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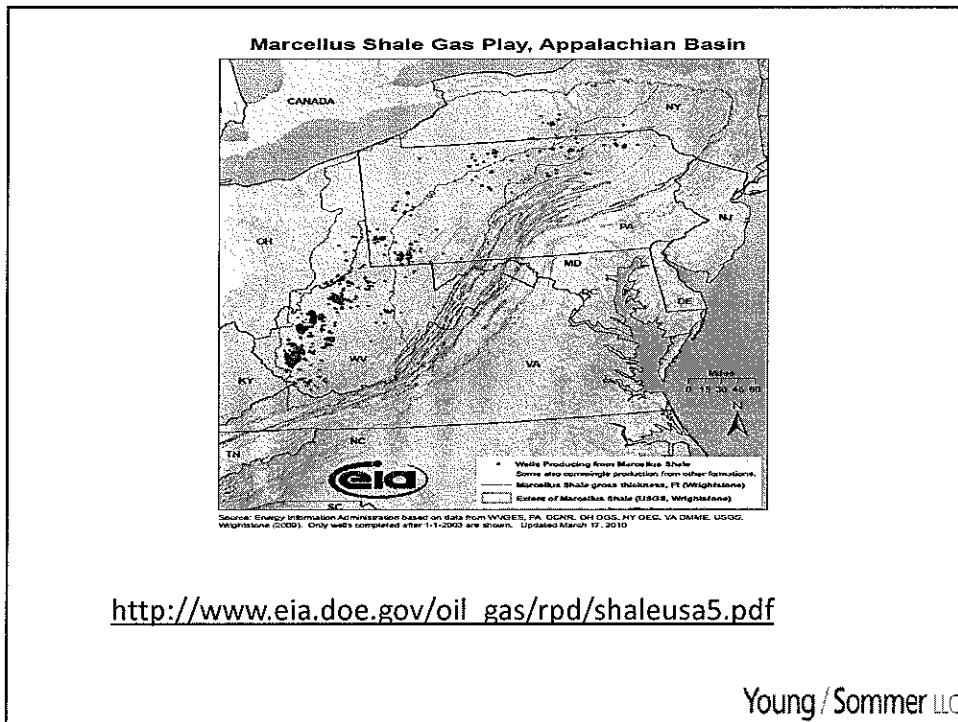
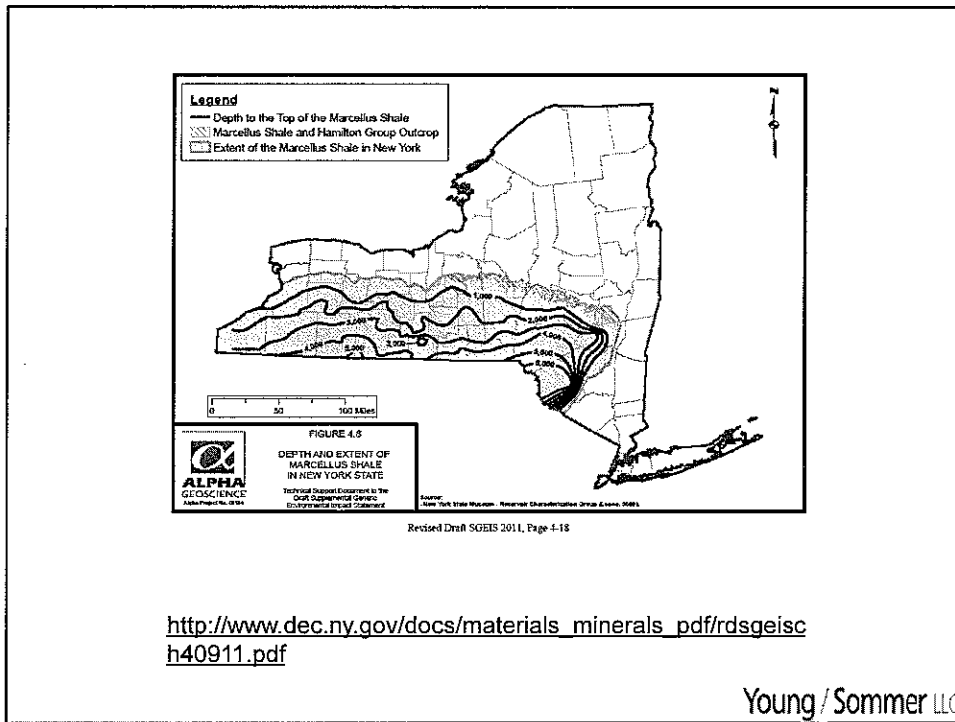
Hydrofracking in New York: A (Hopefully) Unbiased Overview

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What is the Marcellus Shale?

