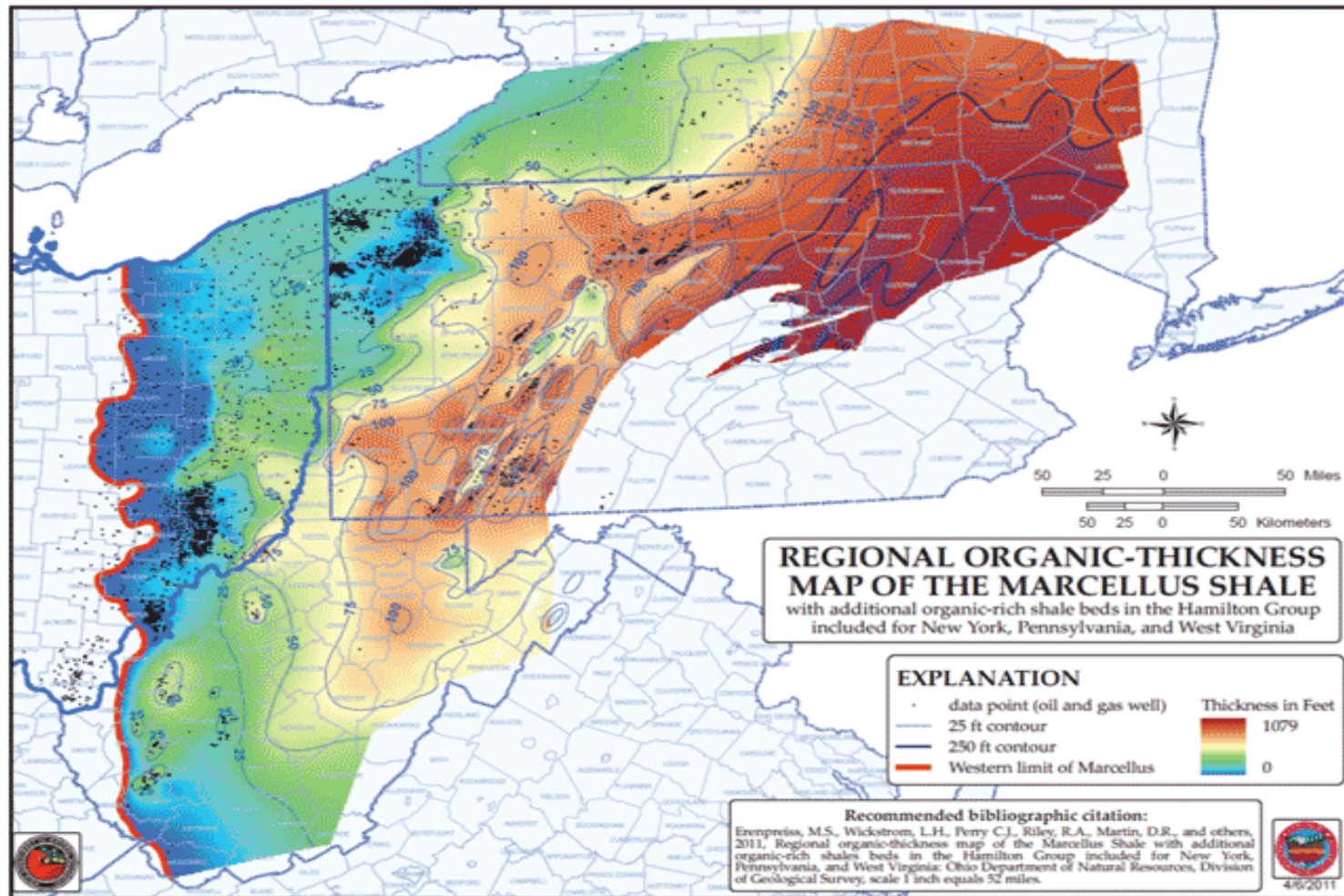


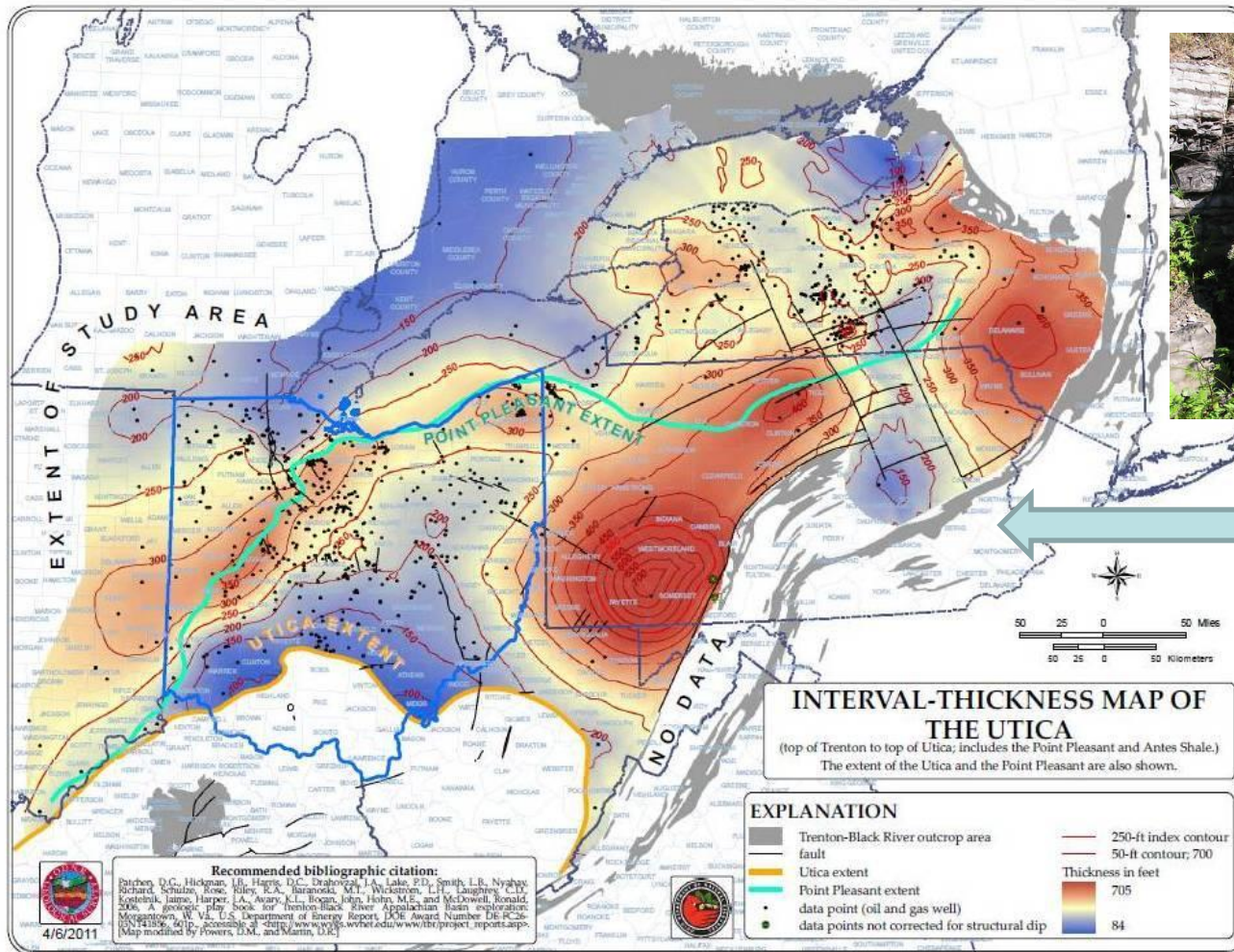


# Marcellus Shale



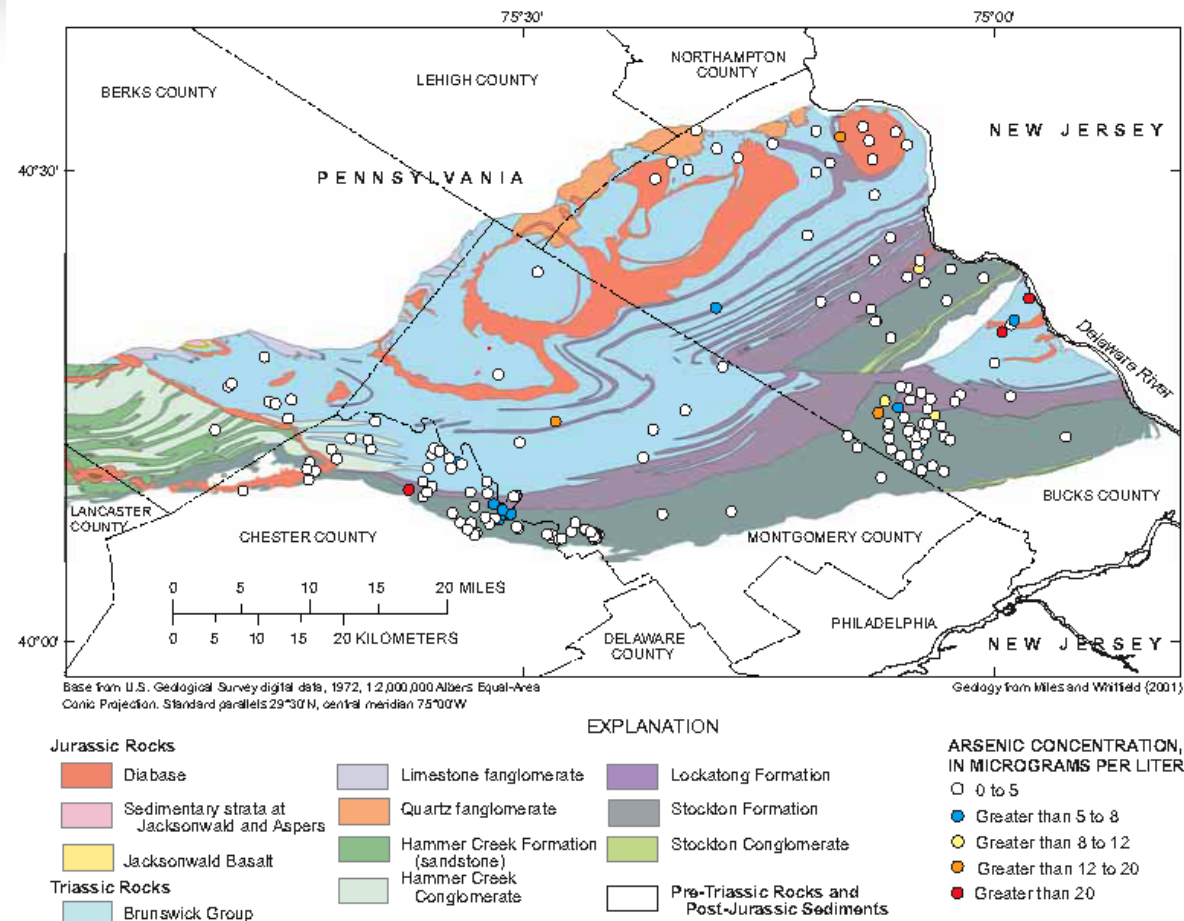


# Utica Shale





# South Newark Basin

