

The DSGEIS must address the cumulative impacts of waste management failures rather than relying on regulations that prohibit them.

DSGEIS *6.1.8.1*

"Discharges will be managed at treatment facilities or in disposal wells." "Residual fracturing chemicals and [NORMs]…could be present in flowback water."[176]

RIVERKEEPER COMMENT 6.1.8.1-2

DEC has elected to use the benign term "flowback water" to describe highly toxic wastewater that must be disposed of properly. Tables 6.1 and 6.2 demonstrate that residual fracturing chemicals *will* be present in flowback water. In order to better inform the public, the DSGEIS must be revised to reflect this fact. DEC must also asknowledge that NYSDOH concluded that handling and disposal of wastewater with NORMs "could be a public health concern."[177]

As there are no facilities in New York that can currently treat these wastes, DEC's analysis of cumulative impacts associated with high-volume hydraulic fracturing will not be complete unless and until it includes analysis of, among the other items highlighted herein, the construction, operation, and maintenance of additional treatment facilities that may be necessary if any flowback water is expected to be treated within the region.

DSGEIS *6.1.8.1*

"[T]he potential for significant adverse environmental impacts from any proposal to inject flowback water from high-volume hydraulic fracturing into a disposal well will be

[174] DEP REPORT at ES-5 (emphasis added).
[175] *See id.* at ES-5, ES-6.
[176] DSGEIS at 6-39.
[177] RIVERKEEPER APPENDIX 3: NYSDOH COMMENTS.

reviewed on a site-specific basis with consideration to local geology (including faults and seismicity), hydrogeology, nearby wellbores or other potential conduits for fluid migration and other pertinent site-specific factors."[178]

RIVERKEEPER COMMENT 6.1.8.1-3

DEC's admission that it will not analyze the cumulative impacts of disposal wells makes the current DSGEIS deficient for failure to properly analyze cumulative impacts associated with the proposed action.

Recent reports from Pennsylvania demonstrate that there is a tremendous opportunity for significant negative impacts from the inability of wastewater treatment plants to treat flowback water. **SEE RIVEREEPER APPENDIX 1: CASE STUDIES. SEE RIVERKEEPER COMMENT 6.1.3.3-3**.

DSGEIS *6.1.8.1* [sic] *Disposal Wells*

RIVERKEEPER COMMENT 6.1.8.1-4

There are two sections with the heading "6.1.8.1" in the DSGEIS. The Chapter on Disposal Wells should be correctly labeled "6.1.8.2."

DSGEIS *6.1.9.1 Naturally Occurring Radioactive Material (NORM) Considerations – Cuttings*

"Based on the analytical results from field-screening and gamma ray spectroscopy performed on samples of Marcellus shale, NORM levels in cuttings are not likely to pose a problem."[179]

RIVERKEEPER COMMENT 6.1.9.1

DEC should define what "not likely" means in terms of statistical probability. Also, DEC should explain exactly what "analytical results" it is referring to here.

DSGEIS *6.1.10 Potential Impacts to Subsurface NYC Water Supply Infrastructure*

"[D]amage to the [NYC Water Supply Infrastructure] by high-volume hydraulic fracturing is not reasonably anticipated because the target fracturing zones are thousands of feet deeper than any underground water supply infrastructure."[180]

RIVERKEEPER COMMENT 6.1.10-1

[178] *See id.* at 6-38.
[179] *See id.* at 6-40.
[180] *See id.* at 6-41.

DEC must reassess this finding. NYCDEP's Rapid Impact Assessment contradicts this statement. Specifically, NYCDEP's report states that "[t]he review revealed that substantial portions of DEP's West of Hudson aqueducts and tunnels, as well two reservoirs, are constructed within 500 to 1,500 feet vertical distance of the Marcellus Shale Formation. In two locations near the edge of the Marcellus Formation, portions of the Catskill Aqueduct and the Rondout-West Branch Tunnel of the Delaware Aqueduct are in ***direct contact*** with the Marcellus Formation."[181]

DEC, without any justification or analysis, makes the unsupported statement that the Marcellus Shale is "thousands of feet deeper" than any NYC water supply infrastructure. Faced with NYCDEP's scientific study, DEC must revise this section, reanalyze this issue, and present it again for public comment.

RIVERKEEPER COMMENT 6.1.10-2

"Numerous activities during all phases of natural gas development have the potential to contaminate groundwater or surface water supplies. Fracturing operations in proximity to DEP infrastructure could compromise water quality and potentially damage infrastructure. High levels of water withdrawals during periods of hydrologic stress could impact reservoir operations and impair water supply reliability."[182] **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

"Drilling impacts also include the slight but real potential for inadvertent penetration of a NYCDEP tunnel or aqueduct during vertical or horizontal drilling operations."[183] In addition, "[u]nderlying the Marcellus Shale are several other bedrock formations that have been identified as gas plays that may be potential targets of future extraction in the Region."[184] For all of these reasons, the DSGEIS must analyze and address all potential impacts to the NYC water supply infrastructure.

DSGEIS *6.1.11 Degradation of New York City's Drinking Water Supply*

"Degradation of New York City's drinking water supply as a result of surface spills is not a reasonably anticipated impact of the proposed activity. Potential impacts to the NYC Watershed are greatly diminished by a number of reasons related to the inherent nature of the activity."[185]

RIVERKEEPER COMMENT 6.1.11-1

The "reasons" proffered by DEC on DSGEIS pages 6-41 to 6-42 are far from compelling. Again, DEC relies on its permit system (**SEE RIVERKEEPER COMMENT 5.16.8**) and grossly inadequate processes such as evaporation and

[181] DEP Report at ES-4 (emphasis added).
[182] *See id.* at ES-6.
[183] *See id.* at 33.
[184] *See id.* at 13.
[185] DSGEIS at 6-41.

volatilization of toxic fluids to protect the New York City drinking water supply from degradation.

"Nearly every activity associated with natural gas development in the Marcellus Shale has the potential to impact NYC source water quality to some degree, although some impacts are more likely and have already proven to be problematic in other states."[186] "The [water quality] protection afforded by hydraulic separation between the deeper and shallower bedrock formations may be compromised in areas where natural or induced fracturing occurs."[187] In addition, "it is anticipated that influences from deep groundwater on the surface water and shallow groundwater could result in detectable changes in water quality."[188] For these reasons, degradation of New York City's drinking water from activities directly and indirectly associated with fracturing is foreseeable if these activities are permitted in the NYC Watershed.

RIVERKEEPER COMMENT 6.1.11-2

DEC cannot logically characterize impacts to surface and groundwater resources as "reasonably anticipated" in one section of the DSGEIS and not "reasonably anticipated" in other sections. The "risk from watershed activities will never be zero,"[189] and although "it is possible that some level of natural gas development could occur in or near the NYC watershed without causing substantial adverse impacts to the NYC water supply," it is "important to note that risks to the water supply cannot be eliminated entirely, and that water quality incidents (e.g. spills, leaks) should be anticipated."[190]

Furthermore, "it is acknowledged that such [potential] impacts, were they to occur, could alter the character of the watersheds that comprise NYC's unfiltered West of Hudson water supply."[191] Therefore, DEC must assess and address these risks and identify appropriate mitigation measures.

DSGEIS *6.1.11*

"A comprehensive, long-range watershed protection and water quality management program has been established…. Successful implementation of this plan has resulted in cost savings to the City and State of an estimated $8 billion that otherwise would be required to filter this water supply and an additional $300 million yearly expense to operate and maintain a filtration plant." [192]

RIVERKEEPER COMMENT 6.1.11-3

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[186] DEP REPORT at 87.
[187] *See id.* at 15.
[188] *See id.* at 23.
[189] DEP REPORT, at ES-1.
[190] *See id.* at ES-6.
[191] *See id.* at ES-1.
[192] DSGEIS at 6-41.

It is unclear whether this section refers to the 1997 New York City Watershed Memorandum of Agreement ("MOA"), to which DEC is a signatory, or to U.S. EPA's Filtration Avoidance Determination ("FAD"). DEC must revise this section to state explicitly to which agreement and "plan" it refers. Furthermore, neither the MOA nor the FAD address or even contemplate industrial gas drilling within the New York City Watershed. Accordingly, neither the MOA nor the FAD are "comprehensive" with respect to the prospect of high-volume hydraulic fracturing within this sensitive area. DEC's reliance on either the MOA or the FAD to regulate high-volume hydraulic fracturing is therefore misplaced and irrelevant.

DEC's reliance on existing watershed protection plans also ignores one of the key reasons for this *supplemental* GEIS – the fact that the 1992 GEIS did not study any industrial gas drilling, let alone high-volume hydraulic fracturing, within the New York City Watershed.[193]

RIVERKEEPER COMMENT 6.1.11-4

The DSGEIS must ensure DEC honors its contractual commitments per the MOA. In the MOA, DEC agreed contractually that "the New York City water supply is an extremely valuable natural resource that must be protected in a comprehensive manner."[194] In the MOA DEC also agreed contractually "to take all necessary and appropriate actions…to effect the purposes of [the MOA]."[195] The DSGEIS must be revised to ensure DEC honors its agreements per the MOA.

RIVERKEEPER COMMENT 6.1.11-5

The DSGEIS states that "many chemicals…are subject to evaporation during the warmer months of the year, reducing the volumes or concentrations that would reach the reservoirs." Despite this vague and unsupported statement, the DSGEIS contains no restrictions on chemicals used during colder months. This statement is therefore irrational, arbitrary and capricious. Furthermore, this statement ignores air impacts due to evaporation and volatilization. DEC must revisit this contention.

DSGEIS *6.2 – Floodplains*

"Chapter 2 describes Flood Damage Prevention laws *implemented by local communities* to govern development in floodplains and floodways and also provides information about recent flooding events in the Susquehanna and Delaware River Basins."[196] (Emphasis added). "Local and state permitting processes that govern well development activities *should* consider the volume of fluids and materials associated with high-volume hydraulic fracturing."[197] (Emphasis added)

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[193] DSGEIS Section 1.4.2.
[194] MOA, ¶ 5.
[195] MOA, ¶ 12.
[196] DSGEIS at 6-42.
[197] *See id.*

RIVERKEEPER COMMENT 6.2

> Rather than discuss potential impacts, this section delegates this issue to local communities. Furthermore, one of DEC's "key factors" for determining that it needed to conduct this *supplemental* review was the possibility of drilling in or near the New York City Watershed, Catskill Park, and Upper Delaware Scenic and Recreational River.[198] This section contains no discussion of floodplains in these areas and potential impacts to them. This is particularly shocking given the historic and infamous floods that occur in the Catskill Park and the Catskill System of the New York City Watershed. This omission is irrational, arbitrary, and capricious. Furthermore, the DSGEIS states that local and state permitting processes "should" consider fracturing fluids and the volumes needed. This vague and incomprehensible statement is not a substitute for a thorough analysis of this issue. DEC must redraft this section and allow the public the opportunity to comment.

DSGEIS *6.X Primary and Principal Aquifers*

"Because they are largely contained in unconsolidated materials, the high permeability of Primary and Principal Aquifers and shallow depth to the water table, makes these aquifers particularly susceptible to contamination."[199]

RIVERKEEPER COMMENT 6.X

> "Certain aquifers in the region are heavily utilized for drinking water, have limited recharge, and are somewhat stressed due to demands."[200] Subjecting "particularly susceptible" aquifers to contamination increases concentrations of pollutants in groundwater, which compounds adverse impacts when aquifers are already stressed. The DSGEIS must address the foreseeable contamination of stressed aquifers in the NYC Watershed and throughout New York State.

DSGEIS *6.4 Ecosystems and Wildlife*

"The GEIS discusses the significant habitats known to exist at the time in or near then-existing oil and gas fields (heronries, deer wintering areas, and uncommon, rare and endangered plants). However, the potential mitigation measures for preventing harm to these habitats would also apply to others, such as the Upper Delaware Important Bird Area. Available site-specific options include required setbacks between the disturbance and a habitat or plant community, relocation of a proposed access road or well pad, replanting of cover vegetation in disturbed areas, complete avoidance of specific habitats or endangered plants and seasonal restrictions on specific operations."[201]

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[198] *See id.*at 1-4.
[199] DSGEIS at 6-43.
[200] DEP REPORT at 62
[201] DSGEIS at 6-43

RIVERKEEPER COMMENT 6.4

This section does not qualify as an analysis on Ecosystems and Wildlife. DEC admits that it is not relying on any additional information regarding habitats that it did not already rely upon in the 1992 GEIS. This implies that habitat throughout the state has not changed in the past 17 years. From an ecological perspective, this implication is absurd. Without analyzing what habitats have changed during the time period between the GEIS and the DSGEIS, the Department effectively prevents itself from proposing any actual habitat mitigation measures in specific areas. Further, DEC's unwillingness to investigate, or even mention, potential areas of concern other than one important bird area, however significant that bird area may be in terms of habitiat, represents the Department's abdication of its duty to protect the environment and makes this DSGEIS deficient.