- Shale deposit located deep underground containing large quantities of natural gas
- Extends from southern New York through the northern Appalachians

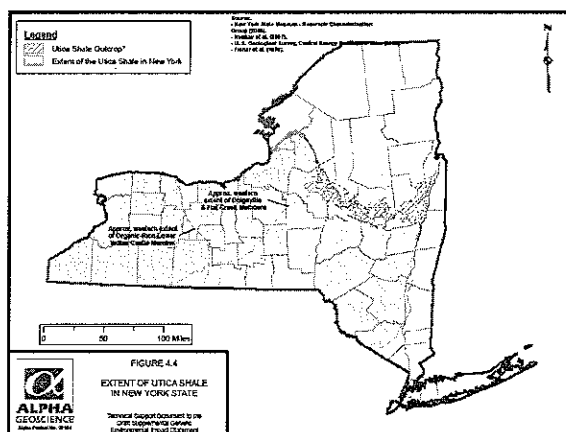
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What is the Utica Shale?

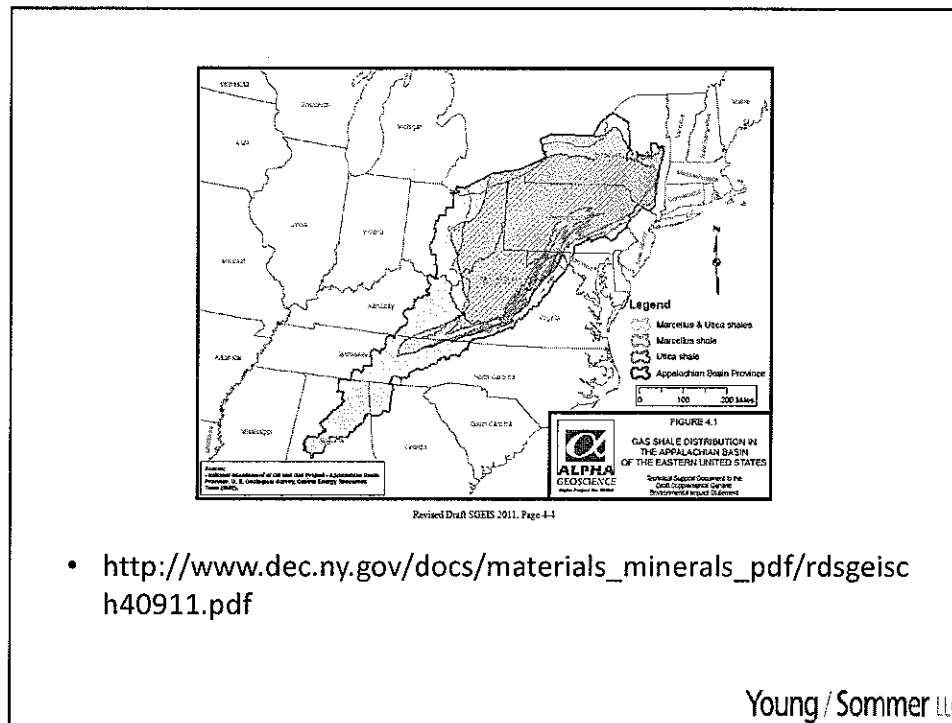
- Shale formation located below Marcellus Shale
- Extends from New York/Ontario south to northern Tennessee
 - In New York located north and east of Marcellus Shale
- Potentially significant natural gas resource
 - More difficult to access
 - Information about extent of natural gas in Utica Shale is limited

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- http://www.dec.ny.gov/docs/materials_minerals_pdf/rdsgeisc_h40911.pdf

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What is Horizontal Hydrofracking?

