

DISCUSSION OF MARCELLUS SHALE RESOLUTION

Linda Nicholson and Colleagues

December 9, 2009

Proposed Amendment to Marcellus Shale Gas Drilling Resolution

Brought by Faculty Senator:

Linda Nicholson, Molecular Biology & Genetics

WHEREAS, It is estimated that the geologic rock bed known as Marcellus Shale may contain up to several trillion cubic feet of natural gas, and dramatic increases in the price of crude oil have resulted in a tremendous increase in interest and activity relating to natural gas exploration and hydraulic fracturing;

WHEREAS, the natural gas of the Marcellus Shale is not going away (i.e. it is "gas in the bank"), while its rapid extraction via ~~horizontal, "slick water" hydraulic fracture gas drilling~~ the combined use of horizontal drilling and "slick water" hydraulic fracturing (never before implemented in the state of NY) will require industrial type development that could impact wide areas of land and water; furthermore, EPA studies of the impact of horizontal hydraulic fracture gas drilling are currently underway in areas where this process has a history of use, and DEC regulation of gas drilling in NYS is currently being debated;

WHEREAS, Cornell University is committed to environmental leadership exemplified by the signing of the American University and College Presidents Climate Commitment by President Skorton;

WHEREAS, Cornell University has a great responsibility to preserve and protect its natural resources, water resources, and quality of life for current and future Cornell faculty, staff and students;

WHEREAS, Cornell University is in a position to take a leadership role on the issue of horizontal drilling combined with hydraulic fracturing of the Marcellus Shale, on sustainability education, and on research in water management, soil health, animal and human health and medicine;

THEREFORE, BE IT RESOLVED, that the Cornell Faculty Senate hereby conveys to the executive administration, including President David Skorton, Provost Kent Fuchs, and the Board of Trustees, our opinion that

1. A moratorium should be imposed on the leasing of Cornell lands for horizontal drilling combined with hydraulic fracturing ~~fracture gas drilling~~ until a scientifically informed consensus is reached at federal, state and local levels on the long-term environmental, health, economic and community impacts of this activity, federal and state legislation for adequate regulation of this activity is in place, and the infrastructure is in place to enforce these regulations.

1. An advisory group should be constructed to advise the executive administration on future decisions regarding the leasing of Cornell lands for horizontal drilling combined with hydraulic fracturing ~~fracture gas drilling~~ , and its recommendations should be reported and made widely available to the Cornell community. This group should be composed of experts in areas such as fracture mechanics of shale, watershed and aquifer dynamics, analytical chemistry, environmental protection law and policy, water law and policy, sociology and community development, climate change, climate policy, renewable energy technology, energy economics, geologic faults of New York state, and other subjects as deemed necessary to gain an in-depth understanding of the potential impacts of hydraulic fracture gas drilling, and of alternatives for sustainable energy production. Undergraduate and graduate student representatives should also be included.

Marcellus Shale Gas Drilling Resolution

Brought by Faculty Senators:

Linda Nicholson, Molecular Biology & Genetics

Peter Hinkle, Molecular Biology & Genetics

Clare Fewtrell, Department of Molecular Medicine

Ted Clark, Department of Microbiology and Immunology

Ron Booker, Department of Neurobiology and Behavior

Elizabeth Sanders, Government

While gas drilling has been performed in the state of New York for decades, the ***combination of horizontal drilling and hydraulic fracturing has not been previously implemented*** in NYS.



serious new concerns:

- enormous volumes of fresh water consumed
- flowback water must be processed as toxic waste.

Source: J. Henry Fair Dimock PA

“Slick Water” Hydraulic Fracturing

- fracturing with large volumes of high pressure water = hydrofracturing
- sand is added to keep new fissures open
- To suspend sand in water, chemicals* are added (~1% of total vol.)
- 364+ water trips per well (3 – 5 million gal)



Source: Chesapeake Energy 2008 (Estimate Denton TX Oil & Gas Task Force)
Hydrofrac'ing a Marcellus Well, West Virginia

***PROPRIETARY formulation, including known carcinogens, endocrine disrupters, benzene, toluene, xylene and formaldehyde**

Gas Industry Exemptions

- Clean Drinking Water Act
- Clean Water Act
- Comprehensive Environmental Response, Compensation, and Liability Act
- Resource Conservation and Recovery Act
- Safe Drinking Water Act
- Clean Air Act

EPA testing of gas drilling impacts on water and air was not required and was not performed

What do we know?