DSGEIS *6.4.1 Invasive Species*

"The number of vehicle trips associated with high-volume hydraulic fracturing, particularly at multi-well sites, has been identified as an activity which presents the opportunity to transfer invasive terrestrial species. Surface water withdrawals also have the potential to transfer invasive aquatic species."[202]

"All machinery and equipment to be used in the construction of the proposed project, including but not limited to trucks, tractors, excavators, and any hand tools, must be washed with high pressure hoses and hot water prior to delivery to the project site to insure that they are free of invasive species."[203]

RIVERKEEPER COMMENT 6.4.1

Who will be responsible for monitoring preventive management practices for thousands of truckloads entering a project site? **SEE RIVERKEEPER COMMENT 6.11** below. What quality control measures will regulators implement? These issues must be addressed.

DSGEIS *6.4.2 Centralized Flowback Water Surface Impoundments*

"Division of Fish, Wildlife and Marine Resources (DFWMR) staff in the Department reviewed Tables 6.2 and 6.3 and concluded that the salt content of the flowback water should discourage most wildlife species from using the surface impoundments."[204]

RIVERKEEPER COMMENT 6.4.2-1

DEC must describe the site-specific and cumulative impacts of replacing potential wildlife habitat with surface water impoundments that will "discourage most wildlife

[202] *See id.* at 6-44.
[203] *See id.* at 7-76.
[204] *See id.* at 6-48.

species from using the surface impoundments." In other words, DEC acknowledges that high-volume hydraulic fracturing operations will destroy habitat but does not even attempt to describe mitigation in any meaningful form, other than to suggest that because wildlife will no longer be present, such wildlife does not require any protection. This position is arbitrary, capricious, and represents an abandonment of DEC's primary duties and responsibilities.

DSGEIS *6.4.2*

"DFWMR staff believe that the flowback water is probably not acutely toxic to waterfowl from short term contact, although adverse effects might result from more prolonged exposure."[205]

RIVERKEEPER COMMENT 6.4.2-2

All North American waterfowl are federally protected under the Migratory Bird Treaty Act. If drill operators propose to collaterally poison them, they will require a permit from the US Fish and Wildlife Service.

DEC must describe the protocols it currently has in place to ensure that industrial operators in New York comply with this federal requirement. The Department must also describe what additional protocols it will establish in order to account for an increasing number of permits for centralized flowback water surface impoundments. Further, DEC should inform the public of any discussion, or lack thereof, it has had with federal officials concerning this issue.

DEC should define what "might" means in terms of statistical significance. Otherwise, this analysis is insufficient to inform public participation and environmental protection.

SEE RIVERKEEPER APPENDIX 2: CEA REPORT.

DSGEIS *6.11 Road Use*

Up to 1,340 truckloads will be required for each drilling operation;[206] for multi-well pads, up to > 8,900 truckloads.[207]

RIVERKEEPER COMMENT 6.11

"The cumulative impact from trips to tens or hundreds of wells in an area could cause substantial additional stress on transportation infrastructure, resulting in increased erosion, repair costs for damage to DEP-maintained roads or bridges, and potential

[205] *See id.* at 6-48.
[206] *See id.* at 6-138.
[207] *See id.* at 6-142.

access problems to DEP facilities."[208] The DSGEIS must address the cumulative impacts of sustained, intensive road use.

DSGEIS *6.12 Community Character Impacts*

"Many of the community character impacts associated with horizontal drilling and high volume hydraulic fracturing are the same as those addressed in the 1992 GEIS, and no further mitigation measures are required. These include: 1) The possibility of injury to humans or the environment if site access is not properly restricted to prevent accidents or vandalism; 2) Temporal noise or visual impacts; 3) Temporary land use conflicts are identified in the discussion of unavoidable impacts; 4) Potential positive impacts from gas development identified including the availability of clean burning natural gas, generation of State and local taxes, revenues to landowners, and the multiplier effects of private investment in the State."[209]

RIVERKEEPER COMMENT 6.12

DEC concludes that the only community character impacts not addressed in the 1992 GEIS are trucking, land use changes, and environmental justice. This DSGEIS is deficient because, among other things, DEC ignores that the very reason for this DSGEIS is the longer duration of disturbances at each well site, drilling in areas with no drilling history, and increased waste volumes.[210] This analysis must also take into account documented reports from Pennsylvania and elsewhere. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

This section must also consider DEC's obligation to protect community character per the 1997 Watershed MOA.[211]

DSGEIS *6.13 Cumulative Impacts*

In its 1992 GEIS, the Department noted the following: "Though the potential for severe negative impacts from any one site is low. When all activities in the State are considered together, the potential for negative impacts on water quality, land use, endangered species and sensitive habitats increases significantly." [212]

RIVERKEEPER COMMENT 6.13

Although the above statement from DEC's 1992 GEIS is accurate, DEC's analysis of cumulative impacts in the current DSGEIS is completely inadequate. Rather than identify potential environmental impacts (which is the purpose of Chapter 6), the DSGEIS skips over this issue and states it cannot mitigate these undefined impacts.

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[208] DEP REPORT at ES-3, 41.
[209] DSGEIS at 6-139.
[210] DSGEIS at 3-2, 3-3.
[211] MOA, ¶ 6.
[212] *See* DSGEIS at 6-141 (citing the 1992 GEIS).

This is irrational. DEC must identify the statewide cumulative impacts from this new activity. After all, DEC's SEQRA handbook stresses the need for a lead agency to discuss cumulative impacts.[213]

"Even more than a conventional EIS, a GEIS is expected to contain a detailed discussion…of the cumulative, secondary and long-term impacts of the proposed action(s), and the growth inducing aspects."[214] Further, DEC's SEQRA Handbook states that a GEIS "should include elements not typically found" in a site-specific EIS, such as hypothetical situations.[215] Moreover, DEC's SEQRA Handbook states: "The generic EIS should identify upper limits of acceptable growth inducement in order to provide guidance to the decision maker." The DSGEIS utterly fails to identify regional cumulative impacts.

DSGEIS *6.13.1 Site-Specific Cumulative Impacts*

"The potential for site specific cumulative impacts as a result of multi-well pads, while real, is easily quantified and can be adequately addressed during the application review process."[216]

RIVERKEEPER COMMENT 6.13.1-1

DEC states that site specific cumulative impacts are easily quantified but that regional cumulative impacts are hard to quantify. This represents unwillingness by the Department to even attempt to quantify the magnitude and scope of the proposed action. Thus, the Department's assertions and implications throughout the DSGEIS that DEC is prepared to permit and monitor high-volume hydraulic fracturing operations statewide and that no additional regulations are needed are baseless.

DSGEIS *6.13.1*

"When reviewed in 1992, it was assumed that a well pad would be constructed, drilled and reclaimed in a period measured in a few months, with the most significant activity being measured in one or two weeks for the majority of wells. By comparison, a horizontal well takes four to five weeks of 24-hour-per-day drilling with an additional three to five days for the hydraulic fracture. This duration will be required for each well, with industry indicating that it is common for six to eight wells to be drilled on a multi-well pad. Typically, one or two wells are drilled and stimulated and then the equipment is removed. If the well(s) are economically viable, the equipment is brought back and the remaining wells drilled and stimulated. Current regulations require that all wells on a multi-well pad be drilled within three years of starting the first well. As industry gains confidence in the production of the play, there is the possibility that all wells on a pad

[213] DEC, SEQR Handbook, Chapter 5, Section H, *available at*, http://www.dec.ny.gov/permits/56701.html.
[214] Gerrard, Ruzow & Weinberg, *Environmental Impact Review in New York*, § 5.03[2], p.5-29 (Matthew Bender 2009) (*citing* DEC, The SEQR Handbook at 67, 80 (1992)).
[215] DEC, SEQR Handbook, Chapter 5, Section H, *available at*, http://www.dec.ny.gov/permits/56701.html.
[216] DSGEIS at 6-141.

would be drilled, stimulated and completed consecutively. This concept will shorten the time frame of noise generation and eliminate the noise generated by one rig disassembly/reassembly cycle."[217]

RIVERKEEPER COMMENT 6.13.1-2

> In essence, with regard to site specific cumulative impacts, DEC admits that the 1992 GEIS is largely irrelevant. Nevertheless, the Department offers little description on potential noise impacts that concludes with a statement that time frames may be shortened under some circumstances, without specifying what shortened time frames may be applicable. This "trust us" attitude pervades the DSGEIS and DEC does not provide adequate information to inform public participation.

DSGEIS *6.13.1*

"The trucking requirements for rigging and equipment will not be significantly greater than for a single well pad, especially if all wells are drilled consecutively. Water and materials requirements, however, will greatly increase the amount of trucking to a multi-well pad compared to a single well pad. Estimates of truck trips per multi-well pad are as follows (assumes two rig and equipment deliveries and 8 wells):

Drill Pad and Road Construction Equipment 10 – 45 Truckloads
Drilling Rig 60 Truckloads
Drilling Fluid and Materials 200 – 400 Truckloads
Drilling Equipment (casing, drill pipe, etc.) 200 – 400 Truckloads
Completion Rig 30 Truckloads
Completion Fluid and Materials 80 – 160 Truckloads
Completion Equipment – (pipe, wellhead) 10 Truckloads
Hydraulic Fracture Equipment (pump trucks, tanks) 300 – 400 Truckloads
Hydraulic Fracture Water 3,200 – 4,800 Tanker Trucks
Hydraulic Fracture Sand 160 – 200 Trucks
Flow Back Water Removal 1,600 – 2,400 Tanker Trucks.

In the production phase, the operations at multi-well pads are similar to what was addressed in 1992. There will be a small amount of equipment, including valves, meters, dehydrators and tanks remaining on site, which may be slightly larger than what is used for single wells but is still minor and is quiet in operation. The reclamation procedures are the same as for single well pads, however, there will be more area left for production equipment and activities. It is anticipated that a multi-well pad will require up to three acres compared to one acre or less as discussed in 1992."[218]

SEE RIVERKEEPER COMMENT 6.11.

DSGEIS *6.13.1*

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[217] *See id.* at 6-141, 142.
[218] *See id.* at 6-142, 143.

"As can be seen, the vast majority of trucking is involved in delivering water and removing flow back. Multiple wells in the same location provide the potential to reduce this amount of trucking by reusing flow back water for the stimulation of other wells on the same pad. The centralized location of water impoundments may also make it economically viable to transport water via pipeline or rail in certain instances."[219]

RIVERKEEPER COMMENT 6.13.1-3

Again, DEC suggests that an impact, (here, truck traffic) may be reduced without offering any quantitative analysis as to what level the impact will be reduced or a quantitative assessment of what the reduced level will be.

RIVERKEEPER COMMENT 6.13.1-4

The DSGEIS must include a discussion of what rails and/or pipelines may be utilized to transport water. What other agencies would be implicated in the review and permitting of transporting hazardous waste via rail?

DSGEIS *6.13.2 Regional Cumulative Impacts*

RIVERKEEPER COMMENT 6.13.2-1

This section is completely inadequate. Rather than identify potential environmental impacts (which is the purpose of Chapter 6), the DSGEIS skips over this issue and states it cannot mitigate these undefined impacts.

SEE RIVERKEEPER COMMENT 6.13.

DSGEIS *6.13.2*

Land disturbance comparison will be 1.5 to 3 acres per well pad.[220]

SEE RIVERKEEPER COMMENTS 5, 5.1.1.

DSGEIS *6.13.2*

"The level of impact on a regional basis will be determined by the amount of development and the rate at which it occurs. *Accurately estimating this is inherently difficult* due to the wide and variable range of the resource, rig, equipment and crew availability, permitting and oversight capacity, leasing, and most importantly, economic factors. This holds true regardless of the type of drilling and stimulation utilized."[221]

RIVERKEEPER COMMENT 6.13.2-2

[219] *See id.* at 6-142.
[220] *See id.* at 6-144.
[221] *See id.* at 6-143 (emphasis added).

DEC's attempt to avoid any estimate of regional cumulative impacts analysis is contrary to the Department's explicit duties and obligations under SEQRA.

It is inexplicable and inexcusable that DEC is able to estimate potential economic impacts but not able to estimate potential cumulative environmental impacts. This is nonsensical and a clear violation of the Department's responsibilities as a lead agency under SEQRA. Economic benefits must by nature be based on some estimate. However, when it comes to analyzing potential environmental costs, the agency simply throws up its hands and proclaims that it is unable come up with any projected estimate. If cumulative impacts cannot be estimated, then the proposed action cannot be properly evaluated by the public and the No Action alternative is the only action that can be legally authorized by the Department.

DSGEIS *6.13.2*

"As with the development addressed in 1992, once drilling and stimulation activities are completed and the sites have been reclaimed, the long term impact will consist of widely spaced and partially re-vegetated production sites and fully reclaimed plugged and abandoned well sites."[222]

RIVERKEEPER COMMENT 6.13.2-3

This is a conclusory statement with no scientific basis. It is virtually impossible that the only long term impacts of increased gas development will be "partially re-vegetated production sites and fully reclaimed plugged and abandoned well sites." Blanket statements like this preclude proper analysis by the Department and render this DSGEIS deficient. The DSGEIS should be re-drafted to include proper discussion of other potential long-term impacts that may result from increased gas development in New York.