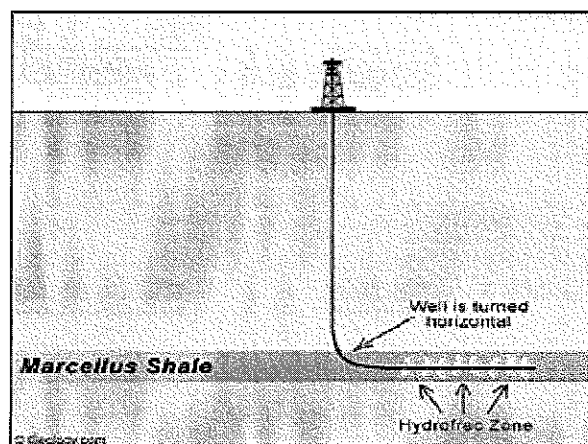
- Gas in the Marcellus/Utica shales can only be accessed through process known as “horizontal” “hydraulic fracturing” (hydrofracking or fracking)
- What is **hydrofracking**?
 - Water, chemicals and sand injected into rock formations to crack rock and release natural gas
 - Chemicals: friction reducers, biocides, gels, corrosion prevention agents, other
 - Sand: “proppant” holds fissures open so natural gas can flow from shale into well

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What is Horizontal Hydrofracking (*cont'd*)?

- What is *horizontal* hydrofracking?
 - Injection of drilling fluids horizontally along strata containing natural gas deposits
- Horizontal hydrofracking also referred to as “high-volume hydraulic fracturing” (HVHF)

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<http://www.dec.ny.gov/energy/46288.html>

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Why Do We Care About HVHF?

Water-Related Issues

- Large quantities of water required relative to traditional hydrofracking
- Possible impact of drilling process on groundwater
 - Injection fluid may contain chemicals
 - Drilling brings up natural contaminants (radiation, salts, methane, metals, etc.)
- On-site storage issues
- Disposal of spent drilling fluids (in particular, flowback water)
 - Possible impacts to surface waters even when treated
 - Concerns relating to disposal via deep well injection

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Why Do We Care About HVHF? *(cont'd)*

Other concerns

- Temporary air emissions impacts (associated with drilling/fracking stage)
- Temporary traffic issues
- Possible climate change impacts
- Possible noise, visual, wildlife and other impacts

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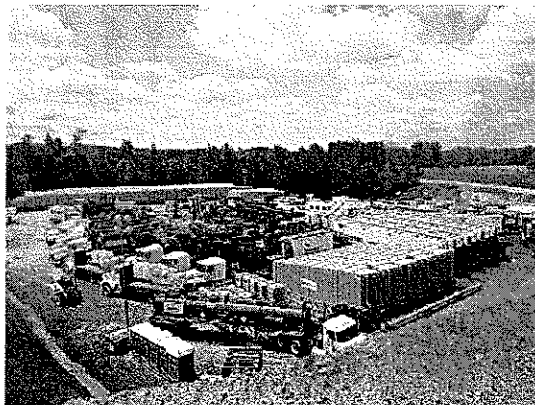


Photo 5.6 Hydraulic fracturing operation, horizontal Marcellus well, Upshur County, WV
Source: Chesapeake Energy, 2008

- http://www.dec.ny.gov/docs/materials_minerals_pdf/rdsgeisc h50911.pdf

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Why is Hydrofracking an Issue Now?

- Fluid injection has long been a part of the drilling process
- HVHF raises new issues
 - Involves greater quantities of water than traditional hydrofracking
 - Allows drillers to reach gas in previously off-limit reserves
 - Expands potential number of wells and areas affected, leading to increase in affected population (and, by extension, possible local opposition)
- In many parts of country drilling wastewater disposed of in underground disposal wells
 - Option not available in much of Marcellus Shale, raising new wastewater disposal concerns

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How is HVHF Currently Regulated? Federal

Injection

- Underground injection of fluid normally regulated under Safe Drinking Water Act (SDWA) Underground Injection Control (UIC) program
 - 2005 Energy Policy Act exempted fracking operations from SDWA regulation (except for diesel fracking injection)

Wastewater/Stormwater

- Stormwater discharged during drilling activities generally exempt from permitting

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How is HVHF Currently Regulated? Federal (*cont'd*)

- Wastewater from well drilling subject to categorical standard (40 CFR Part 435); flowback/production water barred from direct discharge
 - No pretreatment standards for discharges to publicly owned treatment works (POTW)

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Recent Federal Developments

- Study authorized by Congress to address hydraulic fracturing and its relationship to drinking water
 - Generalized scenarios
 - Retrospective/prospective case studies
- Site-specific studies (Pavillion, WY; Dimock, PA)
- Debate regarding regulation of diesel fracking under UIC program