- The gas industry has only **recently disclosed *some of the toxic chemicals*** used in slick water fracturing. ***Time is now needed*** to test for impacts on aquifers, water wells, and other sources of drinking water where this process has been employed.
- In response to complaints, the EPA recently tested water wells near gas drilling sites in Pavillion, Wyoming: 11 of 39 (**28%**) of the water wells tested were ***contaminated with substances used in nearby gas drilling***.
- Hydraulic fracturing is the ***suspected source of impaired or polluted drinking water*** in ***Pennsylvania, Texas, Colorado, and Wyoming***.
- ***Hundreds of cases of water impairment or pollution related to the oil and gas industries in NY state*** have been documented by the DEC, but a majority have not been properly remediated (www.toxicstargeting.com).

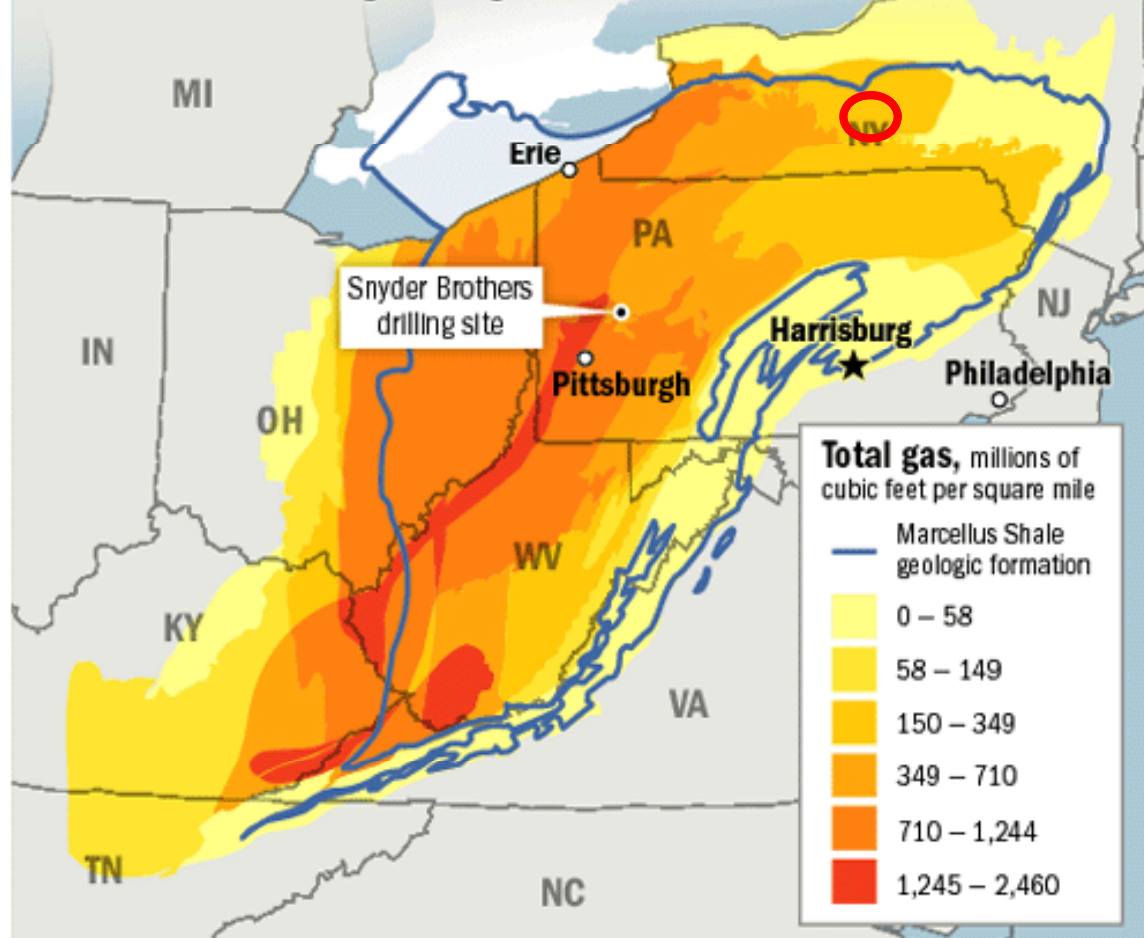
Will DEC regulations ensure safety, and can NYS enforce them?

Legislation in the Works

- On June 9, 2009, the ***Fracturing Responsibility and Awareness of Chemicals (FRAC) Act (S. 1215)*** was introduced in the US Senate and was referred to the Committee on Environment and Public Works in the US Senate. This ***pending bill*** would ***amend the Safe Drinking Water Act to repeal the exemption for hydraulic fracturing*** by the gas industry.
- On Oct. 30, 2009, President Obama signed into law the ***Interior, Environment and Related Agencies fiscal year (FY) 2010 Appropriations Bill (H.R. 2996)***. The Conference Report of this bill includes a request that the EPA re-examine the impact of hydraulic fracturing on drinking water by performing a scientifically robust and peer-reviewed study “*using a credible approach that relies on the best available science.*” This requested study will require time to complete.
- If the ***pending NYS DEC draft Supplemental Generic Environmental Impact Statement*** is approved, the current moratorium on issuing permits for “slick water” hydraulic fracturing of horizontal wells in NYS will be lifted.