DSGEIS *6.13.2*

"The statewide spacing regulations for vertical shale wells of one single well pad per 40-acre spacing unit will allow no greater density for horizontal drilling with high volume hydraulic fracturing than is allowed for conventional drilling techniques. This density was anticipated in 1992 and areas of New York, including Chautauqua, Cayuga and Seneca Counties, have experienced drilling at this level without significant negative impacts to agriculture, tourism, other land uses or any of the topics discussed in this report."[223]

RIVERKEEPER COMMENT 6.13.2-4

[222] *See id.*
[223] *See id.*

The Department's narrow focus here on the *density* of well pads is misplaced and is inadequate for purposes of scientifically analyzing potential cumulative impacts that may result from a variety of aspects of drilling operations other than well site density. The DSGEIS should be re-drafted to include an expanded analysis of the numerous other potential cumulative impacts that may result from increased gas development in New York.

DSGEIS *6.13.2*

DEC states it is difficult to estimate the amount of shale gas development, and therefore it cannot estimate the level of impact on a regional basis. "As can be seen, multi-well pads will significantly decrease the amount of disturbance on a regional basis in all phases of development. The reduction in sites should also allow for more resources to be devoted to proper siting and design of the pad and to mitigating the short-term impacts that occur during the drilling and stimulation phase."[224]

RIVERKEEPER COMMENT 6.13.2-5

This section is inadequate. DEC must identify regional cumulative impacts. Simply because 640-acre spacing for multi-well pads is larger than 40-acre spacing for vertical wells does not relieve DEC of its obligation to identify regional cumulative impacts. DEC must redraft this section and again make it available for public review.

Indeed, DEC's very own SEQR Handbook instructs that a GEIS is particularly well suited to identifying and analyzing cumulative impacts. The Handbook states:

- "The broader focus of a generic EIS may aid the lead agency in identifying and broadly analyzing the ***cumulative impacts*** of a group of actions."
- "A generic EIS may be useful to" "[a]ccount for ***cumulative impacts***, regional influences, or secondary effects of an overall program or group of actions."
- "A generic EIS may also be the most effective way for an agency to assess potential significant ***cumulative impacts*** from a number of small projects that individually do not have a significant impact on the environment."
- "Finally, a generic EIS allows an agency to examine ***cumulative impacts*** of multiple potential projects on a particular resource, even if none of the projects considered individually would lead to significant impacts."[225]

DSGEIS *6.13.2.1 Rate of Development and Thresholds*

DEC states it cannot predict the rate of development. DEC states it cannot set a limit on the rate of development of the Marcellus Shale.

SEE RIVERKEEPER COMMENT 6.13.

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[224] *See id.* at 6-144.
[225] DEC, SEQR Handbook, Chapter 5, Section H ("Generic EISs"), *available at*, http://www.dec.ny.gov/permits/56701.html.

DSGEIS *6.13.2.1*

The DSGEIS also states that "it is [not] possible to define the threshold at which development results in adverse noise, visual and community character impacts."[226]

RIVERKEEPER COMMENT 6.13.2.1-1

> This statement is completely inadequate and flies in the face of DEC's obligations as lead agency. Moreover, DEC apparently limits its analysis to noise, visual and community character impacts. There is no basis for this. DEC made no attempt to identify cumulative impacts from wastewater, air, stormwater, and roads, among many others.

RIVERKEEPER COMMENT 6.13.2.1-2

> DEC audaciously relies on its own Final Scope to offer the baseless conclusion that it is not possible "to define the threshold at which development results in adverse noise, visual and community character impacts," adding that "[s]ome people will feel that one drilling rig on the landscape is too many, while others will find the changes in the landscape inoffensive and will want full development of the resource as quickly as possible. There is no way to objectify these inherently subjective perspectives. As a result, there is no supportable basis on which to set a limit on the rate of development of the Marcellus and other low-permeability gas reservoirs."[227]
>
> DEC's express duties include regulating industrial development in order to protect the environment. With the above statement, DEC indicates that is either unwilling and/or unable to carry out its commitments under the Environmental Conservation Law. Unless and until such time that the Department wishes to resume its obligations, its status as lead agency is untenable.

DSGEIS *6.13.2.1*

"It is certain that widespread development of the Marcellus shale as described in this document will have community impacts that will change the quality of life in the affected areas in the short term."[228]

RIVERKEEPER COMMENT 6.13.2.1-3

> DEC offers no explanation for how it determined that, on one hand, quality of life will certainly be affected in the short term, but on the other hand, it is impossible to determine how quality of life will be affected in the long term. The DSGEIS must be redrafted to account for this.

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[226] DSGEIS at 6-145.
[227] *See id.* at 6-145-146.
[228] *See id.* at 6-146.

DSGEIS *6.13.2.1*

"For purposes of this review, however, there is *no sound basis* for an administrative determination limiting the shale development on the basis of those changes at this time. Accordingly, any limitation on development, aside from the mitigation measures discussed in the next chapter, is more appropriately considered in the context of policy making, primarily at the local level, outside of the SGEIS."[229]

RIVERKEEPER COMMENT 6.13.2.1-4

DEC relies upon its own unwillingness and/or inability to estimate long-term impacts in order to conclude that it has "no sound basis" for an administrative determination limiting shale development. This represents an abdication of the Department's duties under the ECL; it is arbitrary, capricious, unprofessional and highly irresponsible.

DSGEIS *6.14 Seismicity*

"There are no seismic monitoring protocols or criteria established by regulatory agencies that are specific to high volume hydraulic fracturing."[230]

RIVERKEEPER COMMENT 6.14

"Induced seismicity is known to be associated with injection wells, and has reportedly been linked with hydrofracturing operations. Given the widespread use of injection wells for disposal of wastes in other regions, the possibility of causing or accelerating changes in subsurface faults and fractures, and the creation of new or enhanced flow paths, is considered a potential risk to water supply infrastructure."[231]

"Seismic energy released during testing can range from 2,000 to over 100,000 foot-pounds and could potentially be a threat to nearby shallow infrastructure.[232]

"In the 1960s the U.S. Army injected millions of gallons of brine and chemical waste into a formation approximately 12,000 feet below the surface at the Rocky Mountain Arsenal in Colorado. The well was implicated in inducing a series of earthquakes that lasted over ten years, the largest of which was 5.3 on the Richter scale. The injected fluid is believed to have lubricated a dormant fault line."[233]

These facts and circumstances indicate that seismic monitoring protocols are imperative in environmentally sensitive areas such as the NYC Watershed, where

[229] *See id.* (emphasis added)
[230] *See id.* at 6-150.
[231] DEP REPORT at ES-4.
[232] *See id.* at 66.
[233] *See id.*

seismic events are considered a potential risk to water supply infrastructure. **SEE RIVERKEEPER COMMENT 4.5.4**.

DSGEIS *6.14*

"Avoiding pre-existing fault zones minimizes the possibility of triggering movement along a fault through hydraulic fracturing. It is important to avoid injecting fluids into known, significant, mapped faults when hydraulic fracturing. Generally, operators will avoid faults because they disrupt the pressure and stress field and the hydraulic fracturing process. The presence of faults also potentially reduces the optimal recovery of gas and the economic viability of a well or wells."[234]

RIVERKEEPER COMMENT 6.14

By not proposing to put any areas off limits in order to minimize the possibility of triggering movement along a fault, DEC is abdicating its responsibilities to protect the environment and is violating applicable laws as a lead agency under SEQRA.

DSGEIS *6.14.1.1 Background*

"There are no seismic monitoring protocols or criteria established by regulatory agencies that are specific to high volume hydraulic fracturing. Nonetheless, operators monitor the hydraulic fracturing process to optimize the results for successful gas recovery. It is in the operator's best interest to closely control the hydraulic fracturing process to ensure that fractures are propagated in the desired direction and distance and to minimize the materials and costs associated with the process."[235]

RIVERKEEPER COMMENT 6.14.1.1

For purposes of protecting the environment by evaluating potential environmental impacts, it is irrelevant what practices may be in the operator's best interest, unless it can be proven that operators' best interests conclusively ensure that seismicity has never been an issue with regards to high-volume hydraulic fracturing.

DSGEIS *6.14.1.2 Recent Investigations and Studies*

"The Bureau of Geology, the University of Texas' Institute of Geophysics, and Southern Methodist University are planning to study earthquakes measured in the vicinity of the Dallas–Fort Worth (DFW) area, and Cleburne, Texas, that appear to be associated with salt water disposal wells, and oil and gas wells. The largest quakes in both areas were magnitudes of 3.3, and more than 100 earthquakes with magnitudes greater than 1.5 have been recorded in the DFW area in 2008 and 2009."[236]

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[234] DSGEIS at 6-149.
[235] *See id.* at 6-150.
[236] *See id.* at 6-152.

SEE RIVERKEEPER COMMENTS 4.5.4, 6.14.

DSGEIS *6.14.1.4 Affects of Seismicity on Wellbore Integrity*

"Earthquake-damaged wells can often be re-completed. Wells that cannot be repaired are plugged and abandoned (Foxall and Friedmann, 2008). Induced seismicity from hydraulic fracturing is of such small magnitude that it is not expected to have any effect on wellbore integrity."[237]

RIVERKEEPER COMMENT 6.14.1.4

> The DSGEIS should include analysis on any and all environmental impacts that may result from the plugging and abandonment of wells that cannot be repaired.

DSGEIS *6.14.2 Summary of Potential Seismicity Impacts*

"It is Alpha's opinion that an independent pre-drilling seismic survey probably is unnecessary in most cases because of the relatively low level of seismic risk in the fairways of the Marcellus and Utica shales. Additional evaluation or monitoring may be necessary if hydraulic fracturing fluids might reach a known, significant, mapped fault, such as the Clarendon-Linden fault system."[238]

RIVERKEEPER COMMENT 6.14.2-1

> DEC relies on Alpha's finding that pre-drilling seismic surveys are unnecessary and then states that additional evaluation or monitoring may be necessary. DEC should explain this apparent contradiction and discuss what specific events might warrant additional monitoring and why additional monitoring would be warranted only after such events have been triggered.

DSGEIS *6.14.2*

"There is a reasonable base of knowledge and experience related to seismicity induced by hydraulic fracturing. Information reviewed in preparing this discussion indicates that there is essentially no increased risk to the public, infrastructure, or natural resources from induced seismicity related to hydraulic fracturing. The microseisms created by hydraulic fracturing are too small to be felt, or to cause damage at the ground surface or to nearby wells."[239]

RIVERKEEPER COMMENT 6.14.2-2

> Will NYC's infrastructure such as the Delaware Aqueduct "feel" microseismic events? What would be the effects on towns like Wawarsing or on the overall water

[237] *See id.* at 6-154.
[238] *See id.*
[239] *See id.* at 6-155.

supply? The DSGEIS is deficient as it does not even begin to answer these questions in a scientifically sound manner.

RIVERKEEPER COMMENT 6.14.2-3

If DEC does not have photographs depicting what the areas shown in photos 6.3 and 6.4 looked like pre-drilling, then it remains unclear what purpose these photos serve.

DSGEIS Chapter 7 Mitigation Measures

"The proposed EAF Addendum contains a series of informational requirements…that also serve as mitigation measures."[240]

RIVERKEEPER COMMENT 7

As a preliminary matter, DEC must explain how "informational requirements" are "mitigation measures." This statement is nonsensical. In addition, it is wholly inappropriate to use mere permit conditions to mitigate impacts from high-volume hydraulic fracturing. DEC must promulgate new regulations to govern this statewide activity, rather than through ad hoc permit requirements.

DSGEIS *7.1 Protecting Water Resources*

Impacts to water resources are to be mitigated by DEC, SRBC & DRBC regulations.[241]

RIVERKEEPER COMMENT 7.1-1

"There is a broad range of activities during natural gas development that have the potential to contaminate groundwater or surface water supplies, cause reliability problems from water withdrawals, or damage critical DEP infrastructure. Effective regulation, inspection programs, inter-agency coordination, and regional planning can minimize these potential impacts, *but they cannot be expected to eliminate risks to the water supply*.[242] As discussed above, NYC Watershed stakeholders cannot rely on the DEC permit system to mitigate impacts to the water supply from fracturing activities. **SEE RIVERKEEPER COMMENT 5.16.8**.

Furthermore, SRBC and DRBC have no authority in the Catskill Watershed. The existing regulatory framework is therefore inadequate to protect water resources in the NYC Watershed.

DSGEIS *7.1*

[240] *See id.* at 7-2.
[241] *See id.* at 7-2 *et seq*.
[242] DEP REPORT at 9 (emphasis added).

"In addition to its specific authority to regulate well operations to protect the environment, the Department also has broad authority to "[p]romote and coordinate management of water… resources to assure their protection, enhancement, provision, allocation and balanced utilization… and take into account the cumulative impact upon all of such resources in making any determination in connection with any…permit…"[243]

RIVERKEEPER COMMENT 7.1-2

The Department fails to discuss or analyze potential impacts to the Hudson River. Specifically, the DSGEIS should include analysis of how accidental and/or permitted discharges into the Hudson River would affect the drinking water supplies of those municipalities that draw drinking water from the Hudson.

In addition, the DSGEIS contains no discussion of how the proposed action may impact the State's impaired waterbodies.

SEE RIVERKEEPER COMMENT 7.1-1.

DSGEIS *7.1*

"The Department has broad authority to '[p]romote and coordinate management of water…and take into account the cumulative impact upon all such resources…'"[244] (citing ECL §23-0301(b)).