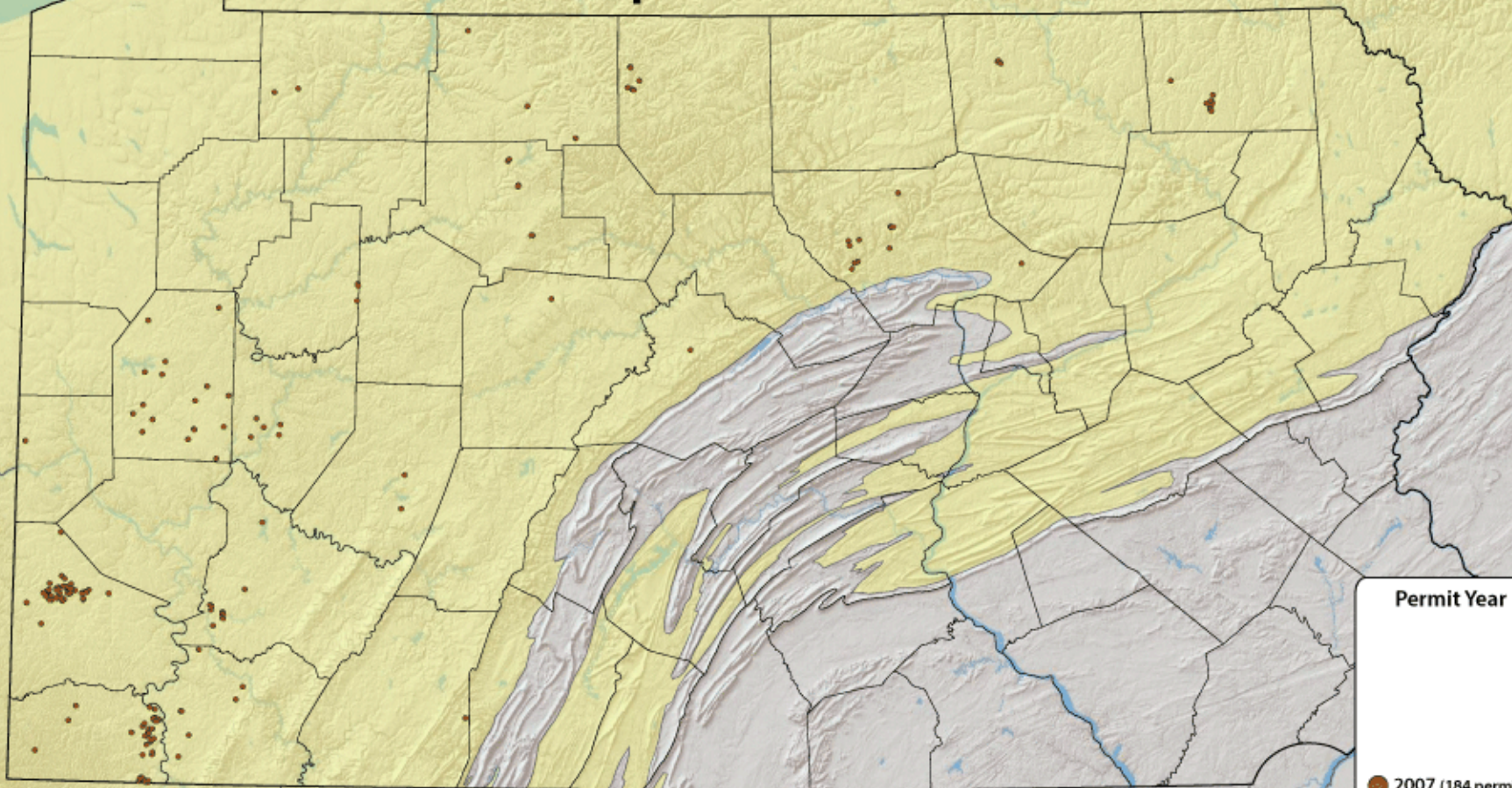


Source: USGS



# Unconventional Well Drilling Permits

184 permits in 2007



## Permit Year

● 2007 (184 permits)

■ Marcellus extent  
(includes non-economic areas)

