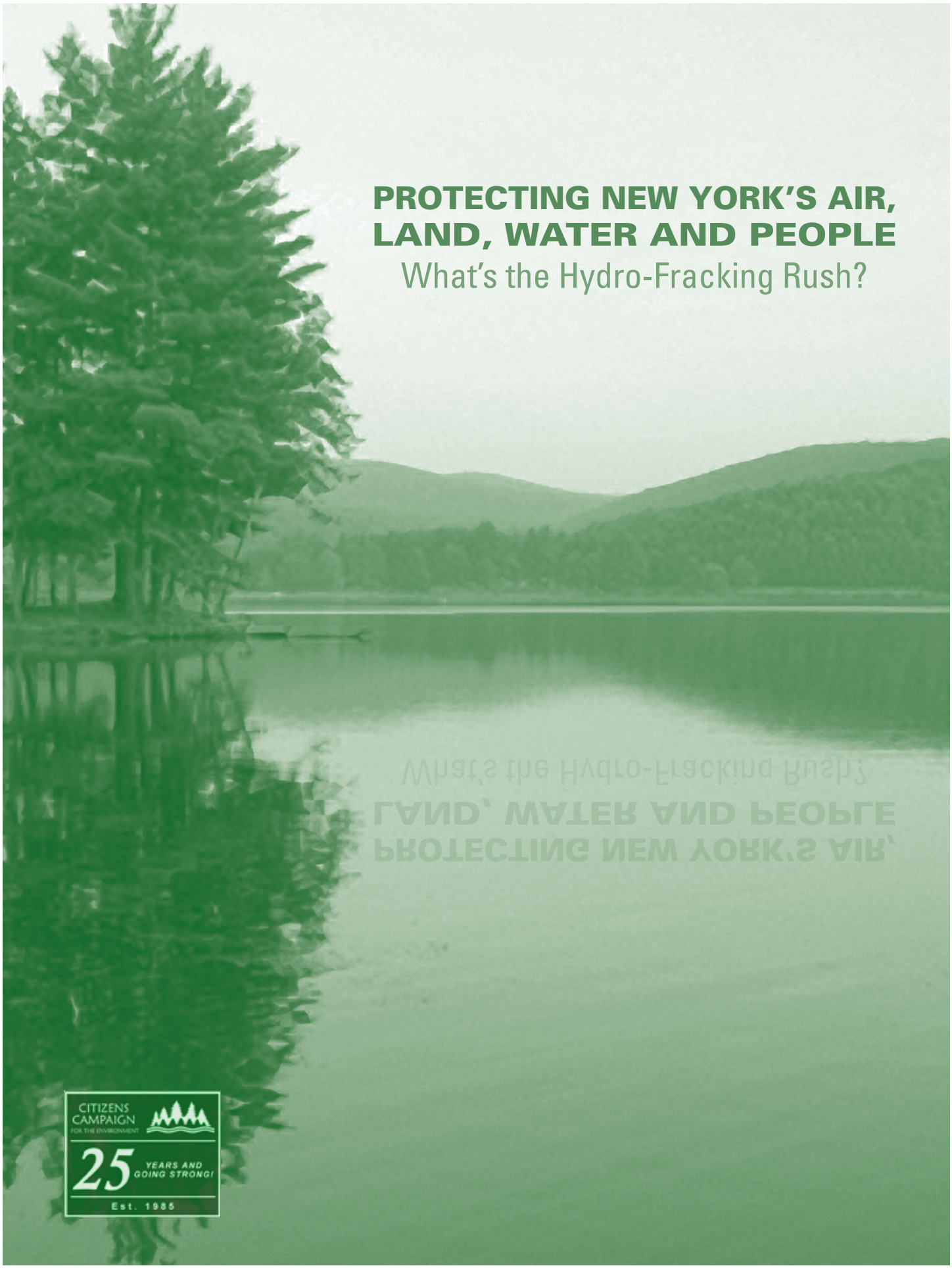

PROTECTING NEW YORK'S AIR, LAND, WATER AND PEOPLE

What's the Hydro-Fracking Rush?

CITIZENS CAMPAIGN FOR THE ENVIRONMENT

25 YEARS AND GOING STRONG!

Est. 1985

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Acknowledgements

Protecting New York's Air, Land, Water and People: A Case for Enacting a Moratorium on Hydro-fracking is produced by Citizens Campaign Fund for the Environment and could not have been prepared without the generous support of the Park Foundation and members of Citizens Campaign for the Environment. This document could not have been possible without dedicated citizens and professionals committed to protecting New York's air, land, water, and people from the adverse impacts associated with hydro-fracking. For more information on the concerns with hydro-fracking activities and resources, please visit **www.citizenscampaign.org/hydrofracking**

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Citizens Campaign for the Environment *(CCE) is a non-partisan advocacy organization, supported by over 80,000 members, working to protect public health and the natural environment.*

For more about CCE, please visit:
www.citizenscampaign.org

Note: This report was prepared with the best information available at the time. We welcome any new information as we strive to make this report as accurate and up-to-date as possible.

Executive Summary

Named for the exposed outcrop in Marcellus, NY, the Marcellus Shale formation exists below much of New York State from the Catskills to the Allegany forest. Natural gas exists in small pockets of the fragile shale. Recently, the oil and gas industry has begun using **High Volume Hydraulic Fracturing**, or **Hydro-Fracking** to drill thousands of feet below the surface to recover natural gas. Hydro-fracking uses millions of gallons of water per well and generates millions of gallons of toxic, corrosive, and radioactive waste.

Hydro-fracking New York's shale formations, including the Marcellus and Utica formation pose inherent risks to human and environmental health while increasing burdens on local governments, health departments, and taxpayers. Especially problematic is the lack of federal protection for drinking water, air quality, water treatment infrastructure, and landowner liability.