RIVERKEEPER COMMENT 7.1-3

Footnote 2 in this section cites to the wrong statute. Rather than ECL §23-0301(b), footnote 2 should cite to ECL §3-0301(b).

DEC's statutory authority identified in ECL §3-0301 identifies numerous instances where DEC must protect water resources. Significantly, absolutely nothing in ECL §3-0301 authorizes DEC to promote the extraction of natural gas.

The first part of DEC's general functions, powers, and duties state that "It shall be the responsibility of the department…to carry out the environmental policy of the state set forth in section 1-0101." ECL §3-0301.

New York's statutory environmental policy states:

1. The quality of our environment is fundamental to our concern for the quality of life. It is hereby declared to be the policy of the State of New York to conserve, improve and protect its natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance

[243] DSGEIS at 7-3.
[244] *See id.*

the health, safety and welfare of the people of the state and their overall economic and social well being.

2. It shall further be the policy of the state to improve and coordinate the environmental plans, functions, powers and programs of the state, in cooperation with the federal government, regions, local governments, other public and private organizations and the concerned individual, and to develop and manage the basic resources of water, land, and air to the end that the state may fulfill its responsibility as trustee of the environment for the present and future generations.

3. It shall further be the policy of the state to foster, promote, create and maintain conditions under which man and nature can thrive in harmony with each other, and achieve social, economic and technological progress for present and future generations by:
   (a.) Assuring surroundings which are healthful and aesthetically pleasing;
   (b.) Guaranteeing that the widest range of beneficial uses of the environment is attained without risk to health or safety, unnecessary degradation or other undesirable or unintended consequences;
   (c.) Promoting patterns of development and technology which minimize adverse impact on the environment;
   (d.) Preserving the unique qualities of special resources such as the Adirondack and Catskill forest preserves;
   (e.) Providing that care is taken for the air, water and other resources that are shared with the other states of the United States and with Canada in the manner of a good neighbor." ECL § 1-0101.

Nowhere in the plain language of this unambiguous statutory policy is the extraction of natural gas mentioned, let alone encouraged. This policy expands upon the New York State Constitution's directive to that it is policy is to "conserve and protect its natural resources …."[245]

ECL § 3-0301(1) charges DEC with the responsibility of carrying out this policy enunciated in ECL § 1-0101.[246] It is apparent that the legislature intended the general provisions regarding the mission of DEC contained in §1-0101 and §03-0301 to inform the application and enforcement of subsequent provisions. The "powers and duties of [NYSDEC] and the [DEC] commissioner" must be exercised to "carry out the environmental policy set forth in section 1-0101."[247]

In addition, the State Environmental Quality Review Act ("SEQRA") requires that "to the fullest extent possible" State statutes and regulations must be interpreted and administered in accordance with SEQRA's policies.[248] Pursuant to SEQRA, it is state

[245] NY CONST. ART. XIV § 4.
[246] *Id.* § 3-0301(1).
[247] *Id.*
[248] ECL § 8-0103(6).

policy "to promote efforts which will prevent or eliminate damage to the environment and enhance human and community resources"[249]; all agencies "have an obligation to protect the environment for the use and enjoyment of this and future generations"[250]; and all agencies "shall regulate…activities so that due consideration is given to preventing environmental damage."[251]

It is this statutory mandate that must guide the mitigation measures DEC proposes in Chapter 7. Furthermore, the clear policy in ECL § 1-0101 require DEC to "preserve the unique qualities of special resources such as the Adirondack and Catskill forest preserves." Without question these special resources should include, at a minimum, the New York City Watershed.

Thus, DEC cannot legally promote horizontal drilling and high-volume hydraulic fracturing over the Department's clear statutory commands.

In short, the wishes of DEC's Division of Mineral Resources to encourage industrial gas drilling cannot trump New York's unambiguous state policy to conserve, improve and protect natural resources.

DSGEIS *7.1.1 – Water Withdrawal Regulatory and Oversight Programs*

"Existing jurisdictions and regulatory programs address some concerns regarding the impacts related to water withdrawals that are described in Chapter 6."[252]

RIVERKEEPER COMMENT 7.1.1

DEC states that existing regulatory programs address only "some" impacts. The DSGEIS does not attempt to delineate which impacts are addressed, but only "some." This is unacceptable. The DSGEIS must identify fully all regulatory gaps and propose mitigation measures for impacts that may not be currently regulated. These include regulation of wetlands below a certain acreage size and water withdrawals in New York. Furthermore, simply identifying existing regulations only defers analysis of critical issues and is an improper segmentation of issues. DEC, as lead agency, has the legal responsibility to analyze all issues fully.

DSGEIS *7.1.1.1 NYSDEC Jurisdictions*

"The concern for aquifer depletion due to increased ground water use is New York currently is being reviewed and addressed by the DEC."[253]

RIVERKEEPER COMMENT 7.1.1.1-1

[249] ECL § 8-0101.
[250] ECL § 8-0103(8).
[251] ECL § 8-0103(9).
[252] *See id.*
[253] DSGEIS at 7-6.

Because aquifer depletion is not addressed in DSGEIS, no informed review is possible. A revised DSGEIS must address this deficiency.

DSGEIS *7.1.1.1*

"[T]he placement of a structure to withdraw surface water or to withdraw groundwater within 100 feet of a wetland requires a permit… If there is no alternative location, a permit can only be granted if the structure has no impact on the wetlands or if that impact is outweighed by an economic and social need."[254]

RIVERKEEPER COMMENT 7.1.1.1-2

This section contains absolutely no analysis of impacts to wetlands from water withdrawals and proposes no mitigation measures. Rather, the DSGEIS simply states that actions located within 100 feet of DEC regulated wetlands "generally require" a DEC permit. Shockingly, neither this section nor any other in the DSGEIS contains a discussion of any mitigation measures for water withdrawal impacts to wetlands. This is despite the DSGEIS statement that "withdrawal of surface water or groundwater for high volume hydraulic fracturing could impact wetland resources."[255] DEC must rewrite this section, analyze wetland impacts from water withdrawals, propose mitigation measures, and make them available for public comment.

For example, there is no discussion of how upstream withdrawals could impact wetlands, whether or not regulated by DEC, and what the mitigation measures for these impacts would be. This is despite the fact that one of the "key factors" for this *supplemental* GEIS is the amount of water needed in high-volume hydraulic fracturing. This omission is irrational, arbitrary, and capricious.

RIVERKEEPER COMMENT 7.1.1.1-3

Nothing in New York's environmental policy allows DEC to grant a permit to place a structure within 100 feet of a DEC regulated wetland "if that impact is outweighed by an economic and social need." DEC is statutorily obligated to carry out New York's environmental policy.[256] Nothing in this policy allows DEC to permit wetland impacts if economic needs outweigh the impacts.[257] In fact, DEC's statement in the DSGEIS contradicts state policy. DEC must revise this section to conform to state law.

RIVERKEEPER COMMENT 7.1.1.1-4

[254] *See id.* at 7-6.
[255] *See id.* at 6-6.
[256] *See* ECL § 3-0301.
[257] *See* ECL § 1-0101.

DEC proposes no mitigation measures for this impact. This is an improper segmentation and deferral of an issue ripe for inclusion in this DSGEIS. DEC must include this in a revised draft SGEIS and make it available for public comment.

DSGEIS *7.1.1.2 Other Jurisdictions - Great Lakes-St. Lawrence River Water Resources Compact*

"No significant adverse individual or cumulative impacts shall [sic] to the quantity of the waters and water-dependent natural resources"[258]

RIVERKEEPER COMMENT 7.1.1.2

New York State has not passed legislation to enforce this condition, so it does not apply to activities in the NYC Watershed.

DSGEIS *7.1.1.3 Other Jurisdictions - River Basin Commissions*

This section discusses DRBC and SRBC regulations.[259]

RIVERKEEPER COMMENT 7.1.1.3

DRBC and SRBC regulations do not apply to the Catskill watershed.

DSGEIS *7.1.1.4 – Impact Mitigation Measures for Surface Water Withdrawals*

The DSGEIS states that the Natural Flow Regime Method, DEC's preferred method, is designed to avoid impacts associated with "degradation of a stream's best use and reduced stream flow including impacts to aquatic habitat and aquatic ecosystems."[260]

RIVERKEEPER COMMENT 7.1.1.4

This "mitigation measure" fails to address impacts to wetlands from water withdrawals. This is despite the DSGEIS' statement that "withdrawal of surface water or groundwater for high volume hydraulic fracturing could impact wetland resources."[261] DEC must provide mitigation measures for this impact. As drafted, DEC has deprived the public of the opportunity to comment on any wetland mitigation measures.

DSGEIS *7.1.2 Stormwater*

Stormwater Pollution Prevention Plans (SWPPPs) address the significant impacts of erosion, contaminant discharge and nutrient pollution associated with industrial activity.

[258] *See id.* at 7-7.
[259] *See id.* at 7-7—7-22.
[260] *See id.* at 7-18.
[261] *See id.* at 6-6.

"Such concerns are raised with…access roads, drill pads, impoundments, staging areas, and pipeline routes."[262]

RIVERKEEPER COMMENT 7.1.2-1

SEE RIVERKEEPER APPENDIX 2: CEA REPORT.

RIVERKEEPER COMMENT 7.1.2-2

DEC acknowledges that pipelines present significant impacts. The DSGEIS must address this issue.

SEE RIVERKEEPER COMMENTS 5, 5.1.1.

DSGEIS *7.1.2*

DEC "has determined that natural gas well development using high-volume hydraulic fracturing is eligible for inclusion in Sector AD of the Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-06-002) (MGSP)." DEC "is proposing the option of amending this Multi-Sector General Permit to address a number of potential pollutant discharges associated with the subject operations."[263]

RIVERKEEPER COMMENT 7.1.2-3

SEE RIVERKEEPER COMMENTS 5, 5.1.1.

DSGEIS *7.1.2*

"A SWPPP, meeting or exceeding the requirements of the Construction General Permit, must be developed as a stand-alone document and incorporated, by reference, in a comprehensive SWPPP."[264]

RIVERKEEPER COMMENT 7.1.2-4

"A SWPPP…must be incorporated…in a comprehensive SWPPP." DEC should explain what this means or correct the statement.

DSGEIS *7.1.3 – Surface Spills and Releases at the Well Pad*

DEC's proposed spill prevention and mitigation measures reflect consideration of certain information Department staff reviewed, including the 1992 GEIS, a survey of other state regulations, industry documents, and DEC guidance documents.

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[262] *See id.* at 7-22.
[263] *See id.* at 7-23.
[264] *See id.* at 7-24.

RIVERKEEPER COMMENT 7.1.3

DEC must consider the case studies from the Marcellus Shale and other shale reserves where spills have occurred, including some very recent, well publicized spills. DEC must not rely solely upon industry documents and other state regulations to study the frequency and likelihood of spills.

SEE RIVERKEEPER APPENDIX 1 CASE STUDIES.

DSGEIS *7.1.3.1 Drilling Rig Fuel Tank and Tank Refilling Activities*

"The comprehensive Stormwater Pollution Prevent Plan (SWPPP) that is required by the Department's Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-06-002) (MSGP) will include Best Management Practices to minimize or eliminate pollutants in stormwater."[265]

RIVERKEEPER COMMENT 7.1.3.1-1

SEE RIVERKEEPER COMMENTS 5, 5.1.1.

DSGEIS *7.1.3.1*

"The diesel tank associated with the larger rigs…may be larger than 10,000 gallons in capacity…[266] [T]he Department will encourage operators to position the tank more than 500 feet from" certain water resources."[267]

RIVERKEEPER COMMENT 7.1.3.1-2

These tanks should not be allowed within the New York City Watershed or any other surface drinking water supply watershed.

RIVERKEEPER COMMENT 7.1.3.1-3

The Department must do more than "encourage" operators to position these thanks within 500 feet of aquifers, water wells, water-supply springs, wetlands, and ponds. The Department should establish firm setbacks, rather than amorphously encouraging operators to position tanks more than 500 feet from these water resources.

RIVERKEEPER COMMENT 7.1.3.1-4

The Department must explain how it arrived at the 500 feet setback for these tanks. Nothing in the DSGEIS indicates how DEC arrived at this figure.

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[265] *See id.* at 7-27.
[266] *See id.* at 7-26.
[267] *See id.* at 7-27.

DSGEIS *7.1.3.2 Drilling Fluids*

"… measures will be implemented to mitigate the potential for releases associated with the on-site reserve pit… Diversion of surface water and stormwater runoff away from the pit,"[268]

RIVERKEEPER COMMENT 7.1.3.2-1

SEE RIVERKEEPER COMMENTS 5, 5.1.1.

DSGEIS *7.1.3.2*

"The GEIS describes reserve pits excavated at the well which may contain drill cuttings, drilling fluid, formation water, and flowback water from a single well."[269]

RIVERKEEPER COMMENT 7.1.3.2-2

The Department must not allow these open pits within the boundaries of unfiltered water supply areas such as the New York City Watershed.

RIVERKEEPER COMMENT 7.1.3.2-3

The description in the DSGEIS envisions reserve pits to be used only for a "single well." There is nothing to envision reserve pits being used for multiple wells, despite DEC's clear understanding that there will be multiple-well sites. DEC must revise this section to reflect this fact. Further, there is no analysis of potential impacts of the placement of these pits in the Catskill Park or near the Wild and Scenic Upper Delaware River, one of the "key reasons" for this *supplemental* GEIS.[270] DEC must include this analysis.