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Recent Federal Developments (*cont'd*)

- Planned pretreatment rules for shale gas industry (applicable to discharges to POTWs)
- Recent federal air emission standards for natural gas wells, 40 CFR Part 60 (new, modified and reconstructed sources); Part 63 (hazardous air pollutants)

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How is HVHF Currently Regulated? New York State

- Oil, Gas and Solution Mining Law (OGSML)(NY ECL Art. 23, Titles 1, 3, 5 et al.; 6 NYCRR Parts 550-559)
 - DEC permit prior to drilling
 - Well spacing and other limitations on location (proximity to homes, streets, water bodies, etc.)
 - Drilling practices (including fluid management plan and double casing); operating practices
 - Plugging and abandonment
 - Reporting and recordkeeping
 - Financial security

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How is HVHF Currently Regulated? New York State (*cont'd*)

- Wastewater/stormwater discharge permits
- State Environmental Quality Review Act (SEQRA) (NY ECL Art. 8; 6 NYCRR Part 617)
- Other

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History of Hydrofracking Regulation in New York

- 1992 Generic Environmental Impact Statement (GEIS) on Oil and Gas Solution Mining Regulatory Program
 - Eliminated need for further SEQRA review if drilling carried out per conditions in GEIS
 - Found that issuance of oil or gas well drilling permit anywhere in state when no other permits involved does not have significant environmental impact
 - Imposed certain restrictions on location

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History of Hydrofracking Regulation in New York (*cont'd*)

- DEC determined that HVHF raised concerns requiring further review
 - Proposed to prepare supplement to 1992 GEIS (SGEIS)
- 2008/2009: Completed scoping for SGEIS
- 2009: Draft SGEIS prepared
- 2011: Revised Draft SGEIS prepared
 - Draft revisions to 6 NYCRR Parts 550-559
 - Draft stormwater general permit

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Overview of Revised Draft SGEIS

- Introduction, Description of Proposed Action, Proposed SEQRA Review Process
- Geology
- Natural Gas Development Activities and High Volume Hydraulic Fracturing
- Potential Environmental Impacts
- Mitigation Measures
- Permitting Process and Regulatory Coordination

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Key SGEIS Mitigation Measures

- Prohibit HVHF in various locations
 - In or near NYC and Syracuse watersheds
 - On or near primary aquifers
 - On certain state-owned land
 - Within 50 feet of private water well or 2,000 feet of public drinking water well or reservoir
 - Within 100-year floodplain
- Mandatory disclosure of fracturing additives and evaluation of eco-friendly alternatives
- Third well casing

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Key SGEIS Mitigation Measures (*cont'd*)

- Baseline water quality testing of private wells near well pad
- Storage of on-site flowback water in watertight tanks within secondary containment
- Fluid disposal plan
- System for tracking disposal of flowback water
- Other mitigation measures (relating to air, greenhouse gases, wildlife and other impacts)

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Revised Drilling Regulations

- Changes to existing regulations (6 NYCRR 550-559)
- Update mining regulations, including incorporating recent statutory changes
- Add new Part 560 specifically addressing HVHF
 - Define HVHF as well fracturing that involves more than 300,000 gallons of water for fracturing operations
 - Codifies many mitigation measures contained in SGEIS (e.g., setbacks, permit application process, well testing, recordkeeping, and reporting, and well construction and operation)

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Draft HVHF Stormwater General Permit

- Establish stormwater management requirements for three phases of HVHF operation
 - Construction phase (access road and well pad construction): Similar to stormwater construction permit
 - HVHF phase (actual well drilling activities, including use and storage of chemicals and other materials, equipment use and storage, etc.): Reflects elements of SGEIS and multisector general stormwater permit
 - Production phase (natural gas extracted from well): Minimal inspection, monitoring and other requirements

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HVHF in New York: Current Status

- DEC currently reviewing SGEIS comments
 - Over 60,000 comments received
- Numerous bills introduced in State Legislature
 - Moratoria/ban
 - Regulation of fracking fluid
 - Individual SEQRA review
 - Waste/wastewater disposal

Municipal Home Rule

- Local governments allowed to legislate
 - In any areas not specifically prohibited by NY Constitution or statute, or
 - Where State has not “pre-empted” the field of regulation (explicitly or implicitly)