In 2005, influenced by gas drilling giants Halliburton and Chesapeake Energy, the 110th Congress and President Bush exempted hydro-fracking operations from critical Safe Drinking Water Act and Clean Water Act protections and public comment opportunities provided by the National Environmental Policy Act.

From Texas to Pennsylvania, the oil and gas industry has been busy exploiting its exemptions from every major federal environmental statute. The result is the destruction of drinking water supplies, overtaxed water treatment infrastructure, and killing tens of thousands of fish and other aquatic life. New York does not have to repeat these same mistakes.

In September 30, 2009 The New York State Department of Environmental Conservation (DEC) released the draft *Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs* herein referred to as the "**dSGEIS**". This 800+ page document is filled with speculation, now outdated information, and seeks to establish a regulatory program to govern hydro-fracking without adequate staff, cumulative impact assessments, and by placing unfunded mandates on agencies and local governments with no regulatory power.

The dSGEIS fails to provide a clear plan for treating millions, if not billions, of gallons of radioactive and corrosive fracking wastewater; ensure New Yorker's are protected from increased exposure to the known carcinogen, Radon; and it fails to protect New York's amazing surface and groundwater resources from contamination by spills, accidents, and storm events.

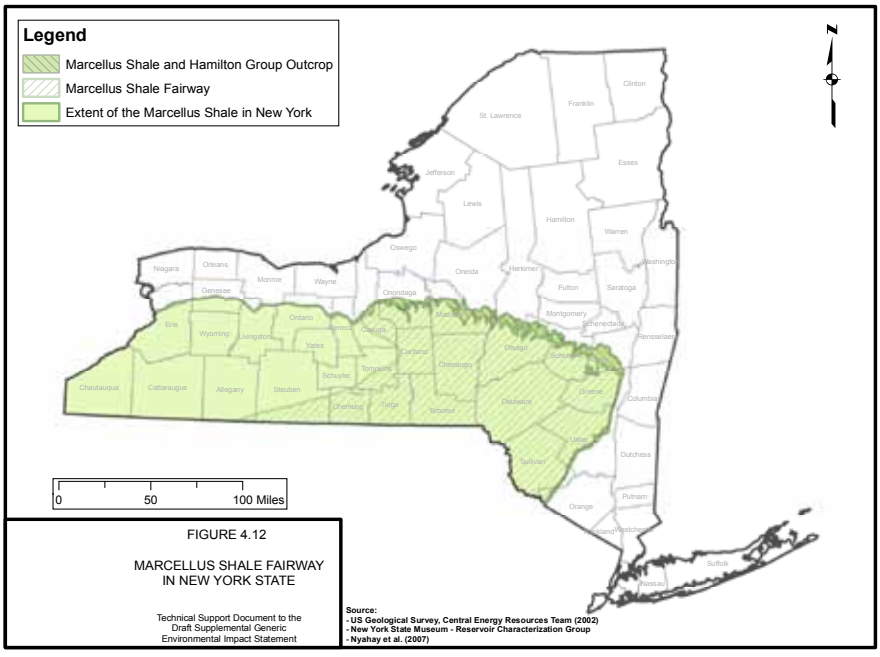

FIGURE 4.12

MARCELLUS SHALE FAIRWAY IN NEW YORK STATE

Technical Support Document to the Draft Supplemental Generic Environmental Impact Statement

Source:
- US Geological Survey, Central Energy Resources Team (2002)
- New York State Museum - Reservoir Characterization Group
- Nyahay et al. (2007)

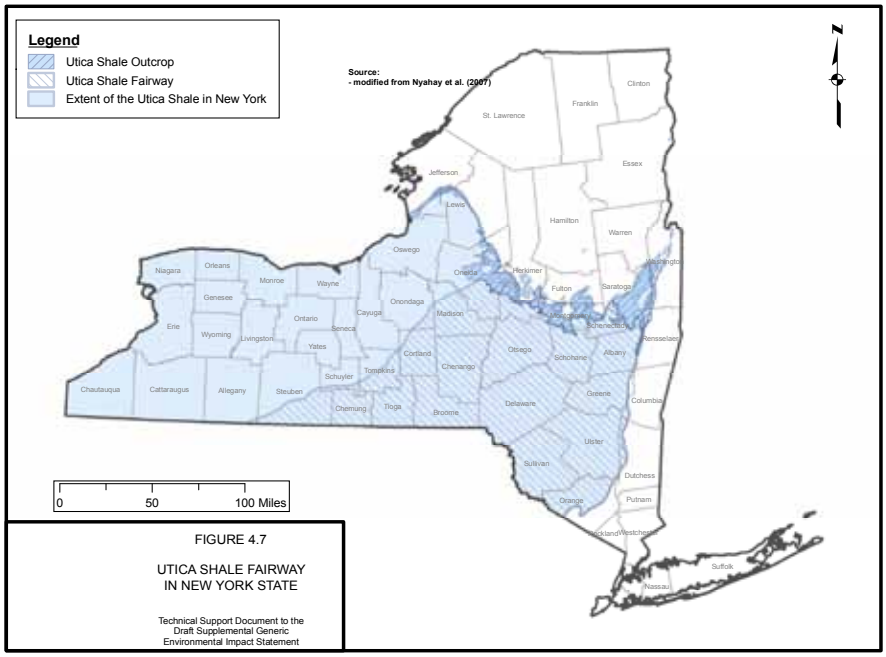

FIGURE 4.7

UTICA SHALE FAIRWAY
IN NEW YORK STATE

Technical Support Document to the
Draft Supplemental Generic
Environmental Impact Statement

To protect human health and the environment, the DEC should withdraw the dSGEIS and the New York State should adopt a moratorium for time to gain the full scientific and policy understanding of hydro-fracking risks and consequences.