Based on Pennsylvania Department  
of Environmental Protection permit  
activity reports

MARCELLUS CENTER

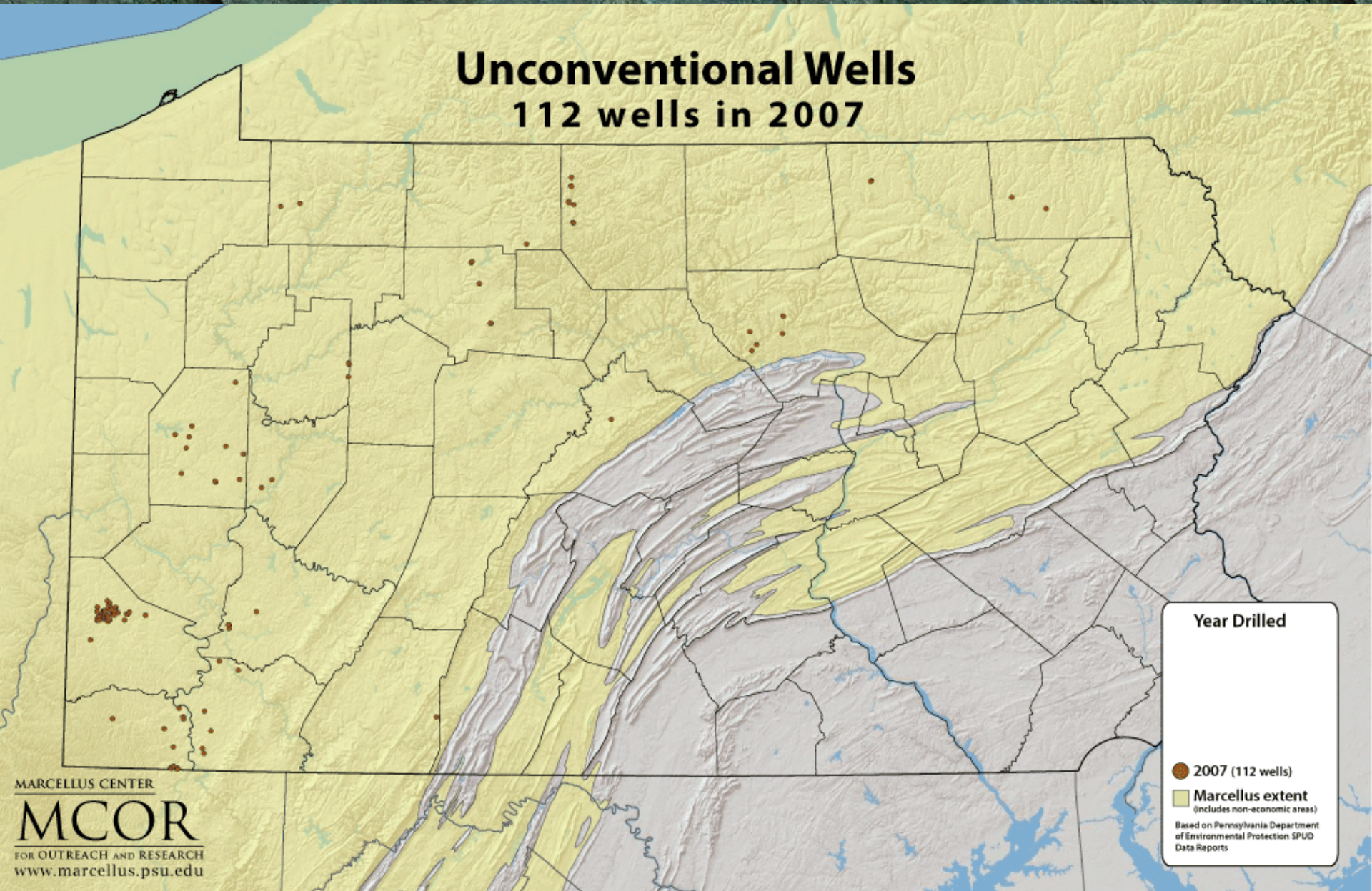
**MCOR**

FOR OUTREACH AND RESEARCH  
[www.marcellus.psu.edu](http://www.marcellus.psu.edu)



# Unconventional Wells

112 wells in 2007



## Year Drilled

- 2007 (112 wells)
  - Marcellus extent  
(includes non-economic areas)
- Based on Pennsylvania Department  
of Environmental Protection SPUD  
Data Reports