RIVERKEEPER COMMENT 7.1.3.2-4

There is nothing in this section to reflect the fact that water volumes for high-volume hydraulic fracturing operations will be in excess of GEIS descriptions, despite DEC's acknowledgement that this is one of the "key reasons" for this *supplemental* GEIS.[271] DEC must revise this section to account for this.

RIVERKEEPER COMMENT 7.1.3.2-5

[268] *See id.* at 7-30.
[269] *See id.* at 7-28.
[270] *See id.* at 1-4.
[271] *See id.*

There is nothing in this section to account for the longer duration of disturbance at multi-well sites, one of DEC's "key reasons" for conducting this *supplemental* GEIS.[272] DEC must revise this section to analyze this issue.

RIVERKEEPER COMMENT 7.1.3.2-6

DEC must establish adequate setback requirements for these pits from aquifers, water wells, wetlands, and ponds. As drafted, there is nothing to prevent operators from siting pits adjacent to surface water supplies or wetlands. This is unacceptable.

DSGEIS *7.1.3.4 – Flowback Water*

The "Department proposes a requirement that flowback water handled at the well pad be directed to and contained in steel tanks."[273]

RIVERKEEPER COMMENT 7.1.3.4-1

For reasons stated below, the Department must not allow these tanks within the boundaries of unfiltered water supply areas such as the New York City Watershed.

RIVERKEEPER COMMENT 7.1.3.4-2

There is no analysis in this section about potential impacts of placement of these tanks in the Catskill Park or near the Wild and Scenic Upper Delaware River, one of the "key reasons" for this *supplemental* GEIS.[274] DEC must include this analysis. Frequent, intense flooding is well documented within these areas. At a minimum, DEC must study the impact of floods on these tanks.

RIVERKEEPER COMMENT 7.1.3.4-3

There is nothing in this section to reflect the fact that water volumes in high-volume hydraulic fracturing will be in excess of GEIS descriptions, despite DEC's acknowledgement that this is one of the "key reasons" for this *supplemental* GEIS.[275] DEC must revise this section to account for this. For example, there is nothing indicating whether DEC expects operators to use multiple steel tanks on site and the volume capacity of these tanks. This information is fundamental to analyzing these impacts and is absent from this section.

RIVERKEEPER COMMENT 7.1.3.4-4

[272] *See id.*
[273] *See id.* at 7-34.
[274] *See id.* at 1-4.
[275] *See id.* .

There is nothing in this section to account for the longer duration of disturbance at multi-well sites, one of DEC's "key reasons" for conducting this *supplemental* GEIS.[276] DEC must revise this section to analyze this issue.

RIVERKEEPER COMMENT 7.1.3.4-5

DEC must establish adequate setback requirements for these tanks from aquifers, water wells, water-supply springs, wetlands, and ponds. As drafted, there is nothing preventing operators from siting tanks adjacent to surface water supplies or wetlands. This is unacceptable.

DSGEIS *7.1.3.4*

"Supplementary permit conditions for high-volume hydraulic fracturing will include the following requirements: a. Fluids removed if there will be a hiatus in site activity longer than 45 days, b. Fluids removed within 45 days of completing drilling and stimulation operations at last well on pad, and c. Fluid transfer operations from tanks to tanker trucks must be manned at the truck and at the tank if the tank is not visible to the truck operator from the truck."[277]

RIVERKEEPER COMMENT 7.1.3.4-6

DEC should explain the scientific basis for the 45-day timeframe. In other words, why would fluids need to be removed if there is a hiatus longer than 45 days, but not if a hiatus is 45 days or less? Flood events, erosion, and other stormwater concerns associated these fluids do not recognize a 45-day timeframe. DEC offers no explanation for its adoption of this timeframe. A revised DSGEIS must describe the methodology used by DEC to determine this seemingly arbitrary figure.

DSGEIS *7.1.4 Ground Water Impacts Associated With Well Drilling and Construction*

"Existing construction and cementing practices and permit conditions to ensure the protection and isolation of fresh water will remain in use, and will be enhanced by Supplementary Permit Conditions for High-Volume Hydraulic Fracturing."[278]

RIVERKEEPER COMMENT 7.1.4

It is "important to note that risks to the water supply cannot be eliminated entirely, and that water quality incidents (e.g. spills, leaks) should be anticipated."[279]

DSGEIS *7.1.4.1 Private Water Well Testing*

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[276] *See id.*
[277] *See id.* at 7-34.
[278] *See id.* at 7-36.
[279] DEP REPORT at ES-6.

"Supplementary permit conditions for high-volume hydraulic fracturing will require the sampling and testing of residential water wells within 1,000 feet of the well pad, subject to the property owner's permission, or within 2,000 feet of the well pad if no wells are available for sampling within 1,000 feet either because there are none of record or because the property owner denies permission."[280]

RIVERKEEPER COMMENT 7.1.4.1-1

This condition should include a requirement to drill test wells if no existing wells are available for sampling within 2,000 feet of the well pad; the absence of residential wells at a rural drill site does not preclude contamination of groundwater aquifers, which can extend for many miles and contaminate more distant groundwater and surface water supplies used for drinking water.

DSGEIS *7.1.4.1*

"The New York State Department of Health recommends water well testing as set forth in Table 7.1 [sic] prior to using a new residential water well. DEC proposes that the same parameters also be tested prior to high-volume hydraulic fracturing, in order to establish a baseline and to ensure that pre-existing conditions are adequately characterized."[281]

RIVERKEEPER COMMENT 7.1.4.1-2

DEC incorrectly references Table 7.1 instead of Table 7.3. DEC also includes two tables labeled "Table 7.3" in this chapter. The second Table 7.3 should be correctly labeled "Table 7.4." A revised DSGEIS should correct these mistakes.

The above-described procedure is entirely reactive and does not provide for continuous monitoring once baseline data have been established. DOH should conduct voluntary, free-of-charge (at the project sponsor's expense) monitoring on a regular basis throughout the life of the drilling operation and beyond once operations have ceased. Without continuous proactive monitoring, if drinking well water consumers cannot see, taste, or smell any of the toxic and/or carcinogenic compounds known to be used in fracturing fluid, they may ingest them unknowingly. DOH therefore should screen well monitoring samples for a wider array of organics than simply methane and benzene as proposed at DSGEIS 7-41.

DSGEIS *7.1.4.1*

"Contaminant-indicators should be included in the initial, pre-drilling or baseline round of sampling to ensure that pre-existing conditions are considered in response to complaints of suspected contamination. Of the above parameters, barium, TDS and pH are identified as those which could initially suggest contamination as a result of the fracturing operation. Monitoring for strontium, sodium, chloride, hardness, surfactants,

[280] DSGEIS at 7-38.
[281] *See id.* at 7-39.

TSS, iron, carbonates and bicarbonates could provide a better understanding of the extent of potential contamination. As diesel-based fracturing fluid is not proposed or reviewed by this Supplement, the primary reason for its inclusion is to indicate above-ground fuel spills.45 NYSDOH Bureau of Environmental Radiation Protection staff indicates that total gross alpha activity is an inexpensive (but effective) screening tool, and would indicate the need for additional analysis if the value is greater than 15 pCi/L. Analysis of changes in static water level should carefully consider the well's construction, maintenance and operational history, recent precipitation and use patterns, the season and the effects of competing wells."[282]

RIVERKEEPER COMMENT 7.1.4.1-3

> DEC does not suggest any actual enforceable requirements or even indicate that it may be considering enforceable requirements in the future. As lead agency, DEC is tasked with doing more than simply recommending what "should" be measured or what measurements "could" provide more information. In the DSGEIS, DEC must explain the scientific basis for not proposing any requirements for the testing of water wells and describe how this omission does not represent a violation of its duties to protect the environment.

DSGEIS *7.1.4.1*

"The diversity of jurisdictions having authority over local water supplies complicates the response to complaints about water supplies, including those complaints that complainants believe are related to oil and gas activity. Water supply complaints occur statewide and take many forms, including taste and turbidity problems, water quantity problems, contamination by salt, gasoline and other chemicals and problems with natural gas in water wells. All of these problems, including natural gas in water supplies, occur statewide and are not restricted to areas with oil and gas development… The initial response to water supply complaints is best handled by the appropriate local health office, which has expertise in dealing with water supply problems."[283]

RIVERKEEPER COMMENT 7.1.4.1-4

> DEC must document all of its communication with county health departments and/or "local health office[s]" in order to inform the public on the issue of handling complaints. In addition, DEC should describe the staffing resources allocated to all county health departments located within the Marcellus and Utica shale areas. Such a description should include the hours of operation, the qualifications of all staff and the hours worked by each staff member, and the typical response time to emergencies by each county health department. DEC also must describe what training, if any, county health department staff have received with regard to chemicals present in fracturing fluid and flowback water. Without a detailed assessment available for

[282] *See id.* at 7-41.
[283] *See id.* at 7-42.

public review, DEC's recommendation that complaints are "best handled" by "the appropriate local health office" is meaningless and this DSGEIS is deficient.

DSGEIS *7.1.4.1*

"Complaints that occur during active operations at a well pad within 2,000 feet or the radius where baseline sampling occurred, or within a year of last hydraulic fracturing at such a site, should be jointly investigated by DEC and the county health department. Mineral Resources staff shall conduct a site inspection, and if a complaint coincides with any of the following documented potentially polluting non-routine well pad incidents, then the Department will consider the need to require immediate cessation of operations, immediate corrective action and/or revisions to subsequent plans and procedures on the same well pad, in addition to any applicable formal enforcement measures…"[284]

RIVERKEEPER COMMENT 7.1.4.1-5

What is the basis for the lack of DEC involvement in complaints that do not occur "within 2,000 feet or the radius where baseline sampling occurred, or within a year of last hydraulic fracturing at such a site?"

DEC must describe in detail the ability of Mineral Resource staff to respond to complaints. Such a description should include the number of staff and the hours, operation, and location of the staff offices. In addition, DEC should describe the number of complaints the Department has received to date in its regulation of the oil and gas industry, the status of those complaints, what resources were expended investigating each complaint, and what corrective action, if any, was taken.

DSGEIS *7.1.4.2 Sufficiency of As-Built Wellbore Construction*

"The Supplementary Permit Conditions will require submission of a *Pre-Frac Checklist and Certification Form* (pre-frac form) at least 48 hours prior to commencement of high-volume hydraulic fracturing operations. Regarding the surface casing hole, the pre-frac form will…"[285]

RIVERKEEPER COMMENT 7.1.4.2-1

DEC must describe what will occur in the 48 hours prior to commencement of operations in order to enable the public to analyze the potential efficacy of this proposed Supplementary Permit Condition.

DSGEIS *7.1.4.2*

*"*Current casing and cementing practices attached as conditions to all oil and gas well drilling permits require notification to the Department prior to any surface casing

[284] *See id.* at 7-43.
[285] *See id.*at 7-44.

pressure test. In primary and principal aquifer areas, the Department must be notified prior to surface casing cementing operations and cementing cannot commence until a state inspector is present. These requirements will continue to apply to wells drilled for high-volume hydraulic fracturing. Supplementary Permit Conditions for High-Volume Hydraulic Fracturing will require notification prior to surface casing cementing for all wells, so that Department staff has the opportunity to witness the operations."[286]

RIVERKEEPER COMMENT 7.1.4.2-2

DEC must explain how a supplemental permit condition that allows Department staff "the opportunity to witness the operations" will provide for environmental protection as nothing in this permit condition would ensure on-site Department inspections.

DSGEIS *7.1.5 Hydraulic Fracturing Procedure*

"As explained in Section 6.1.5.2, the conclusion that harm to freshwater aquifers from fracturing fluid migration is not reasonably anticipated is contingent upon the presence of certain natural conditions, including 1,000 feet of vertical separation between the bottom of a potential aquifer and the top of the target fracture zone."[287]

RIVERKEEPER COMMENT 7.1.5.1

SEE RIVERKEEPER COMMENT 5.18.2.

DSGEIS *7.1.6.1 – Flowback Water – Drilling and Production Waste Tracking Form*

"The record-keeping requirements and level of detail will be similar to what is presently required for medical waste."[288]

RIVERKEEPER COMMENT 7.1.6.1

The DSGEIS does not contain the draft form, only a reference to the medical waste tracking form and a vague assurance that the gas drilling form "will be similar" to it. DEC must include a draft form for the public to have any meaningful input into this issue. As it stands, this issue escapes public scrutiny.

DSGEIS *7.1.7 Centralized Flowback Water Surface Impoundments*

DEC "will not approve use of centralized flowback water surface impoundments within the boundaries of primary and principal aquifers or unfiltered water supplies (e.g., the NYC Watershed)."[289]

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[286] *See id.* at 7-47.
[287] *See id.* at 7-49.
[288] *See id.* at 7-50.
[289] *See id.* at 7-51.

RIVERKEEPER COMMENT 7.1.7-1

> **SEE RIVERKEEPER COMMENT 7.1.4**. Flowback water must be collected and transported away from the project sites within the NYC Watershed. The DSGEIS must address the impacts of anticipated leaks into aquifers and surface waters rather than relying on regulations that prohibit the discharge of flowback water.