Reasons to Wait

Thoughtful consideration and action on these critical issues can avoid the largest potential environmental and public health disaster in New York State history.

Science should guide policy, not quantify contamination

Due to innumerable drinking water problems associated with hydro-fracking, on October 29, 2009 Congress approved United States Environmental Protection Agency (EPA) to study drinking water effects from hydro-fracking. New York State should consider and incorporate this scientific knowledge before permitting hydro-fracking operations in the state.

The enforcement farce

In the midst of the bleakest budget crisis in recent memory, New York State lacks the funding and the trained professionals to ensure enforcement of any hydro-fracking operation in the state. The dSGEIS directs the NYS Department of Health—which has no regulatory power over hydro-fracking—to actively monitor hydro-fracking chemicals and radioactive waste concerns, assure drinking water protection, and assist local county health departments on water well investigations and complaints.

Local governments are only given the ability to regulate local roads and assess property taxes on gas wells. However, local health departments are required to facilitate and conduct complaints of water quality violations. Additionally, energy companies are expected to consult with local governments on their local planning documents, while giving these local governments no recourse if those plans are violated.

The only responsible solution is to enact a moratorium on hydro-fracking to ensure New York's clean water and energy future. New York needs leadership of conscience to allow time for regulators, landowners, taxpayers, policymakers and citizens to understand the true consequences to our flowing streams, infamous lakes, protected watersheds, pure aquifers and our pocketbooks. We need leadership to ensure the proper treatment and disposal of the toxic, radioactive, and abundant waste produced as a by-product of this industry-preferred extraction method for the natural gas deposits contained in the Marcellus and Utica shale.

Introduction

Oil and gas companies are eager to use unconventional, resource-intensive drilling methods to recover natural gas from shale deposits in New York State. New York relies upon natural gas for 24% of its energy supply. Oil and gas companies propose to recover natural gas by combining hydraulic fracturing of the shale with horizontal gas drilling wells.

New York's natural gas demand is primarily met through sources from the Gulf Coast and Canada. New York State sits atop one of the largest shale formations in the United States, which contains natural gas.

Oil and gas drilling activities in New York State is regulated by a Generic Environmental Impact Statement (GEIS) adopted in 1992. Due to the increased interest in recovering natural gas supplies from "unconventional shale formations" by using high volume hydraulic fracturing, Governor Paterson directed the New York State Department of Environmental Conservation (DEC) to issue supplemental regulations to the GEIS to consider the environmental impacts of high volume horizontal hydraulic fracturing, herein referred to as hydro-fracking.

Released on September 30, 2009, the DEC's draft Supplemental Generic Environmental Impact Statement (dSGEIS) failed to assess the real impacts of hydro-fracking. Hydro-fracking is being used across the country from Texas to Wyoming to Pennsylvania with dire consequences. These states rushed into hydro-fracking without properly regulating the industry practice and now face problems including contaminated drinking water supplies and overtaxed wastewater treatment facilities.

In general, the dSGEIS is flawed, needs to be withdrawn, and highlights the insurmountable challenges to properly regulate this industry. To protect New York's air, land, water and people, a moratorium on hydro-fracking is needed to avoid drilling New York into environmental and economic ruin.

What is Hydro-Fracking?

Large deposits of natural gas are estimated to be located deep within New York's shale formations. The natural gas is trapped in pockets, or veins, where the shale naturally fractured during settling. Hydro-fracking is a more commercially viable method to extract natural gas from deep shale formations, including the Marcellus and Utica. The hydro-fracking process uses two (2) to seven (7) million gallons of water mixed with chemicals for each gas well to fracture rock. Once fractured, the natural gas is released from isolated veins within the shale formation.

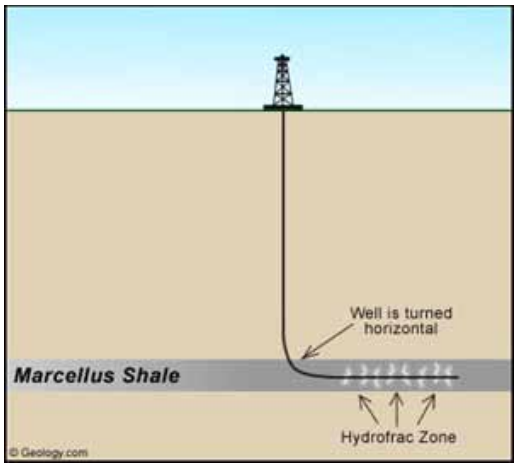

Figure 1.

To capture a commercially viable amount of gas from the deep shale formations, the gas well is drilled vertically to approximately 500 feet above the formation. Next, the wellbore is drilled horizontally to tap the tiny pockets of gas in the shale. The length of a typical horizontal wellbore in Pennsylvania is drilled 4,500 feet.

Multiple well spacing

In July 2008, Governor Paterson signed the **Well-Spacing Law**[1] to allow multiple wells to be drilled from one well-pad. A single well typical land disturbance is approximately 3 acres. A partial reclamation occurs with the production phase, leaving 1.5 acres disturbed. In the case of a multi-well pad, land disturbance is increased to 5 acres of land and 3 acres are left disturbed during gas production. A total of 10 wells can be drilled per pad.

Drawbacks to drilling multiple gas wells per pad include the concentration of waste generated during the hydro-fracking process.[2] The waste streams are discussed below, and it is important to remember that waste generated by a multi-well pad is multiplied by how many wells are sited for that pad.