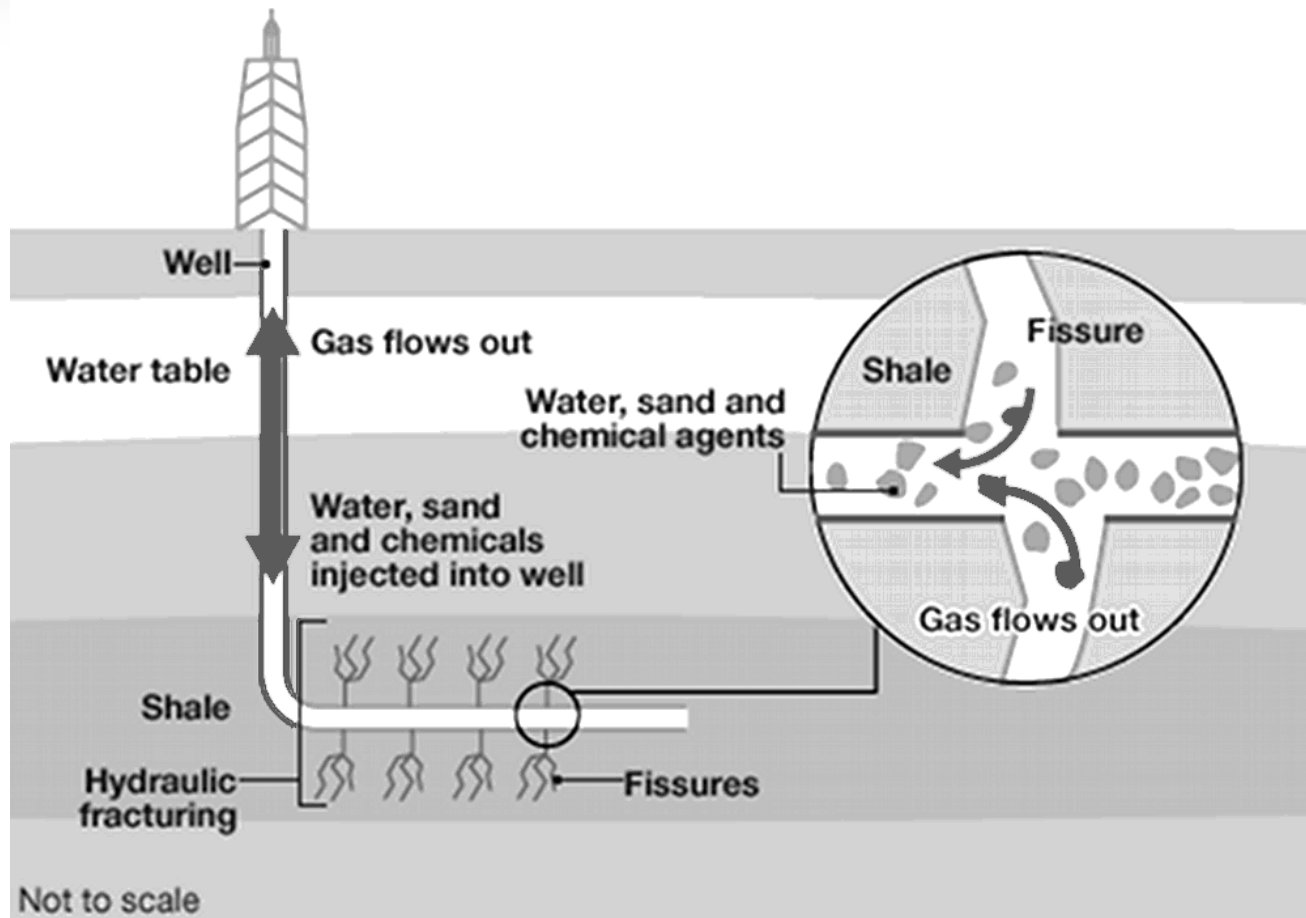


# Fraccidents





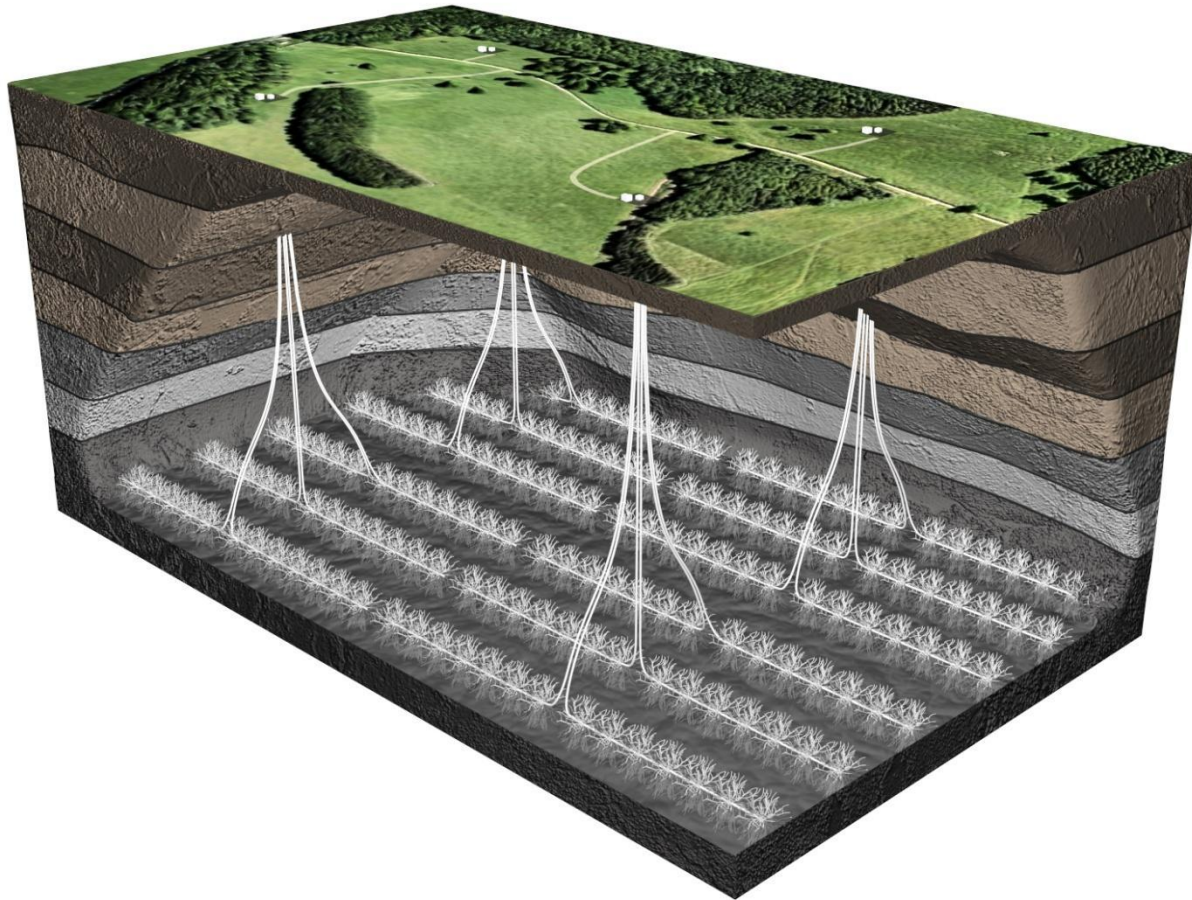
# The Basics



Source: North Oxfordshire/Buckinghamshire Fracking Campaign Page



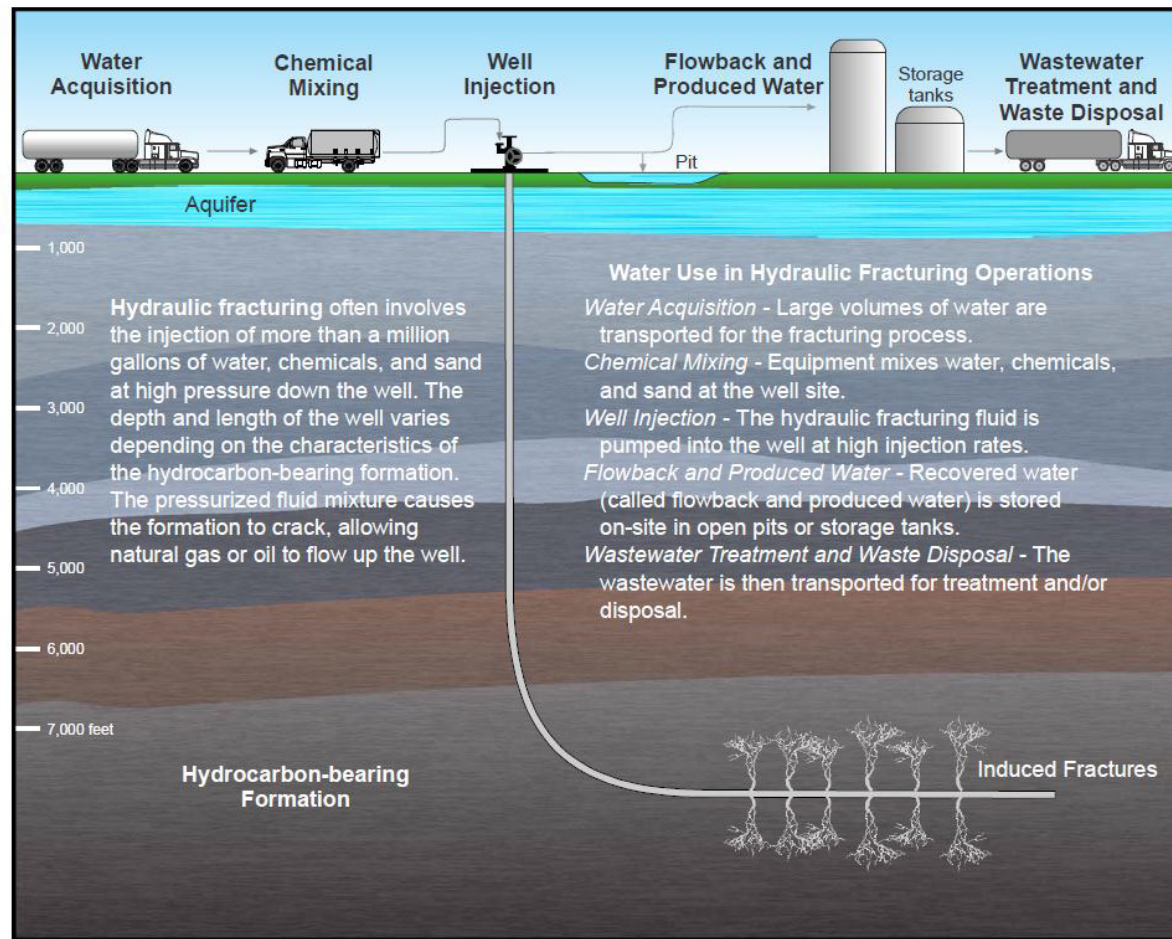
# Multi-Well Pad Drilling



Source: Statoil



# Consumptive Water Use



Source: Worcester Polytechnic Institute



# Fracking Chemicals

## Functional Categories of Fracturing Chem

**Acids**

**Fluid loss  
control**

**Proppants**

**Biocides**

**Foamers**

**Pseude  
polymers**

**Breakers**

**Friction  
reducers**

**Resins**

**Clay stabilizers**

**Gellants**

**Sand**

**Corrosion inhibit.Iron control**

**Scale control**

**Crosslinkers**

**Non-emulsifiers Solvents**

**Defoamers**

**pH control**

**Surfactants**

**Emulsifiers**

**Polymers**

**Viscosifiers**

Sources: Powder River Basin Resource Council and Oil & Gas Accountability Project