Untapped riches ?

The Marcellus Shale formation, which stretches all through the Appalachians, holds as much as 516 trillion cubic feet of natural gas. Current, high energy prices have made drilling for the gas attractive.



Source: U.S. Bureau of Land Management, Geology.com, Catskillmountainkeeper.org

Ed Yozwick, Keith McCafferty/Post-Gazette

http://www.post-gazette.com/images4/20080720Marcellus_Shale_map.gif

So How Much Can Marcellus Gas Help U.S. Supplies??

Natural Gas Consumption by End Use

(Million Cubic Feet)

Area: U.S.

Period: Annual



[Download Series History](#)



[Definitions, Sources & Notes](#)

Show Data By:

☒ Data Series

☐ Area

2003

2004

2005

2006

2007

2008

Total Consumption

22,276,502

22,388,975

22,010,596

21,684,641

23,047,229

23,206,390

Lease and Plant Fuel

1,122,283

1,097,904

1,111,517

1,141,977

1,198,648

1,283,846

Lease Fuel

Plant Fuel

Pipeline & Distribution Losses

661,762

666,761

664,625

664,215

622,555

627,194

Volumes Delivered to Consumers

20,562,727

20,724,883

20,315,054

19,958,451

21,225,688

21,295,350

Residential

5,079,351

4,868,797

4,826,775

4,368,466

4,717,311

4,865,691

Commercial

3,179,493

3,128,972

2,998,920

2,832,030

3,017,105

3,119,988

Industrial

7,150,396

7,242,837

6,597,330

6,512,115

6,624,846

6,618,631

Vehicle Fuel

18,271

20,514

22,884

23,739

25,016

30,094

Electric Power

5,135,215

5,463,763

5,869,145

6,222,100

6,841,408

6,660,947

That's 23 TRILLION Cubic Feet

http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcu_nus_m.htm

slide courtesy of Prof. Tony Ingraffea

Total estimate of NYS Marcellus gas

- 500 trillion cubic feet total
- 10% can be extracted via current technology
- 15% of this is in Southern Tier of NYS
 $(500)(0.10)(0.15) = 7.5$
- **7.5 trillion cubic feet TOTAL**

This is **1/3 of 1 year** of US natural gas consumption. **TOTAL.**

WHEREAS, It is estimated that the geologic rock bed known as Marcellus Shale may contain up to several trillion cubic feet of natural gas, and dramatic increases in the price of crude oil have resulted in a tremendous increase in interest and activity relating to natural gas exploration and hydraulic fracturing;

WHEREAS, the natural gas of the Marcellus Shale is not going away (i.e. it is "gas in the bank"), while its rapid extraction via horizontal, "slick water" hydraulic fracture gas drilling (never before implemented in the state of NY) will require industrial type development that could impact wide areas of land and water; furthermore, EPA studies of the impact of horizontal hydraulic fracture gas drilling are currently underway in areas where this process has a history of use, and DEC regulation of gas drilling in NYS is currently being debated;

WHEREAS, Cornell University is committed to environmental leadership exemplified by the signing of the American University and College Presidents Climate Commitment by President Skorton;

WHEREAS, Cornell University has a great responsibility to preserve and protect its natural resources, water resources, and quality of life for current and future Cornell faculty, staff and students;

WHEREAS, Cornell University is in a position to take a leadership role on the issue of horizontal hydraulic fracturing of the Marcellus Shale, on sustainability education, and on research in water management, soil health, animal and human health and medicine;

THEREFORE, BE IT RESOLVED, that the Cornell Faculty Senate hereby conveys to the executive administration, including President David Skorton, Provost Kent Fuchs, and the Board of Trustees, our opinion that

1. A moratorium should be imposed on the leasing of Cornell lands for horizontal hydraulic fracture gas drilling until a scientifically informed consensus is reached at federal, state and local levels on the long-term environmental, health, economic and community impacts of this activity, federal and state legislation for adequate regulation of this activity is in place, and the infrastructure is in place to enforce these regulations.
1. An advisory group should be constructed to advise the executive administration on future decisions regarding the leasing of Cornell lands for horizontal hydraulic fracture gas drilling, and its recommendations should be reported and made widely available to the Cornell community. This group should be composed of experts in areas such as fracture mechanics of shale, watershed and aquifer dynamics, analytical chemistry, environmental protection law and policy, water law and policy, sociology and community development, climate change, climate policy, renewable energy technology, energy economics, geologic faults of New York state, and other subjects as deemed necessary to gain an in-depth understanding of the potential impacts of hydraulic fracture gas drilling, and of alternatives for sustainable energy production. Undergraduate and graduate student representatives should also be included.