The phases of the hydro-fracking process

1. **Drilling -** First the land 500 ft. above the target formation is cleared during the vertical drilling phase. Next, a larger drill rig begins angling the drill bit to create the horizontal drilling bore. **Drilling mud** is added and drill cutting waste generation is created. Drilling mud is used by to cool and power the drill. Drilling mud can be 1) water-based; 2) potassium-chloride/polymer-based with a mineral oil lubricant; or 3) synthetic oil-based.[3] **Drill cuttings** are the rocks from the drilling process. They are stored temporarily on-site and depending upon the type of drilling mud used, cuttings could be classified as hazardous waste. The initial drilling process can take up to two months.[4]

2. **High Volume Hydraulic Fracturing -** After the well is drilled, it is then fractured. Water is combined with chemical additives to form the **fracturing fluid**, or **frack fluid**. Each hydro-fracked well requires between 2-7 million gallons of frack fluid, comprised of 2% chemical mixture. Approximately 30% of the frack fluid flows back up to the surface as flowback fluid. Flowback fluid generates the largest amount of waste for the gas wells. The hydro-fracking process takes approximately 4 months to complete from preparation to waste disposal.

3. **Production -** Following fracking, the drilling rigs are removed and the gas production phase begins- when natural gas is extracted. **Production brine** is a by-product of this phase of the process.

See page 8 for a detailed discussion of Hydro-fracking waste streams.

Inherent Risks of Hydro-Fracking Shale

Using high volume hydro-fracking techniques to extract natural gas and other natural resources from shale formations, including the Marcellus and Utica, pose significant risks of adverse impacts to land, air, water, and people.

Chief concerns include human and environmental exposure to:

- Radioactivity, from **Radium – 226** and **Radon**, which both naturally occur in the Marcellus shale
- The **cocktail of hydro-fracking chemicals** injected into the ground, proposed to be stored in open lagoons, transported on public roadways, and treated at unidentified water treatment plants
- Cumulative air emissions from open **hydro-fracking waste lagoons** and associated gas drilling operations

Radioactivity

The DEC warns that "…activities that have the potential to concentrate NORM need to come under government scrutiny to ensure adequate protection.[5]" The radioactivity of Marcellus Shale is a natural physical attribute of the shale, and this type of radioactivity is described as a NORM or Normally Occurring Radioactive Material.[6] NORMs generally pose little to no human health or environmental risk due to their natural isolation deep below the Earth's surface.

Appendix 13 of the dSGEIS includes well sampling from 13 conventional vertical wells drilled in the Marcellus Shale formation. These wells are currently producing gas in New York State, and their production brine contains elevated levels. In fact, over 80% of the DEC's tests for Radium-226 exceed the U.S. EPA recommended safe drinking water standards of 5 picocuries/Litre (pCi/L).

Production brine positive for radioactivity would have to be treated as radioactive waste and could not be treated at a publicly owned sewage treatment facility. The dSGEIS fails to identify facilities to properly treat and dispose of liquid radioactive waste. In addition to the high levels of radiation from production brine, flowback fluid is positive for Radium-226, with levels ranging between 2.58- 33 pCi/L. The dSGEIS data is limited to samples from Pennsylvania and West Virginia.[7] Additional testing for radioactivity is needed in New York, as well as a clear and accountable plan for proper treatment and disposal for flowback fluid exceeding EPA standards for Safe Drinking Water.

Figure 2 presents Radium-226 levels from conventional vertical gas wells drilled in New York's Marcellus Shale.

Radiation Levels from Conventional Gas Wells in New York State

Town, County	Measured Radium-226 (in picoCuries/Litre)
Caton, Steuben	2,472
Orange, Schuyler	2,647
Orange, Schuyler	16,030
Orange, Schuyler	13,510
Caton, Steuben	7,885
Troupsburg, Steuben	5,352
Woodhull, Steuben	4,049
Reading, Schuyler	15,140
Oxford, Chenango	1,779
Dix, Schuyler	6,125
Dix, Schuyler	10,160

EPA Safe Drinking Water Standards for Radium-226 is 5 pCi/L

Figure 2

Human Health Effects from Radium[9]

- Long term exposure to radium increases the risk of developing several diseases
- Inhaled or ingested radium increases the risk of developing such diseases as lymphoma, bone cancer, and diseases that affect the formation of blood, such as leukemia and aplastic anemia
- External exposure to radium's gamma radiation increases the risk of cancer in all tissues and organs at varying degrees
- The greatest health risk from radium is from exposure to its radioactive decay product radon. It is common in many soils and can collect in homes and other buildings.

There is no safe level of radon – any exposure poses some risk of cancer

-United States Environmental Protection Agency

Radon

Radon occurs naturally as a decay product of Radium-226, and therefore is present in rocks and soils. The build up of radon is what leads to its deadly risks. Radon exposure is the second leading cause of lung cancer in the United States, after smoking.[10] Radon build up in homes Onondaga County, New York led to discovery of the radioactive nature of Marcellus shale.

Estimates from the National Academy of Sciences on Radon[11]

- 15,000-22,000 Americans die every year from radon-related lung cancer
- Radon in drinking water causes an additional 180 cancer deaths annually
- Almost 90% of those projected deaths were from lung cancer from the inhalation of radon released to the indoor air from water
- About 10% were from cancers of internal organs, mostly stomach cancers, from ingestion of radon in water

Cocktail of Hydro-Fracking Chemicals

Numerous combinations of chemicals are added to millions of gallons of water to facilitate hydro-fracking. Risk for human and environmental exposure is greatest from potential spills.

The following *Hydro-Fracking Chemical Table* (figure 3) summarizes the hydro-fracking additive class, provides a brief description of its purpose, provides examples of chemicals companies could use, and the final column summarizes key environmental and health concerns associated with the specific chemical example. The intent of this table is to provide a general overview of the types of additive classes used in fracking and the additive's purpose. The information highlights fracking chemicals disclosed to DEC and published in the dSGEIS. While some chemicals were disclosed, the specific chemical cocktails are "proprietary information" and only disclosed to the DEC, and withheld from the public.