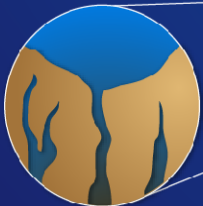
# HOW NATURAL GAS DRILLING CONTAMINATES DRINKING WATER SOURCES

**11.** Toxic fracking fluid waste is dumped in poorly constructed and sometimes unlined pits and seeps into local waterways and aquifers

**10.** Concentrated methane gas creates flammable water and poisonous fumes



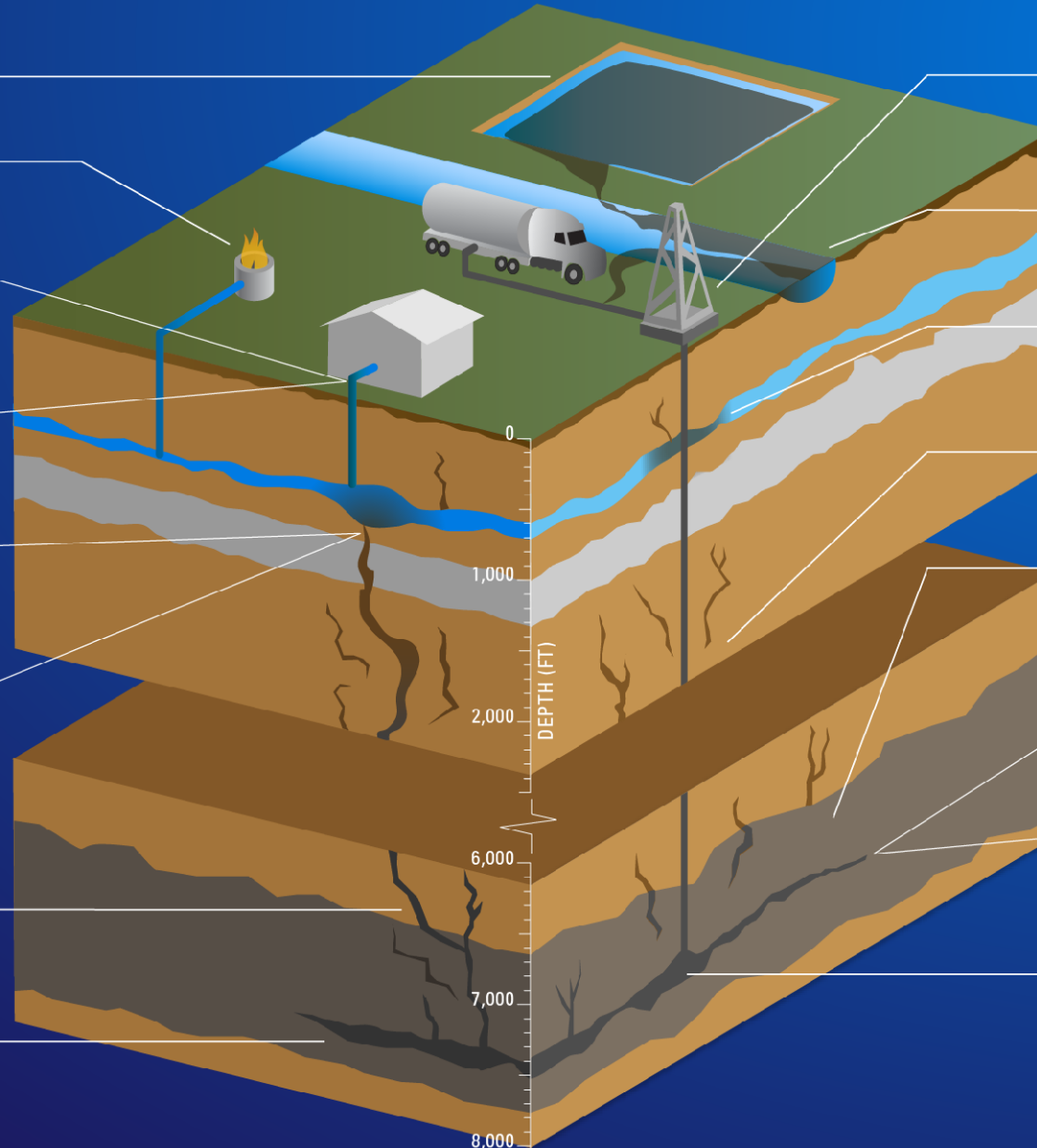
**9.** Residential wells pump water unsafe for use from contaminated aquifers into homes



**8.** Toxic fracking fluids, benzene, methane and other carcinogens pierce and pollute local aquifers

**7.** High pressure creates more fractures, releases methane gas and forces toxic fracking fluid upwards

**6.** The majority of fracking fluid remains in the ground and is not biodegradable



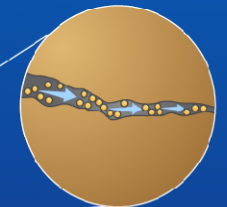
**1.** A mixture of millions of gallons of water, chemically treated sand and toxic chemicals is injected under high pressure into drilling well

**2.** Toxic fracking fluid spills from pipes, open valves and transporting vehicles and contaminates local waterways

**3.** Fracking fluid leaks through fissures and contaminates aquifer

**4.** Fracking fluid is pumped 7000 ft or more down and a similar distance horizontally to release natural gas

Gas producing rock formation



Proppants like chemically treated sand and ceramic keep fractures open

**5.** Fracking fluid injected at high pressure creates fractures and releases natural gas

DIAGRAM NOT TO SCALE  
[checksandbalancesproject.org](http://checksandbalancesproject.org)