DSGEIS *7.1.7*

"Any proposed centralized surface impoundment will be considered part of the project for the first well permit application that proposes its use."[290]

RIVERKEEPER COMMENT 7.1.7-2.

> Any centralized surface impoundment must be considered part of the project for each subsequent permit application that proposes to use it. Otherwise, the cumulative impacts of these centralized surface impoundments will avoid regulatory review. DEC must revise this section to include this analysis.

DSGEIS *7.1.7*

"As with all environmental containment systems, it is acknowledged that conservative liner requirements alone do not guarantee groundwater protection."[291]

SEE RIVERKEEPER COMMENT 7.1.7-1.

DSGEIS *7.1.8 SPDES-Regulated Discharges*

"Flowback water and production brine are considered industrial wastewater. Wastewater is generated by many water users and industries. NYSDEC's EPA-approved program for the control of wastewater discharges is called the State Pollutant Discharge Elimination System and is commonly referred to as SPDES. The program controls point source discharges to ground waters and surface waters."[292]

RIVERKEEPER COMMENT 7.1.8

> In order to properly inform the public and to assess its own capabilities, DEC should revise this section and include a description of the following: (1) the number of permit writers currently on staff within the Department; (2) an estimate for the number of additional SPDES permit applications that may be generated by the proposed action; and (3) an explanation as to whether this estimated increase in permit applications will require additional staffing and budget resources.

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[290] *See id.* at 7-51.
[291] *See id.* at 7-52.
[292] *See id.* at 7-56.

DEC relies on its existing permitting system to impose mitigation measures to protect water resources. DEC's permitting system, however, amounts to a critical gap in regulatory oversight. According to a New York Times report, in recent years DEC has issued 882 violations of SPDES permits to 74 facilities in the New York City Watershed but has not levied any fines against any of those facilities.[293] The disposition of these violations demonstrates that DEC's permit enforcement provides no deterrence to violators, creates no incentive for future compliance, and illustrates DEC's inability to protect water resources through its permitting system.

Under the Clean Water Act, EPA has the responsibility to withdraw a state's delegation if it fails to meet federal requirements. EPA must de-delegate a state's program if the state fails to issue permits; fails to reissue permits in a timely manner; issues permits that do not conform with federal requirements; fails to inspect facilities as required by law; fails to effectively enforce the program; fails to seek adequate penalties; or fails to comply with public participation requirements.[294]

When developing effluent limitations required for permits that arise from the proposed action, DEC must adhere to federal requirements including those outlined in EPA's NPDES Permit Writers' Manual as well as the Department's own Technical Operational Guidance Series (TOGS). This process may involve, among other things, evaluating appropriate technologies for all aspects of horizontal drilling and hydraulic fracturing operations, as well as promulgating water quality standards and guidance values for any pollutant that may be present but is not currently listed by the State in its TOGS.

SEE RIVERKEEPER COMMENT 5.13.3-3.

DSGEIS *7.1.8.1 Treatment Facilities*

"A POTW must have an approved pretreatment program, or mini-pretreatment program, developed in accordance with the above requirements in order to accept industrial wastewater from non-domestic sources covered by Pretreatment Standards which are indirectly discharged into or transported by truck or rail or otherwise introduced into POTWs."[295]

"Privately owned facilities for the treatment and disposal of industrial wastewater from high-volume hydraulic fracturing operate in other states, including Pennsylvania. Similar facilities that might be constructed in New York would require a SPDES permit."[296]

RIVERKEEPER COMMENT 7.1.8.1-1

[293] NEW YORK TIMES, TOXIC WATERS (2009), available at http://projects.nytimes.com/toxic-waters/polluters/new-york.
[294] 40 C.F.R. § 123.63.
[295] *See* DSGEIS at 7-56.
[296] *See id.* at 7-59.

DEC must explain the difference between "an approved pretreatment program" and "an approved mini-pretreatment program." As drafted, the public cannot adequately review and comment on this issue.

RIVERKEEPER COMMENT 7.1.8.1-2

DEC must explain in greater detail how it proposes to process flowback water at POTWs. Nothing in this section, beyond individual POTWs contacting DEC, explains whether New York is prepared in any meaningful way to process this industrial wastewater. This is particularly true here, for a statewide generic EIS, assessing high-volume hydraulic fracturing.

SEE RIVERKEEPER APPENDIX 2: CEA REPORT.

SEE RIVERKEEPER COMMENTS 6.1.8.1-1, 6.1.8.1-2.

DSGEIS *7.1.10 Protecting New York City's Subsurface Water Supply Infrastructure*

"For any well within the 1,000-foot corridor [of water supply infrastructure], the Department notifies the applicant that the proposed drilling is an unlisted action and may pose a significant threat to a municipal water supply, necessitating a site-specific SEQRA finding.[297]

RIVERKEEPER COMMENT 7.1.10-1

A 1,000-ft corridor is arbitrary and inadequate considering the seismicity issues addressed in **RIVERKEEPER COMMENT 6.14**.

DSGEIS *7.1.10*

"A negative declaration is only filed upon a demonstration to NYCDEP's satisfaction…that it is feasible to drill at the proposed location with confidence that there will be no impacts to tunnels or aqueducts."[298]

RIVERKEEPER COMMENT 7.1.10-2

As lead agency, DEC must make this determination as part of the public review process under SEQRA and may not defer this issue to another agency. SEQRA's "policy…as well as its language, is transgressed when the initial determination of the significance of the environmental effect of a project is removed from the ambit of the agency principally responsible for approving the proposal." Coca-Cola Bottling Co. of N.Y v. Board of Estimate of City of N.Y., 72 N.Y.2d 674, 682, 532 N.E.2d 1261, 536 N.Y.S.2d 33 (1988).

[297] *See id.* at 7-62.
[298] *See id.*

DSGEIS *7.1.10*

"Department staff will continue to follow [an existing] protocol for any proposed Article 23 well, including any proposed gas well, in the NYC Watershed."[299]

RIVERKEEPER COMMENT 7.1.10-3

Application of protocols designed for geothermal well drilling is absolutely inappropriate for industrial gas drilling using high-volume hydraulic fracturing. Moreover, these protocols are entirely insufficient to protect New York City's Subsurface Water Supply Infrastructure. DEC must revise this section substantially, and re-issue it for public review and comment.

As an initial matter, DEC must make the proposed protocol part of the DSGEIS. Without it, the public has no meaningful opportunity to comment on its sufficiency. **SEE RIVERKEEPER APPENDIX 4: PERMITTING PROTOCOLS FOR WELLS NEAR NYC WATER TUNNELS AND AQUEDUCTS, April 17, 2007**.

The DSGEIS states that DEC will "notify NYCDEP of any proposed well in the counties outside of New York City, so that NYCDEP could determine if the proposed *surface location* is within a 1,000-foot wide corridor surrounding a water tunnel or aqueduct."[300] However, the protocol states that "DMN staff will determine whether the location is within the 1,000-foot wide protective corridor." DEC must resolve this ambiguity.

Further, the Draft SGEIS states that "in actual practice, lateral [or horizontal] distance drilled will normally exceed 2,000 feet and would most likely be 3,500 feet or more."[301] Thus, the 1,000-foot-wide corridor measured on the surface is entirely inadequate to protect the aqueducts and tunnels.

DSGEIS *7.1.10*

The Draft SGEIS states that "horizontal drilling and hydraulic fracturing…may occur thousands of feet below the depth of any tunnel or aqueduct."[302]

RIVERKEEPER COMMENT 7.1.10-4

NYCDEP's Rapid Impact Assessment contradicts this statement. In fact, NYCDEP's report found that "substantial portions of DEP's West of Hudson aqueducts and tunnels, as well as two reservoirs, are constructed within 500 to 1,500 feet vertical distance of the Marcellus Shale Formation."[303] Further, NYCDEP found that portions

[299] *See id.*
[300] *See id.* at 7-61.
[301] *See id.* at 5-19.
[302] *See id.*
[303] DEP Report at ES-4.

of critical aqueducts "are in direct contact with the Marcellus Shale Formation." In light of NYCDEP's findings, DEC must revisit this issue, revise this section, and again make it available for public comment.

DSGEIS *7.1.11 Protecting the Quality of New York City's Drinking Water Supply*

"Review of existing authorities relative to both water resources in general and the New York City Watershed in particular indicates that the City's water supply is adequately protected regarding water quality and quantity, and that the possibility of high-volume hydraulic fracturing presents no realistic threat to the Filtration Avoidance Determination."[304]

RIVERKEEPER COMMENT 7.1.11-1

DEC does not explain which alleged "authorities" it consulted. Furthermore, nothing in the New York City's Watershed Rules and Regulations governs, let alone contemplates, the prospect of industrial gas drilling utilizing horizontal drilling, high-volume hydraulic fracturing and all the disruptive surface activity accompanying these activities.

Evidence shows that these activities would be highly disruptive and poses a threat to the FAD. The geology and hydrology of the Catskill Watershed generate excessive turbidity levels in receiving waters "caused by inorganic sediment from soil and channel erosion mobilized during rainfall, snowmelt, and stormflow events.[305] In addition, NYCDEP regularly discharges sediment from the Schoharie Reservoir, via the Shandaken Tunnel, into Esopus Creek, in violation of water quality standards and in absence of a valid SPDES permit required for said discharges. Although DEP is working to address turbidity issues in the Schoharie and Ashokan Reservoirs, the fact that such work is necessary demonstrates that the City's water supply is ***not*** "adequately protected," and further degradation of surface water quality in the Catskill System due to high-volume hydraulic fracturing operations would exacerbate turbidity problems.

SEE RIVERKEEPER APPENDIX 2: CEA REPORT.

SEE RIVERKEEPER COMMENTS 6.1.1.5, 6.1.10.

DSGEIS *7.1.11*

"The web of interrelated regulatory requirements is likely to present significant practical challenges to an operator wishing to engage in high volume hydraulic fracturing within the bounds of the New York City Watershed."[306]

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[304] DSGEIS at 7-63.
[305] NATIONAL RESEARCH COUNCIL, WATERSHED MANAGEMENT FOR A POTABLE WATER SUPPLY: ASSESSING THE NEW YORK CITY STRATEGY (2000), National Academy Press, Washington, D.C., at 498.
[306] DSGEIS at 7-63.

RIVERKEEPER COMMENT 7.1.11-2

For DEC to suggest that developers will back away from gas drilling opportunities simply because they are required to negotiate a "web of interrelated regulatory requirements" is naïve in the extreme. The DSGEIS presents no evidence whatsoever that the challenges of the existing regulatory framework have ever dissuaded an operator from engaging in high-volume fracturing activities in any watershed.

DSGEIS *7.1.11*

"New York City's control of a substantial amount of acreage surrounding the reservoirs through fee ownership or conservation easements provides further protection. Drilling and high-volume hydraulic fracturing cannot occur on such acreage without the City's permission. Similarly, New York State's ownership of land within the New York City watershed, including portions of the Catskill Forest Preserve, provides protection."[307]

RIVERKEEPER COMMENT 7.1.11-3

How much remaining acreage in the NYC Watershed is unprotected and subject to fracturing operations? DEC's statements attempt to divert attention away from the vast majority of land holdings that are available to gas developers in the West-of-Hudson NYC Watershed.

DSGEIS *7.1.11*

"Proposed enhanced procedures and requirements specifically applicable to the New York City Watershed include:

--Prohibition against centralized flowback water surface impoundments within the boundaries of the New York City Watershed (Section 7.1.7)…"[308]

RIVERKEEPER COMMENT 7.1.11-4

This prohibition means flowback water must be collected and transported away from project sites within the NYC Watershed. **SEE RIVERKEEPER COMMENT 7.1.7**.

DSGEIS *7.1.11*

--"Requirement in an unfiltered watershed to remove fluids from any reserve pit or on-site (i.e., well pad) tanks within seven days of completing drilling and stimulation operations at the last well on the pad, or immediately if operations are suspended and the site will be left unattended (Section 7.1.3.2)…"[309]

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[307] *See id.*
[308] *See id.* at 7-63, 7-64.
[309] *See id.* at 7-64.

RIVERKEEPER COMMENT 7.1.11-5

SEE RIVERKEEPER COMMENTS 7.1.7-1, 7.1.7.1-2.

DSGEIS *7.1.11*

--"Site-specific SEQRA determination for any proposed well pad within 300 feet of a reservoir, reservoir stem or controlled lake or within 150 feet of a watercourse (Section 7.1.12.2)."[310]

RIVERKEEPER COMMENT 7.1.11-6

These setback distances are arbitrary and inadequate to protect water resources and infrastructure in the NYC Watershed. **SEE RIVERKEEPER COMMENT 4.5.4**.

DSGEIS *7.1.12 – Setbacks*

RIVERKEEPER COMMENT 7.1.12

As a general matter, DEC does not propose any true setbacks for the various activities discussed in Section 7.1.12. Rather, DEC proposes that planned activity within a certain distance requires a site-specific SEQRA review. This is unacceptable. DEC must establish firm buffer zones through regulations.