This table represents a sample of hydro-fracking chemicals proposed to be injected into the ground, stored in open lagoons, transported on public roadways, and treated at unidentified water treatment plants. Not all of these additive classes will be used at every well; the exact composition of the frack fluid is mostly determined by the energy company with consideration given to the site-specific geology.

Additive Type	Description	Examples	Health Effects of Chemicals
Proppant	"Props" open fractures and allows gas /fluids to flow more freely to the well bore	Sand (Sintered bauxite; zirconium oxide; ceramic beads)	Prolonged exposure to sintered bauxite dust can cause respiratory tract infection and irritation to skin and eyes. Zirconium Oxide can be slightly hazardous in case of eye contact, skin contact, inhalation or indigestion. Chronically, it can be toxic to the upper respiratory tract, and can produce organ damage.
Acid	Cleans up perforation intervals of cement and drilling mud prior to fracturing fluid injection, and provides accessible path to formation	Hydrochloric acid (HCl, 3% to 28%)	A clear, colorless, fuming, poisonous, highly acidic aqueous solution of hydrogen chloride, HCl, used as a chemical intermediate and in petroleum production, ore reduction, food processing, pickling, and metal cleaning. The EPA regulates HCl as a toxic substance
Breaker	Reduces the viscosity of the fluid in order to release proppant into fractures and enhance the recovery of the fracturing fluid	Peroxydisulfates	Peroxydisulfates can be mixed with sodium, potassium, or ammonia. Depending upon what is used there are varying degrees of irritation to skin and eyes. Mostly strong irritants based upon prolonged exposure. Prolonged exposure to ammonium persulfates may cause skin burns and ulcerations.
Bactericide/ Biocide	Kills organisms that could contaminate methane gas and kills bacteria to promote proppant delivery	Gluteraldehyde; 2-Bromo-2-nitro-1,2-propanediol	Gluteraldehyde is hazardous in case of skin contact, eye contact, ingestion, and inhalation. Severe over-exposure can result in death. 2-Propanediol decomposes on heating or on burning producing toxic and corrosive fumes including hydrogen bromide and nitrogen oxides. Reacts with some metals, amines and alkaline compounds.
Clay Stabilizer	Prevents swelling and migration of formation clays which could block pore spaces thereby reducing permeability	Salts (eg. Tetramethyl ammonium chloride) Potassium chloride (KCl)	Potassium Chloride can cause eye and skin irritation. Ingestion will cause gastrointestinal irritation and inhalation will cause respiratory tract infection. Lab experiments have resulted in mutagenic effects.
Corrosion Inhibitor	Reduces rust formation on steel tubing, well casings, tools, and tanks.	Methanol	Methanol is toxic: drinking 10 ml will cause blindness, and as little as 100 ml will cause death. It is used as an antifreeze, solvant, and fuel.
Crosslinker	Increases fracturing fluid viscosity to carry more proppant into the fractures.	Potassium hydroxide	Pure potassium hydroxide forms white, deliquescent crystals. It dissolves readily in water, giving off heat and forms a strongly alkaline, caustic solution. It closely resembles sodium hydroxide and has similar uses.
Friction Reducer	Allows fracture fluids to be injected at optimum rates and pressures by minimizing friction.	Sodium acrylate-acrylamide copolymer; polyacrylamide (PAM)	Environment Canada lists sodium acrylate as a possible carcinogen, expected to be toxic and bioaccumulative and has flagged this as a chemical of concern for further testing. The building block of PAM acrylamide is a known carcinogen, mutagen, and a bioaccumulative toxic.
Gelling Agent	Increases fracturing fluid viscosity, allowing the fluid to carry more proppant into the fractures	Guar gum	Guar gum is generally not hazardous during normal handling
Iron control	Prevents the precipitation of metal oxides which could plug off the formation	Citric acid; thioglycolic acid	Thioglycolic Acid is extremely hazardous in case of eye contact. It is very hazardous in case of skin contact, ingestion, and inhalation. Severe over-exposure can result in death.
Scale Inhibitor	Prevents the precipitation of carbonates and sulfates	Ammonium chloride; ethylene glycol; polyacrylate	Ammonium chloride has severe corrosive effect on brass and bronze, and is hazardous in case of eye contact. It is slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion, of inhalation. Ethylene Glycol is antifreeze
Surfactant	Reduces fracturing fluid surface tension thereby aiding fluid recovery	Methanol; isopropanol	Isopropanol is poisonous if taken internally, and is a major component of rubbing alcohols. The propylene is a byproduct of petroleum refining

Figure 3

Hydro-fracking Waste Products: Cuttings, Brine & Flowback

Drill Cuttings

The rock or "**drill cuttings**" along with the drilling lubricant or "**mud**" that return to the surface during the drilling process are stored on-site in open-lined storage pits or contained in steel tanks. For a multi-well pad, the DEC proposes to permit central storage of drill cuttings for the duration of drilling operation.[13] Cuttings are stored either stored temporarily on-site in an open lined storage pit or contained in a steel tank. Final disposal of cuttings is dependent upon the specific chemical composition of the drilling mud. The 1992 GEIS allows on-site burial of drill cuttings using air and freshwater drilling methods, while pits storing cuttings generated by polymer- or oil-based drilling muds must be removed by permitted hauler and disposed at a solid waste landfill.[14, 15]

Differences in Amounts of Cutting Waste Generated Per Well

Well Type	Vertical Well	Horizontal Well
Depth of Well	7,000 ft down	7,000 ft down + 3,000 ft out
Amount of Cuttings	125 cubic yards	165 cubic yards
	Source:	dSGEIS- pp.5-29-30