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Local Regulation of Hydrofracking

- Dozens of municipalities have enacted laws banning/limiting hydrofracking/drilling
- Laws take several forms
 - Total bans
 - Moratoria
 - Limitations (limit drilling to specific areas, require special use permit, establish setbacks)

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Recent Litigation

- ECL § 23-0303(2) of OGSML bars local laws “relating to **regulation** of oil, gas and solution mining industries” (emphasis added)
- *Anschutz Exploration Corp. v. Town of Dryden*, 940 NYS2d 458 (Sup. Ct. Tompkins Co. 2012)
 - Town amended zoning ordinance to ban all activities related to exploration for, and production or storage of, natural gas and petroleum
 - Relying on a case interpreting language similar to ECL § 23-0303(2) from Mined Land Reclamation Law, court concluded that OGSML superseded local laws that directly regulate drilling activities but not zoning ordinances that address land use generally

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Recent Litigation (*cont'd*)

- *Cooperstown Holstein Corp. v. Town of Middlefield*, 2012 WL 1068841 (Sup. Ct. Otsego Co. 2012)
 - Focused on legislative history of OGSML to support conclusion that ECL § 23-0303(2) was not intended to supersede local zoning laws
- Both cases have been appealed

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Issues Relating to Local Regulation

- Distinction between “regulation” and “zoning” (how versus where)
 - Municipalities generally allowed to ban particular uses
 - Bans only permitted in municipalities with zoning
- Mining and drilling raise different practical issues
 - Gas more likely to cross municipal boundaries
 - Surface impacts of mineral extraction typically greater
 - Major impacts of HVHF are temporary

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HVHF Arguments: For

- Reliable source of clean, homegrown natural gas
- Major economic development benefits
 - Income for cash-strapped rural landowners (lease payment/royalties)
 - State/local government tax revenues
 - Jobs
- HVHF is safe, if properly managed
 - Many of reported problems relating to groundwater attributable to inadequate well casings

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HVHF Arguments: For (*cont'd*)

- HVHF more efficient than traditional hydrofracking
 - Smaller footprint
- Wastewater disposal and other concerns are exaggerated
- Most of major impacts are temporary

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HVHF Arguments: Against

- HVHF threatens groundwater
 - Chemicals in fracking fluid
 - Introduction of naturally occurring contaminants to groundwater (e.g., methane, radiation)
- Flowback water difficult to manage
 - POTWs not well suited to treating bromines, radiation and other components of flowback water
 - Reinjection poses risks (contamination, earthquakes)
 - On-site wastewater management challenges (spills, storage, etc.)

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HVHF Arguments: Against (*cont'd*)

- HVHF requires large quantities of water
- Accidents
- Major short-term impacts (air, traffic, etc.)

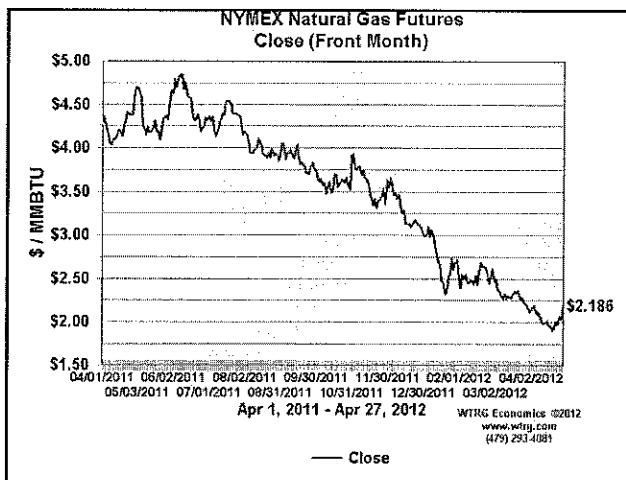
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Recent Articles, Other Sources of Information

- "The Fracturing of Pennsylvania," *New York Times*, November 17, 2011
- Fracking Hazardous to New Yorker's Health," *Albany Times Union*, April 25, 2012
- "Natural Gas Is On A Roll, Executive Declares," *New York Times*, "Green" Blog, April 26, 2012
- "Natural Gas Switch Is On," *Albany Times Union*, April 29, 2012

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Significant Drop in Price of Natural Gas



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