DSGEIS *7.1.12.1 Setbacks from Ground Water Resources*

DEC proposes site-specific SEQRA review for any proposed well pad within 300 feet of a reservoir, reservoir stem or controlled lake.[311]

RIVERKEEPER COMMENT 7.1.12.1

DEC should establish an exclusionary zone around the New York City Watershed and all other surface water supply watersheds. **SEE RIVERKEEPER COMMENT 7.1.11-5.**

DSGEIS *7.1.12.2 – Setbacks – Setbacks from Surface Water Resources*

DEC proposes site-specific SEQRA review for any proposed well pad within 150 feet of a watercourse, perennial or intermittent stream, storm drain, lake or pond.[312]

RIVERKEEPER COMMENT 7.1.12.2-1

In addition to establishing exclusionary zones around areas such as the New York City

[310] *See id.*
[311] *See id.* at 7-71.
[312] *See id.*

Watershed, DEC must establish protective regulatory setbacks from a watercourses, perennial or intermittent streams, storm drains, lakes or ponds. **SEE RIVERKEEPER APPENDIX 2: CEA REPORT**.

DSGEIS *7.1.12.2*

"The proposed well and well pad setbacks apply to well permit applications where the target fracturing zone is either at least 2,000 feet deep or 1,000 feet below the underground water supply."[313]

SEE RIVERKEEPER COMMENT 7.1.11-5.

DSGEIS *7.1.12.2*

"Because the 2,000-foot threshold so greatly exceeds the NYSDOH-required setback distances for analogous activities that could occur on the pad, measuring the distance to the public supply well from the proposed surface location of the well itself (instead of from the edge of the well pad) is sufficiently protective with respect to potential spills or leaks on the well pad."[314]

SEE RIVERKEEPER COMMENT 7.1.11-5.

DSGEIS *7.1.12.2 Setbacks from Surface Water Resources*

150-ft setbacks will be required between well site and surface water supply.[315]

SEE RIVERKEEPER COMMENT 7.1.11-5.

DSGEIS *7.1.12.2*

"Significant surface spills at well pads which could contaminate surface water bodies, including municipal supplies, are most likely to occur during activities which are closely observed and controlled by personnel at the site. More people are present to monitor operations at the site during high-volume hydraulic fracturing and flowback operations than at any other time period in the life of the well pad. Therefore, any surface spills during these operations are likely to be quickly detected and addressed rather than continue undetected for a lengthy time period."[316]

RIVERKEEPER COMMENT 7.1.12.2-2

This conclusory analysis is inadequate. In a revised DSGEIS, the Department should include a detailed discuss how it arrived at the determination that spills that would

[313] *See id.* at 7-66.
[314] *See id.* at 7-68.
[315] *See id.* at 7-70.
[316] *See id,* at 7-69, 70.

contaminate surface water bodies will be quickly detected and addressed simply because "more people are present to monitor operations at the site…" A revised DSGEIS should describe: how many people are in charge of monitoring at the site; what aspect of operations each individual is responsible for monitoring; and whether the Department plans to have any staff on site.

DSGEIS *7.2 Floodplains*

"The EAF Addendum will require the applicant to confirm that Flood Insurance Rate Maps…are checked to identify whether a proposed well pad is in a 100-year floodplain and a floodway."[317]

RIVERKEEPER COMMENT 7.2

In Section 2.4.9.1 DEC advised that "recent flooding has identified concerns regarding the reliability of the existing … Flood Insurance Rate Maps (FIRMs) that depict areas that are prone to flooding with a defined probability or recurrence interval."[318] In that same section DEC also noted the "increased frequency and magnitude of flooding" and that at least the Delaware and Susquehanna River Basins are vulnerable to flash floods every year (the DSGEIS is silent as to other river basins such as the Esopus, Schoharie, and Hudson).[319]

USEPA also has acknowledged that increased storm events resulting in floods have led to significant turbidity problems within the New York City Watershed, in an area outside of both the Delaware and Susquehanna River Basins.[320]

Despite DEC's admission that the existing FIRMS may be inadequate and the DSGEIS' express acknowledgment of increased storm events and resultant flooding, DEC proposes to rely on existing FIRMs to confirm whether a proposed well pad is in a floodplain. This is patently irrational. DEC must revise this section to mitigate impacts within floodplains.

DSGEIS *7.3 Protecting Freshwater Wetlands*

DEC proposes that, "to the extent practical, fuel tanks for drilling rigs not be placed within 500 feet of a wetland"[321]

SEE RIVERKEEPER COMMENT 7.1.11-5.

DSGEIS *7.4.1.1 Terrestrial [Invasive Species]*

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[317] *See id.*at 7-27.
[318] *See id.*at 2-34.
[319] *See id.*
[320] *See* U.S. EPA (in consultation with NYSDOH), NYC Filtration Avoidance Determination, July 2007 at 13 and 19.
[321] DSGEIS at 7-73.

"In order to mitigate the potential transfer of terrestrial invasive species from project locations associated with high-volume hydraulic fracturing, including well pads, access roads, and engineered impoundments for fresh water and flowback water storage, well operators will be required to conduct all activities in accordance with" BMPs.[322]

SEE RIVERKEEPER COMMENT 6.4.1.

DSGEIS *7.4.1.2 Aquatic* [Invasive Species]

Regarding aquatic ecosystems: "Regulatory protections exist to mitigate the potential transfer of invasive species."[323]

RIVERKEEPER COMMENT 7.4.1.2

> These "regulatory protections" pertain to jurisdictional waters under DRBC and SRBC, not the Catskill Watershed. The single DEC regulation on Table 7.3 does not apply to invasive species. **SEE RIVERKEEPER COMMENT 7.1.4.1-2**.

DSGEIS *7.8.2 Regulation of NORM in NYS*

"During the initial Marcellus development efforts, sampling and analysis will be undertaken in order to assess this variability. These data will be used to determine whether additional mitigation is necessary to adequately protect the public health and environment of the State of New York."[324]

RIVERKEEPER COMMENT 7.8.2

> As with DEC's failure to require baseline monitoring data for private water wells (**SEE RIVERKEEPER COMMENT 7.1.4.1-2**) the Department again proposes to put public health and the environment at risk by permitting gas development in the state's Marcellus shale plays before it has established baseline NORM data. Considering the very real potential health hazards of human exposure to NORMs, it is extremely irresponsible of DEC to allow gas development *before* it has analyzed the potential adverse impacts of said exposure and presented those analyses for public review and comment.

DSGEIS *7.13 Mitigating Cumulative Impacts*

> DEC states that the rate of development cannot be predicted and it is not possible to define the threshold "at which development results in unacceptable adverse noise, visual and community character impacts…" The DSGEIS claims these are

[322] *See id.* at 7-76 *et seq.*
[323] *See id.*, Table 7.3, at 7-78.
[324] *See id.* at 7-102.

"subjective perspectives" and that "there is no sound basis for an administrative determination limiting the shale development at this time."[325]

RIVERKEEPER COMMENT 7.13

This section is completely inadequate. As an initial matter, DEC abandons its obligations as lead agency to identify and mitigate significant adverse environmental cumulative impacts. "Even more than a conventional EIS, a GEIS is expected to contain a detailed discussion…of the cumulative, secondary and long-term impacts of the proposed action(s), and the growth inducing aspects."[326]

Furthermore, DEC limits its attempted mitigation of cumulative impacts to those from noise, aesthetics, traffic, and community character. This arbitrary list ignores, among many things, wastewater disposal, stormwater and air impacts. **SEE RIVERKEEPER APPENDIX 2: CEA REPORT**.

DEC must redraft this section and again make it available for public comment.

DSGEIS Chapter 8 Permit Process and Regulatory Coordination

8.1.1.5 Road Use Agreements

"The Department strongly encourages operators to attain road use agreements with governing local authorities. The issuance of a permit to drill does not relieve the operator from responsibility to comply with any local requirements authorized by or enacted pursuant to the New York State Vehicle and Traffic Law. Though the Department does not have the authority to require, review or approve road use agreements or trucking plans, the proposed Supplementary Permit Conditions for High-Volume Hydraulic Fracturing require a road use agreement or trucking plan to be filed with the Department for informational purposes prior to site disturbance."[327]

RIVERKEEPER COMMENT 8.1.1.5

DEC states that it "strongly encourages" operators to attain road use agreements, then goes on to say the "proposed Supplementary Permit Conditions…require a road use agreement…prior to site disturbance." DEC needs to clarify whether it will be "strongly encouraging" or, in fact, requiring road use agreements from operators.

DSGEIS *8.1.1.7 County Health Departments*

[325] *See id.* at 7-111.
[326] Gerrard, Ruzow & Weinberg, *Environmental Impact Review in New York*, § 5.03[2], p.5-29 (Matthew Bender 2009) (*citing* DEC, The SEQR Handbook at 67, 80 (1992)).
[327] DSGEIS at 8-4.

"As explained in Chapter 15 of the GEIS and Chapter 7 of this document, county health departments are the most appropriate entity to undertake initial investigation of water well complaints. Therefore, the Department proposes that county health departments receive copies of the required baseline and monitoring analyses of residential water wells in proximity to well pads where high-volume hydraulic fracturing occurs. Furthermore, the Department proposes that county health departments retain responsibility for initial response to most water well complaints, referring them to the Department when other causes have been ruled out. The exception to this is when a complaint is received while active operations are underway within a specified distance; in these cases, the Department will conduct a site inspection and will jointly perform the initial investigation along with the county health department."[328]

RIVERKEEPER COMMENT 8.1.1.7

The above statement by DEC is inaccurate. In fact, the Department does not "explain" anything in Chapter 7 regarding county health departments other than to say that it found in 1992 that county health departments would be the most appropriate entity. This is not an adequate explanation; it is a conclusory statement unsupported by any empirical data and is deficient for purposes of informing the public during participation and review of this DSGEIS.

SEE RIVERKEEPER COMMENT 7.1.4.1-4.

DSGEIS *8.1.2 State*

"The New York State Department of Health (DOH)…will be involved as follows…[p]otential future and ongoing involvement in review of new proposed hydraulic fracturing additives, NORM issues, and assistance to county health departments regarding water well investigations and complaints."[329]

RIVERKEEPER COMMENT 8.1.2

The fact that DOH will only "potentially" be involved in a limited number of areas associated with the proposed action would be laughable were it not a matter of grave public concern and importance. The DSGEIS should describe how DEC reached the conclusion that DOH need be only "potentially" involved in matters of public health.

DSGEIS *8.1.4 River Basin Commissions*

"SRBC and DRBC are not directly involved in the well permitting process, and the Department will gather information related to proposed surface water withdrawals that are identified in well permit applications. However, the Department will continue to participate on each Commission to provide input and information regarding projects of mutual interest. DRBC has asserted jurisdiction to approve natural gas well siting and

[328] *See id.* at 8-5.
[329] *See id.*

drilling in the Delaware River Basin; the Department will continue to seek cooperation and to avoid any unnecessary regulatory duplication."[330]

RIVERKEEPER COMMENT 8.1.4

The DSGEIS should include specific documentation of all participation DEC has had and proposes to have in future DRBC and SRBC activities. In addition, DEC should elaborate what scenarios will cause "potential unnecessary regulatory duplication."

DSGEIS *8.2.1.2 Required Hydraulic Fracturing Additive Information*

"The only potential exposure pathway to fracturing additives identified by this Supplement is via air emissions from uncovered surface impoundments used to contain flowback water. Chemistry dictates the extent of required controls, including the distance within which ambient air thresholds are exceeded and public access must be restricted."[331]

RIVERKEEPER COMMENT 8.2.1.2-1

Numerous real world examples belie the above assertion. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**.

DSGEIS *8.2.1.2*

"The Department recognizes that flowback water chemistry may be preferable for determining impoundment emissions, but to date Department staff has not seen any flowback water analyses that tested for all of the chemicals and compounds that could be present. Flowback water analyses used for this purpose would have to be based on the exact same fracturing additive mix as proposed for all well pads that would use the impoundment, and the Department would have to approve the sampling protocol to ensure that the analysis is representative of the fluid that would be held in the impoundment."[332]

RIVERKEEPER COMMENT 8.2.1.2-2

The Department should insert the above paragraph in each and every instance where it references flowback water in the DSGEIS.

The Department's admission that it has not seen any flowback water analyses that tested for all the chemicals and compounds that could be present in flowback water warrants a withdrawal of this DSGEIS until such time that DEC is able to analyze such data and present it to the public for review and comment. The DSGEIS will remain deficient until this is addressed.

[330] *See id.* at 8-6.
[331] *See id.* at 8-7.
[332] *See id.*

DSGEIS Chapter 9 Alternatives

RIVERKEEPER COMMENT 9

> The DSGEIS should have included an evaluation of an alternative that improved existing regulations by promulgating new regulations. The 1992 GEIS stated that "there is still room to improve the efficiency and effectiveness of the program."[333] Yet, 17 years later, the DSGEIS does not describe how, if at all, the regulations present at the time the GEIS was written have been improved. In the absence of any discussion, Riverkeeper assumes that the "room for improvement" present in 1992 still exists and, in all likelihood, has been exacerbated by further industrialization of the region and cuts to Department staff and resources.

9.1 Prohibition of Development

"The prohibition of development of Marcellus Shale and other low permeability gas reservoirs by horizontal drilling and high-volume hydraulic fracturing would be contrary to New York State and national interests. It would also contravene Article 23-0301 of the Environmental Conservation Law…"[334]

RIVERKEEPER COMMENT 9.1-1

> DEC has neither the authority nor the expertise to assess national interests and any mention of national interests in the DSGEIS is therefore irrelevant and misleading to the general public and should be omitted in a revised DSGEIS.