Not Your Grandfather's Gas Well:
Differences between horizontal drilling and vertical drilling

1. *Larger rigs with longer per well drilling time;*
2. *A higher likelihood of multi-well pads;*
3. *Using drilling mud rather than air to cool and power the drill;*
4. *The volume of rock cuttings associated with high volume hydro-fracking.*

source: DEC-dSGEIS page 5-21

The dSGEIS describes the vertical portion of the gas well drilled using compressed air or freshwater mud as the drilling fluid. The horizontal portion of the gas well can be drilled with water-based, potassium chloride/ polymer-based with a mineral oil lubricant, or synthetic oil-based drilling mud. According to the 1992 GEIS, used drilling mud is typically reconditioned for use at other wells.[16]

Production Brine

The concentrated fluid that flows out of a producing gas is known as production brine. Due to Marcellus shale's marine origin, the production brine contains high levels of total dissolved solids (TDS or salts). Per day, between 300-6300 gallons of brine can be generated and each gallon requires secure on-site storage and a disposal plan.[22,23] On-site brine must be stored in steel tanks, and the DEC is open to constructing pipelines to transport brine off-site.[24] Disposal options under consideration include underground injection, deliver to unspecified treatment plants, and road spreading.[25] In January 2009, DEC Division of Solid and Hazardous Materials notified haulers that road spreading for production fluid had to have a "beneficial use determination" prior to use on New York's roadways.[26]

"In the snowbelt, road salts can be a major pollutant in both urban and rural areas. Snow runoff containing salt can produce high sodium and chloride concentrations in ponds, lakes, and bays. This can cause unnecessary fish kills and changes to water chemistry."

--US Environmental Protection Agency
http://www.epa.gov/OWOW/NPS/roads.html

Flowback Fluid

The flowback fluid contaminated with the chemicals used for fracking and any contaminants from the shale itself. The combination of chemicals used depends on the specific geology of the site and company preference. Each company creates their own cocktail of chemicals.

The public does not have an accurate account of what chemicals will be used in their community as not all chemicals used for hydro-fracking have been disclosed.

Some of the chemicals have been disclosed in the dSGEIS,[17] but this is not comprehensive list. The list was compiled based on voluntary disclosure by the gas companies to DEC. The dSGEIS states that:

> *Any product whose name does not appear…was not evaluated in this SGEIS either because no chemical information was submitted to the Department or because the product was not proposed for use in fracturing operations at Marcellus shale wells or other wells targeting other low permeability gas reservoirs.*[18]

Proper treatment and disposal of this liquid waste poses a great risk. Current water treatment infrastructure cannot meet existing demand and increasing treatment capacity for radioactive and corrosive hydro-fracking wastewater. The DEC estimates that over the next 20 years it will conservatively need $36.2 billion[19] to meet New York's current for gaps in wastewater infrastructure. Adding millions and potentially billions of gallons of flowback water to water treatment plants will severely impair New York's ability to protect its water bodies and local economies.

"The composition of flowback water changes with time, depending on a variety of factors…

- The concentrations of total dissolved solids (TDS), chloride, and barium increase;
- The levels of radioactivity increase,
- Calcium and magnesium hardness increases;
- Iron concentrations increase, unless iron-controlling additives are used;
- Sulfate levels decrease;
- Alkalinity levels decrease, likely due to use of acid; and
- Concentrations of metals increase.[20]"

The DEC attributes these changes to the shale formation, frack fluids, and operations control. What it clearly demonstrates is the need for a waste disposal plan that meets the needs of the changing composition of this liquid waste.

Hydro-Fracking Waste Lagoons

Centralized impoundments are hydro-fracking liquid waste lagoons that store freshwater and flowback fluid for dilution and reuse to service gas wells in a four-mile radius.[28] The lagoons themselves can be five acres, with an additional footprint that includes setbacks, access roads for trucks, and pipelines. Significant environmental and risks exist with hydro-fracking waste lagoons.

Without covers to prevent contact, wildlife could be attracted to the open liquid pools. While the DEC recognizes that: "Cover systems may be used to further restrict access by birds and other wildlife,[29]" the DEC is not mandating covers on open hydro-fracking waste lagoons. Additionally, the hydro-fracking liquid contained in the open lagoons could be released into the environment in the case of a storm event or pit liner failure.

These waste lagoons also threaten the air we breathe. Cumulatively, hydro-fracking lagoons may be a significant source of air pollution. Figure 4 was developed by the DEC and was included in the dSGEIS.[30] It depicts the anticipated annual waste emissions of a hydro-fracking waste lagoon.

While much remains to be seen on the actual impacts of centralized impoundment areas, the DEC says:

> If sufficient information is not provided before the SGEIS is finalized …then any required site specific environmental reviews in New York must be based on the operator's analysis, reviewed by the Department, of actual flowback data collected within reasonable proximity to the well pads that will be serviced by the proposed surface impoundment.[31]

The lack of information surrounding the exact composition of flowback fluid and what this will mean to New York's environment certainly warrant additional tests before this is included in the scope of a generic environmental impact statement. A generic environmental impact statement is based upon the fact that "environmental impacts of separate actions having generic or common impacts.[32]" The entire dSGEIS discusses the fact that chemicals, geology, and impacts will vary depending on what shale is drilled, which company drills it, and where the drilling occurs. This is at odds with a generic impact.

Monitoring and Enforcement

Local Governments

Throughout the dSGEIS the public and municipalities are reminded that the DEC has the role of lead agency in the siting of oil and gas wells.[36] In relation to gas wells, local governments are can only regulate local roads and assess property taxes on gas wells. Real costs must be borne by someone. For example, the dSGEIS tasks local health departments to facilitate and conduct complaints of water quality violations. Additionally, energy companies are expected to consult with local governments on their local planning documents, while giving these local governments no recourse if those plans are violated.