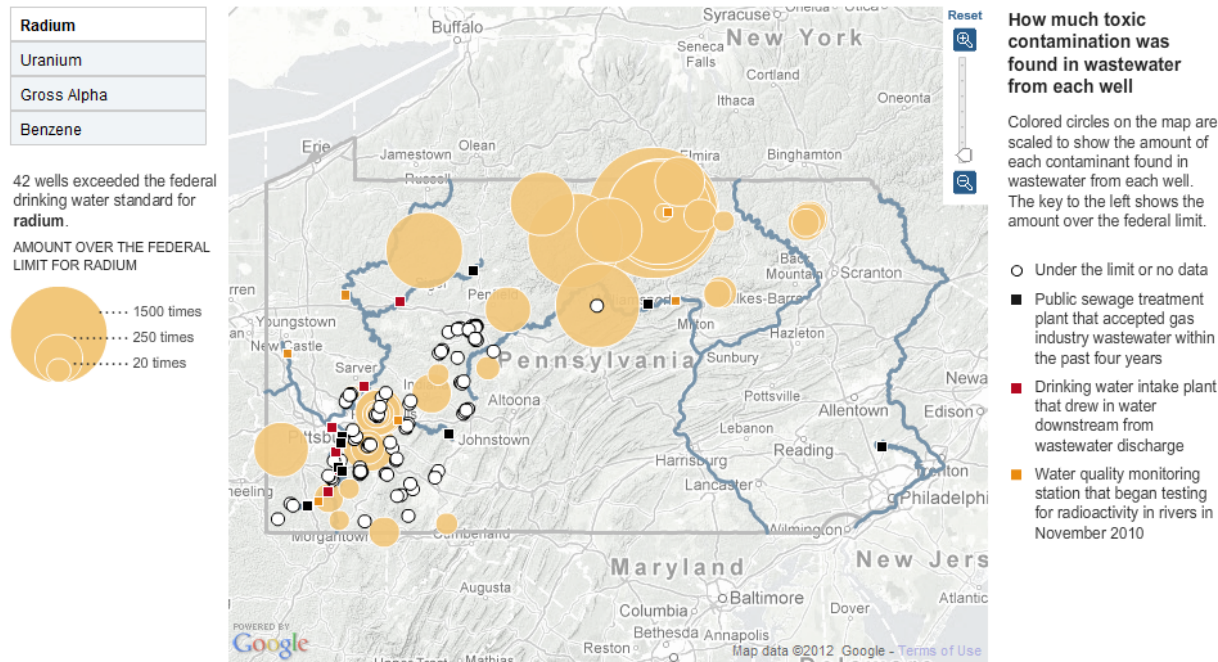
# Toxic Contaminants

## Radium

Published: February 26, 2011

### Toxic Contamination From Natural Gas Wells

The New York Times collected data from more than 200 natural gas wells in Pennsylvania. Many of them are tapping into the Marcellus Shale, a vast underground rock formation. But a method being used to stimulate wells, called hydraulic fracturing, produces wastewater containing corrosive salts and radioactive and carcinogenic materials. In Pennsylvania, this wastewater has been sent through sewage treatment plants that cannot remove some of the contaminants before the water is discharged into rivers and streams that provide drinking water. The Times was able to map 149 of the wells.



JEREMY WHITE, HAEYOUN PARK, IAN URBINA AND GRIFF PALMER  
[Send Feedback](#)

Toxics Targeting; Environmental Protection Agency; state regulators; drilling companies

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Source: New York Times



# Toxic Contaminants Uranium

Published: February 26, 2011

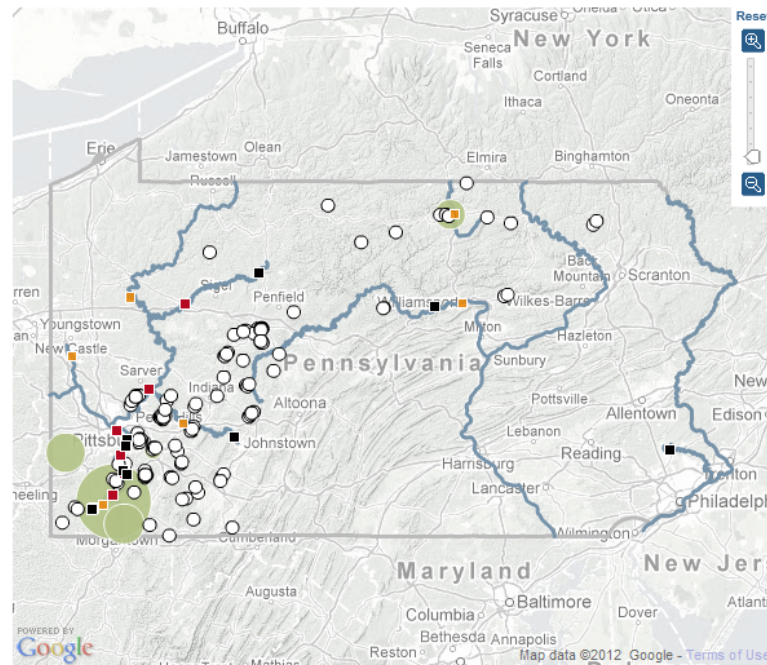
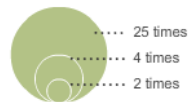
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Radium
Uranium
Gross Alpha
Benzene

4 wells exceeded the federal drinking water standard for **uranium**.

AMOUNT OVER THE FEDERAL LIMIT FOR URANIUM



JEREMY WHITE, HAEYOUN PARK, IAN URBINA AND GRIFF PALMER

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### How much toxic contamination was found in wastewater from each well

Colored circles on the map are scaled to show the amount of each contaminant found in wastewater from each well. The key to the left shows the amount over the federal limit.

- Under the limit or no data
- Public sewage treatment plant that accepted gas industry wastewater within the past four years
- Drinking water intake plant that drew in water downstream from wastewater discharge
- Water quality monitoring station that began testing for radioactivity in rivers in November 2010

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# Toxic Contaminants

## Gross Alpha

Published: February 28, 2011

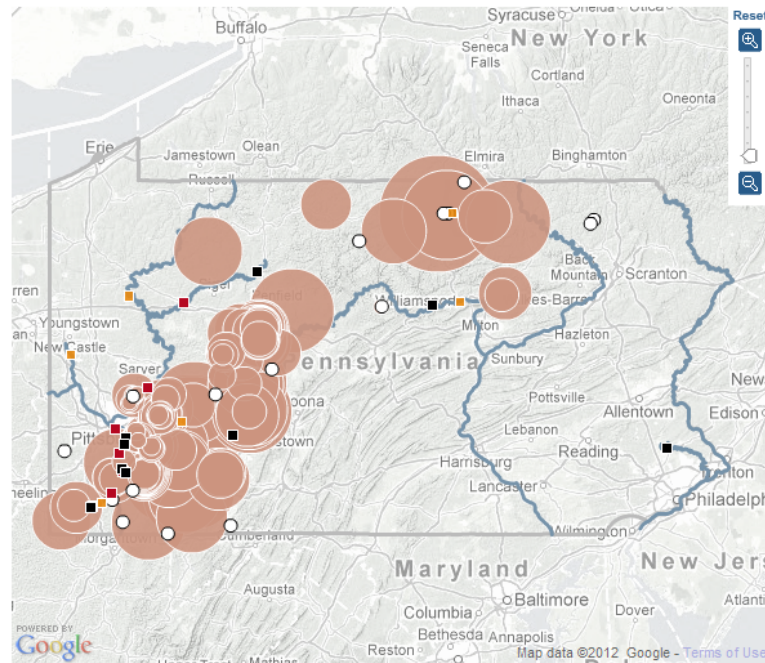
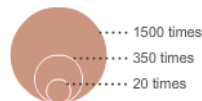
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Radium
Uranium
Gross Alpha
Benzene

128 wells exceeded the federal drinking water standard for **gross alpha**, a type of radiation caused by emissions from uranium and radium.

AMOUNT OVER THE FEDERAL LIMIT FOR GROSS ALPHA



How much toxic contamination was found in wastewater from each well

Colored circles on the map are scaled to show the amount of each contaminant found in wastewater from each well. The key to the left shows the amount over the federal limit.