RIVERKEEPER COMMENT 9.1-2

> Unless Article 23 expressly prohibits a ban or indicates that a ban in certain areas could not be part of a regulatory scheme that protects the rights of the general public, DEC's above legal analysis is inaccurate and misleading. The fact that DEC uses this flawed analysis as a basis for deciding not to consider various alternative actions clearly renders this DSGEIS deficient. **SEE RIVERKEEPER COMMENT 1.2**.

DSGEIS *9.1*

"Although total prohibition of natural gas development using high volume hydraulic fracturing of the Marcellus has been recommended by some, such a prohibition is contrary to New York statute and State policy advocating development of this resource. A prohibition would also deny owners of mineral interests an opportunity to realize the

[333] *See id.*, App 2, SEQRA FINDINGS STATEMENT, at 39 (in electronic copy).
[334] *See id.* at 9-1,2.

benefit of mineral rights ownership. It is not a reasonable alternative to development as set forth in this draft SGEIS."[335]

RIVERKEEPER COMMENT 9.1-3

> This statement is legally wrong. A prohibition on high-volume hydraulic fracturing is consistent with unambiguous New York State policy, as dictated in the New York State Constitution and New York State statutes. **SEE RIVERKEEPER COMMENT 1.2**.
>
> "Although total prohibition is expostulated by some segments of the population, it is against legislated State and Federal mandates… A limited prohibition, such as the restriction of oil and gas drilling and solution salt mining in the most critical and environmentally sensitive areas is a more viable alternative."[336]
>
> In the DSGEIS, the Department chooses to summarily dismiss prohibiting natural gas development within environmentally sensitive areas as proposed in the 1992 FEIS. Because the 1992 FEIS contemplated a limited prohibition in such areas, the DSGEIS is deficient in its omission of this alternative. To correct this deficiency, the DSGEIS must address this alternative for critically important environmental areas areas such as, but not limited to: the New York City Watershed, the Adirondack and Catskill Mountains, the Hudson River basin, the Mohawk River Basin, the upper Delaware River Basin, and the Finger Lakes region, and numerous other state parks, preserves, wetland areas and floodplains that provide critical habitat for fish and wildlife, serve a variety of ecosystem functions such as water filtration, and also contribute extensively to the State's tourism and recreation industries.

DSGEIS *9.2 Phased Permitting Approach*

"The use of a phased-permitting approach to developing the Marcellus Shale and other low permeability gas reservoirs, including consideration of limiting and restricting resource development in designated areas, was evaluated. Phased permitting as a means to mitigate regional cumulative impacts is not practical or necessary given the inherent difficulties in predicting gas well development for a particular region or part of the State. The mitigation proposed in the SGEIS that focuses on the siting of well pads based on Best Practices will lessen or eliminate potential impacts. The 1992 GEIS found that the negative impacts associated with gas development were short term and could be mitigated with siting restrictions and setback requirements. This is also true for multi-well pads; therefore the mitigation techniques discussed in the 1992 GEIS and set forth in this SGEIS should be utilized."[337]

RIVERKEEPER COMMENT 9.2

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[335] *See id.* at 9-3.
[336] 1992 FEIS at 21-3.
[337] DSGEIS at 9-4.

The Department cannot simply state that a phased permitting approach was evaluated and in the next sentence say it is not practical without including any discussion of how this approach was evaluated and describing specifically why it was not evaluated. Again, DEC relies on its own failure to evaluate cumulative impacts in order to justify its dismissal of implementing a phased permitting approach. This is unacceptable.

DSGEIS *9.2.1 Rate of Development and Thresholds*

"In response to questioning, a representative for one company estimated a peak activity for all of industry at 2,000 wells per year ± 25% in the New York Marcellus play. Other companies did not provide an estimate, listing the variables mentioned above as the reason. In Pennsylvania, where the Marcellus play covers a larger area and development has already occurred, the number of permits issued has increased in recent years as indicated in the following table. The source data provides information on the number of permits issued and is not indicative of the number of wells drilled."[338]

RIVERKEEPER COMMENT 9.2.1-1

Because DEC has data from Pennsylvania about the number of permits issued, the Department should use these data to project what rates may be expected in New York. The fact that there are data readily available from Pennsylvania contradicts DEC's false assumption that the rate of development cannot be predicted.

DSGEIS *9.2.1*

"Additional research has identified that "[e]xperience developing shale gas plays in the past 20 years has demonstrated that every shale play is unique."[339]

RIVERKEEPER COMMENT 9.2.1-2

There are numerous states in the Marcellus "play" where the proposed action of gas drilling is currently underway. Therefore, DEC's statement that each "play" is unique is irrelevant as an excuse for the Department's failure to estimate the rate of development in New York.

DSGEIS 9*.3.1 Environmentally-Friendly Chemical Alternatives*

"… it may not be feasible to require the use of 'green' [fracking] chemicals because presently there is no metric or chemicals approvals process in place in the US."[340]

RIVERKEEPER COMMENT 9.3.1

[338] *See id.* at 9-6.
[339] *See id.* at 9-7.
[340] *See id.* at 9-10.

Immediately following the above sentence in the DSGEIS: "New York could choose to adopt the criteria used in Europe." Therefore, if DEC adopts existing European criteria, then the use of green fracking chemicals is feasible and this alternative must be considered and discussed for public review and comment.

APPENDIX 2: 1992 SEQRA Findings Statement

"The range of future alternatives concerning the activities covered by the Oil, Gas and Solution Mining Regulatory Program can be divided into three basic categories: 1) prohibition on regulated activities, 2) removal of regulation, and 3) maintenance of status quo versus revision of existing regulations. A prohibition on these regulated activities would deprive the State of substantial economic and natural resource benefits. Complete removal of regulation would lead to severe environmental problems. While the existing regulations and permit conditions provide significant environmental protection, there is still room to improve the efficiency and effectiveness of the program. Revision of the existing regulations is the best alternative. Chapter 21 of the Draft GEIS contains a more detailed assessment of the environmental, economic, and social aspects of each alternative."[341]

RIVERKEEPER COMMENT APPENDIX 2

SEE RIVERKEEPER COMMENT 9 AND RIVERKEEPER APPENDIX 1: CASE STUDIES.

Appendix 15: Hydraulic Fracturing – 15 Statements from Regulatory Officials

Part A, GWPC's Congressional Testimony

RIVERKEEPER COMMENT APPENDIX 15 Part A-1

As recently as June 4, 2009 the GWPC is cited as recommending that "a study of effective hydraulic fracturing practices should be considered for the purpose of developing Best Management Practices (BMPs) that can be adjusted to fit the specific conditions of individual states."[342] This suggests that these practices have not but should be studied relating to the protection of water resources. The congressional testimony further stated that "further work is needed in the areas of paper-to-digital data conversion and inclusion of more environmental, or water related data."[343]

The statement by PA DEP that "no groundwater pollution or disruption of underground sources of drinking water has been attributed to hydraulic fracturing of deep gas formations" is contradicted by the sentence that follows it immediately: "All

[341] *See id.*, App 2, 1992 SEQRA FINDINGS STATEMENT, at 39 (in electronic copy).
[342] *See id.*, App 15, at 2.
[343] *See id.* at 3.

investigated cases that have found pollution, which are less [sic] then [sic] 80 in over 15 years of records, have been primarily related to physical drilling through the aquifers, improper design or setting of upper and middle well casings, or operator negligence."[344].

New Mexico Energy, Minerals and Natural Resources Department: "While we do currently list approximately 421 ground water contamination cases caused by pits and approximately an equal number caused by other contamination mechanisms, we have found no example of contamination of usable water where the cause was claimed to be hydraulic fracturing."[345] Does this mean it was only the ancillary activities of hydraulic fracturing that caused over 800 incidents of groundwater contamination? Are the "pits" for produced water or something altogether unrelated to fracing? And what is "usable water" versus unusable water?

App 15 includes statements from regulators from 12 states – Alabama, Alaska, Colorado, Indiana, Kentucky, Louisiana, Michigan, Oklahoma, Tennessee, Texas, South Dakota, and Wyoming – all denying any historical incidence of groundwater contamination due to hydraulic fracturing.

RIVERKEEPER COMMENT APPENDIX 15 Part A-2

Reports and documents from these state regulators contradict their statements submitted as part of testimony before the U.S. House of Representatives. These denials by regulators constitute an effort to whitewash the documented and potential human health and environmental impacts of fracturing operations, and they are refuted by numerous case studies cited in **RIVERKEEPER APPENDIX 1: CASE STUDIES**.

In a letter submitted as part of the Groundwater Protection Council's testimony before the U.S. House of Representatives, House Committee on Natural Resources (dated June 4, 2009), Scott Kell, Deputy Chief of Ohio's Division of Mineral Resources (DMNR) stated that after 25 years of investigating citizen complaints the DMNR has "not documented a single incident involving contamination of groundwater attributed to hydraulic fracturing."[346] However, a DMNR report on at least one specific incident concluded otherwise. Specifically, the DMNR's final report on this investigation states:

> The DMRM determined that accumulation and confinement of deep, high-pressure gas in the surface-production casing annulus of the English #1 well, between November 13 and December 15, 2007 resulted in over-pressurization of the annulus. This over-pressurized condition resulted in the invasion, or migration, of natural gas from the annulus of the well into natural fractures in the bedrock below the base of the cemented surface

[344] *See id.*, Letter from Joseph J. Lee.
[345] *See id.*, App 15.
[346] DSGEIS, Appendix 15.

> casing. This gas migrated vertically through fractures into the overlying aquifers and discharged, or exited, the aquifers through local water wells.[347]

By any measure, this is an incident involving contamination of groundwater attributed to hydraulic fracturing, in direct contradiction to Mr. Kell's letter submitted as part of his testimony before the U.S. Congress.

In another letter submitted as part of the Groundwater Protection Council's testimony before the U.S. House of Representatives, House Committee on Natural Resources (dated June 1, 2009), Joseph J. Lee, Jr., Chief, Source Protection Section, Division of Water Use Planning, Pennsylvania Department of Environmental Protection (PA DEP), stated in Pennslyvania: "no groundwater pollution or disruption of underground sources of drinking water has been attributed to hydraulic fracturing of deep gas formations."[348] However, numerous statements of the PA DEP contradict this claim. **SEE RIVERKEEPER APPENDIX 1: CASE STUDIES**. As but one example, on February 27, 2009, PA DEP stated in a Notice of Violation to Cabot Oil & Gas Corporation that PA DEP had determined that as part of a hydraulic fracturing operation, "Cabot had caused or allowed gas from lower formations to enter fresh groundwater."[349]

Therefore, reports, findings, and statements from at least Ohio and Pennsylvania regulators contradict their statements submitted as part of testimony before the U.S. House of Representatives. This calls into question all of the statement of state regulators contained in Appendix 15 and submitted on behalf of the Groundwater Protection Council. In a revised and reissued DSGEIS the Department must not include these documents or rely upon them.

SEE RIVERKEEPER COMMENTS 5.11.1.1, 5.18.1.

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[347] See Riverkeeper Appendix 1: Case Studies; *see also* OHIO DEP'T OF NATURAL RES., DIVISION OF MINERAL RES. MGMT., REPORT ON THE INVESTIGATION OF THE NATURAL GAS INVASION IN BAINBRIDGE TOWNSHIP OF GEAUGA COUNTY OHIO (2008), *available at* http://www.dnr.state.oh.us/Portals/11/bainbridge/report.pdf [hereinafter "REPORT ON BAINBRIDGE INVESTIGATION"] at 4-5.

[348] DSGEIS, Appendix 15.

[349] See Riverkeeper Appendix 1: Case Studies; *see also* Notice of Violation Letter from Craig Lobbins, Regional Manager of the PA DEP, to Thomas Liberatore, Vice President of Cabot Oil & Gas Corporation (Feb. 27, 2009) (on file with the Pace Environmental Litigation Clinic and attached to Riverkeeper Appendix 1).

Appendix 21: Publicly Owned Treatment Works (POTWs) With Approved Pretreatment Programs

Appendix 21 presents a list of POTW's with approved pretreatment and mini-pretreatment programs.

RIVERKEEPER COMMENT APPENDIX 21

> DEC must revise this Appendix to present a clearer picture of POTWs and WWTPs with the ability to treat wastewater from high-volume fracturing operations. This list of POTWs and WWTPs with approved pretreatment and mini-pretreatment programs only confuses the public. It implies that each of these facilities is ready, able and willing to accept flowback water and produced water; however, they are not. DEC must revise Appendix 21 to clarify that this is NOT a list of facilities capable of treating flowback and produced water. Buried in the DSGEIS is DEC's acknowledgment that these facilities must also have "an approved headworks analysis for this wastewater source" and contained in its SPDES permit.[350] Appendix 21, or a new appendix, must list those facilities with "an approved headworks analysis and adequate capacity to receive and treat this wastewater.

III. CONCLUSIONS

For the reasons set forth in detail above, the current draft Supplemental Generic Environmental Impact Statement is wholly inadequate and must be abandoned, re-drafted and re-submitted for extended public review and comment.

[350] DSGEIS at 7-57.