1. *County health departments are directed to facilitate and conduct initial investigations into water well complaints, unless the complaint is made during active operations.[37]*
2. *Gas companies are encouraged to consult with local governments taxing local government staff time. Specifically, gas companies are directed to consult with local planning documents including open space plans and agricultural plans.[38] The mechanism for accountability is unclear.*

State Agencies

Department of Environmental Conservation

The DEC has a clear mandate regarding oil and gas drilling:

> The Department regulates the drilling, operation and plugging of oil and natural gas wells to ensure that activities related to these wells are conducted in accordance with statutory mandates found in the ECL. In addition to protecting the environment and public health and safety, the Department is also required by Article 23 of the ECL to prevent waste of the State's oil and gas resources, to provide for greater ultimate recovery of the resources, and to protect correlative rights.3 ECL §23-0303(2) provides that DEC's Oil, Gas and Solution Mining Law supersedes all local laws relating to the regulation of oil and gas development except for local government jurisdiction over local roads and the right to collect real property taxes. Likewise, ECL §23-1901(2) provides for supersedure of all other laws enacted by local governments or agencies concerning the imposition of a fee on activities regulated by Article 23.[33]

However, the DEC Division of Mineral Resources has less than 20 staff statewide. How is it plausible for the DEC to regulate and monitor a boom in resource-intensive hydro-fracking gas wells across the state? DEC staff is required to on-site for casing and cementing operations as well as for pressure tests. The DEC is proposing that proposed the driller maintain a log of inspections, but it is unclear what personnel will perform these inspections, and with what frequency, if drilling exponentially increases across the state.

Department of Health

Although the Department of Health (DOH) lacks a primary role in the regulatory process, their expertise was integral to the dSGEIS. DOH staff expertise was incorporated on such issues as toxicity of chemicals, drinking water standards, and setbacks. According to the dSGEIS, the DOH will review new proposed hydraulic fracturing additives, NORM issues, and assist county health departments with water well investigations and complaints.[34] DOH will also regulate the operation, design, and quality of public water supplies; assure water sources are adequately protected; and set standards for constructing individual water supplies.[35]

Public Service Commission

The NYS Public Service Commission is responsible for pipeline siting and traditionally pipelines are sited following a successful gas well. The unnecessary "flaring" of natural gas until the pipeline siting process is complete is disconcerting. This inefficient and wasteful process will result in the release of unnecessary quantities of greenhouse gas emissions. New York State needs a comprehensive, transparent, coordinated, and publicly accountable approach to permitting wells and siting pipelines

Federal Exemptions

The oil and gas industry has some form of exemption from every major federal environmental statute, allowing the industry to set its own standards and leaving the American people to rely upon the goodwill of oil and gas energy giants to protect their health and environment.

Highlights of Oil and Gas Industry Exemptions From Federal Statutes

Safe Drinking Water Act (SDWA)

Hydraulic fracturing operations are completely exempted from regulation under SDWA and Underground Injection Control of fracking fluid was defined to exempt it from EPA regulation of Underground Injection Control.

Clean Water Act (CWA)

Expanded the definition of oil and gas operations and activities to include the construction of the drill site, waste management pits, access roads, in-field treatment plants and transportation infrastructure. Eliminated "sediment" as a pollutant in managing stormwater run-off from drill pad site and all oil and gas field construction activities and operations.

National Environmental Policy Act (NEPA)

Weakened environmental review process by presuming that some oil and gas related activities should be analyzed and processed by the Interior and Agricultural Departments under categorical exclusions, which does not provide for a public comment period.

Comprehensive Environmental Response, Compensation and Liability Act (a.k.a. Superfund)

The list of covered hazardous substances section 101(14) excludes crude oil and petroleum.

Resource Conservation and Recovery Act (RCRA)

The Solid Waste Disposal Act of 1980 exempts oil field waste from Subchapter III of RCRA until the EPA could prove the wastes were a danger to human health and the environment. In 1988 EPA made a regulatory determination that oil field waste should be exempted because of adequate state and federal regulations. This includes produced waters, drilling fluids, and associated wastes.

Clean Air Act (CAA)

The CAA states that the oil and gas industry will not be aggregated together to determine if they are subject to Maximum Achievable Control Technology for each source. The exemption also extends to pipeline compressors and pump stations in some instances.

Toxic Release Inventory under the Emergency Planning and Community Right-to-Know Act (EPCRA)

The oil and gas industry is exempted from reporting under section 313 of EPCRA, even though it generally meets the requirements established for reporting.

Policy Solutions

Action is needed now. Landowners are being approached in New York to sign leases to natural gas companies for access to their land and to recover natural gas from shale using hydro-fracking. Thousands have already signed leases. Hydro-fracking is a resource-intensive and hazardous waste producing extraction method of natural gas. Hydro-fracking pose unprecedented environmental, human health, and taxpayer risks. Regulating hydro-fracking has proved impossible due to the laundry list of environmental exemptions the oil and gas industry secured during the previous Administration, which is only compounded by a cash-strapped state and woefully understaffed Department of Environmental Conservation.

The legislative tasks before New York State are great to ensure New York's a sustainable clean water and energy future. Hydro-fracking for natural gas in New York's shale will create abundant liquid waste streams that threaten public health, drinking water supplies, and air quality. The construction of new roads and increased truck traffic fragments our open space, increases air pollution, and industrializes rural New York. Local governments and taxpayers must be protected from increasing and expensive burdens, like road maintenance, public health monitoring, environmental enforcement, and aging water treatment infrastructure. Enacting a moratorium allows New York State to sincerely contemplate welcoming a risky energy extraction industry exempted from environmental protections.