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- Public sewage treatment plant that accepted gas industry wastewater within the past four years
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JEREMY WHITE, HAEYOUN PARK, IAN URBINA AND GRIFF PALMER

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# Toxic Contaminants Benzene

Published: February 26, 2011

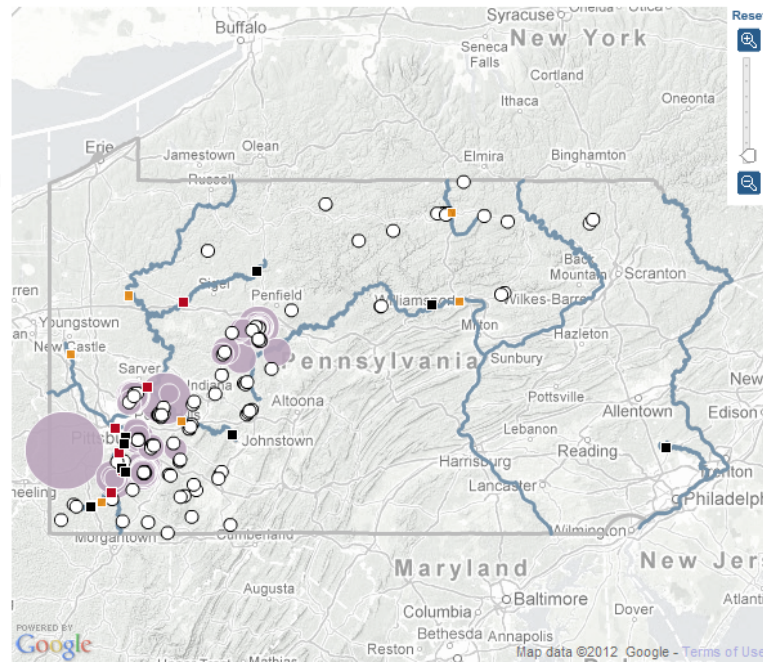
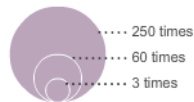
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Radium
Uranium
Gross Alpha
<b>Benzene</b>

41 wells exceeded the federal drinking water standard for **benzene**.

AMOUNT OVER THE FEDERAL LIMIT FOR BENZENE



**How much toxic contamination was found in wastewater from each well**

Colored circles on the map are scaled to show the amount of each contaminant found in wastewater from each well. The key to the left shows the amount over the federal limit.

- Under the limit or no data
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# Local Control in Act 13

Act 13 strips local government of control over ALL drilling operations, including operations related to:

- Pipelines
- Compressor stations
- Waste disposal
- Seismic Testing
- and many others





# Setback Variances

## •3215. Well location restrictions.

(a) General rule.--Wells may not be drilled within **200 feet**, or, in the case of an unconventional gas well, **500 feet** measured horizontally from the vertical well bore to any other water supply well. ***“If consent is not obtained and the distance restriction would deprive the owner of the oil and gas rights of the right to produce or share in the oil or gas underlying the surface tract, the well operator shall be granted a variance from the distance restriction upon submission...”*** If consent is not obtained and the distance restriction would deprive the owner of the oil and gas rights of the right to produce or share in the oil or gas underlying the surface tract, the well operator shall be granted a variance from the distance restriction upon submission of a plan identifying the additional measures, facilities or practices as prescribed by the department to be employed during well site construction, drilling and operations.



# Act 13 Campaign

The Delaware Riverkeeper Network filed a lawsuit calling Act 13 unconstitutional and seeking an injunction.

Joined by 7 municipalities over local control issues and a physician over a gag order in the law.

Commonwealth Court overturned the section of the law on local control and ruled that the injunction shall remain in place through the appeal process.

The PA Supreme Court heard the appeal in Pittsburgh on October 17<sup>th</sup> and is expected to rule within the next few weeks.



# BGT'S Act 13 Campaign

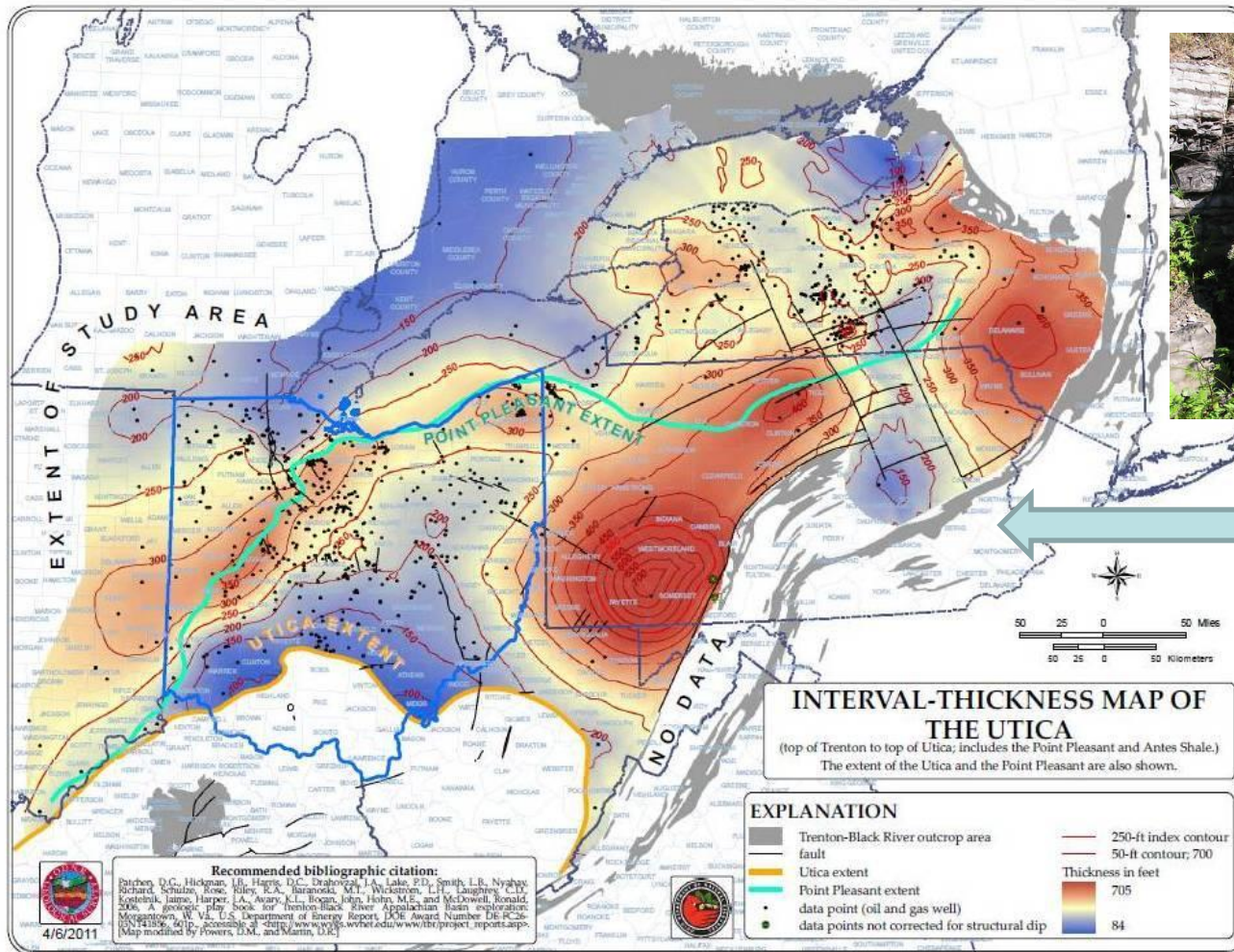
Berks Gas Truth reached out to all 74 municipalities in Berks County asking them to pass resolutions opposing Act 13 and supporting the DRN lawsuit.

Eight municipalities passed resolutions!

Berks Gas Truth is currently participating in an amicus brief filed by Earthjustice and NRDC.