To protect human health and the environment, CCE is calling for the DEC to withdraw the dSGEIS and is urging the New York State Legislature to enact a moratorium to gain the full scientific and policy understanding of hydro-fracking risks and consequences. Thoughtful consideration of the loopholes, standard industry practices, and waste stream solutions could avoid the potentially largest environmental and public health disaster in Empire state history.

During the moratorium, CCE urges local, state, and federal policy makers and regulators to ensure protection of human health and the environment by:

1. Banning high volume hydro-fracking in sensitive watersheds including, but not limited to, sole-source aquifers and unfiltered drinking water supplies.

2. Recognizing and enforcing the protections, including the ban on interbasin water transfers and compulsory return of clean water to the source watershed, of the Great Lakes-St. Lawrence River Basin Water Resources Compact, enacted by Congress and the NYS Legislature in 2008.

3. Ensuring increased coordination between critical state agencies to protect the public heath and our environment while allowing permitted natural gas extraction to be efficiently delivered to market.

4. Establishing a Community Clean Water Protection Fund. Any permitted hydro-fracking activity should require the company to establish a dedicated, interest bearing fund to mitigate unforeseen water and public health impairments resulting from modern natural gas drilling techniques in New York's shale formations to protect taxpayers and our shared natural resources.

5. Prohibiting proposals to drill in state lands from being covered by a generic permitting process. Individual review ensures an opportunity for the public to provide comment and guidance on how the public's land will be used.

6. Mandating cumulative impact assessments for air, water, public health, and wildlife from hydro-fracking activities, including:

a. Adding new gas wells on an approved well-pad;

b. Centralized freshwater storage;

c. Waste capacity of a central flowback storage lagoon;

d. Increased truck traffic and associated diesel particulate pollution; and

e. Habitat fragmentation from drilling access roads and pipeline infrastructure.

7. Restoring environmental and public health protections of key federal statutes, including the Safe Drinking Water Act, Clean Water Act, National Environmental Policy Act to cover high volume hydro-fracking practices by the oil and gas industry.

8. Empowering local governments and involved state and local agencies, including the Health Departments, to assess fees on the industry and assist in regulatory oversight of high volume hydro-fracking operations

Conclusion

New York State should learn from her neighbors. Pennsylvania was caught off-guard by the hydro-fracking industry's wastewater treatment needs. The PA Department of Environmental Protection ordered wastewater treatment facilities to limit the amount of hydro-fracking wastewater accepted to 1% of the plants volume, primarily due to elevated Total Dissolved Solids (TDS) levels. Five times saltier than seawater, hydro-fracking wastewater is impairing the health of Pennsylvania's waters as well as corroding the intake pipes for other electricity-producing plants.[27]

In closing, enacting a moratorium on hydro-fracking is necessary and reasonable to provide time for our State Leaders to ensure New York's clean water and energy future. New York needs leadership of conscience to allow time for regulators, landowners, taxpayers, policy makers and citizens to understand the true consequences to our flowing streams, infamous lakes, protected watersheds, pure aquifers and our pocketbooks. We need leadership to ensure the proper treatment and disposal of the toxic, radioactive, and abundant waste produced as a byproduct of this industry-preferred extraction method for the natural gas deposits contained in the Marcellus and Utica shale.

Endnotes

1. http://www.state.ny.us/governor/press/press_0723084.html
2. dSGEIS- page 5-20
3. dSGEIS- p. 5-28
4. dSGEIS- pp. 5-124-125 Table 5.15- Primary Pre-Production Well Pad Operations
5. dSGEIS. p.4-36
6. Ibid.
7. dSGEIS p. 5-110 Table 5-10- Concentrations of NORM constituents based on limited samples from PA and WV
8. dSGEIS; Appendix 13 - NYS Marcellus Radiological Data from Production Brine
9. http://www.epa.gov/rpdweb00/radionuclides/radium.html#affecthealth
10. Ibid.
11. Ibid.
12. dSGEIS- pp. 5-29-30
13. dSGEIS- p. 5-28 Reserve Pits on Multi-Well Pads
14. dSGEIS- p. 5-119 Reserve Pit Liner from Mud Drilling
15. dSGEIS. Table 5-2 pp. 5-30-31
16. dSGEIS- p. 5-118 Cuttings from Mud Drilling
17. dSGEIS- page 5-28 Drilling Mud
18. Tables 5-3 and 5-4. pp. 5-35-40
19. dSGEIS. p. 5-34
20. http://www.dec.ny.gov/chemical/42383.html
21. dSGEIS- p. 5-106 Temporal Trends in Flowback Water Composition
22. dSGEIS- p. 5-128 Brine Storage
23. dSGEIS- pp.5-126-127 Production Rate
24. Ibid.
25. dSGEIS p. 5-129 Brine Disposal
26. dSGEIS; Appendix 12 - Beneficial Use Determination (BUD) Notification Regarding Roadspreading
27. http://www.post-gazette.com/pg/08322/928571-113.stm; http://www.propublica.org/feature/wastewater-from-gas-drilling-boom-may-threaten-monongahela-river; http://files.dep.state.pa.us/AboutDEP/AboutDEPPortalFiles/RemarksAndTestimonies/TestimonySAC022509.pdf
28. dSGEIS. p. 5-113
29. dSGEIS. pp. 5-113-114
30. dSGEIS. p. 6-108
31. dSGEIS. pp. 7-95-96
32. dSGEIS p. 1-3 Generic Environmental Impact Statements
33. dSGEIS p. 1-2 Regulatory Jurisdiction
34. dSGEIS. p. 8-5
35. dSGEIS. p. 2-17
36. dSGEIS. p. 1-2
37. dSGEIS. p. 8-5
38. dSGEIS. p. 8-4

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