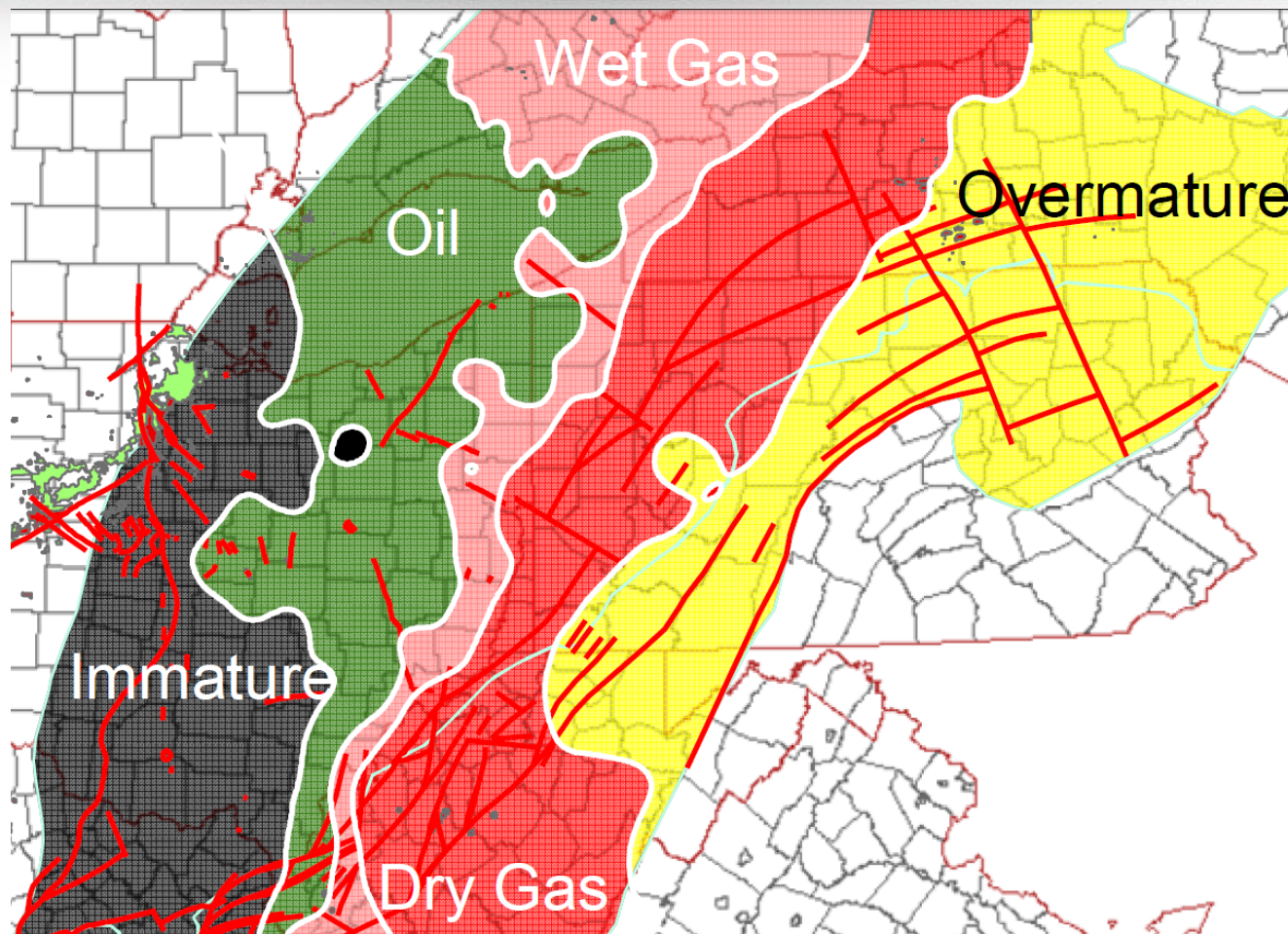


# Utica Shale





# How the industry sees Utica





# However...

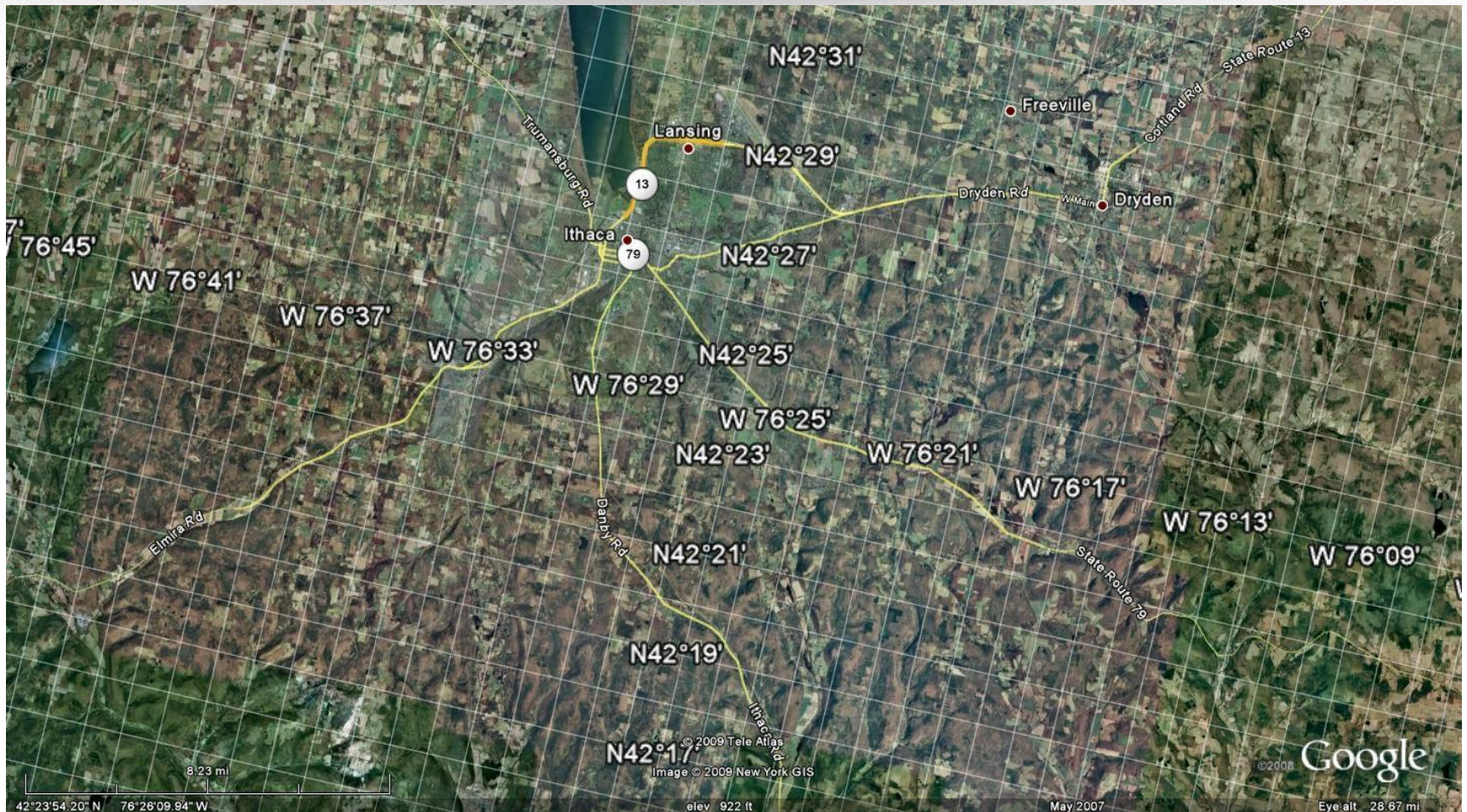
Forced pooling is legal in the Utica Shale, not in the Marcellus Shale.

Drillers speak in terms of Units (~ 1 sq. mile)

If in a unit, 60% of the land is owned by those who have signed leases, the owners of the remaining 40% can't say no to drilling.



# The world in units



Source: Dr. Anthony Ingraffea



# However...

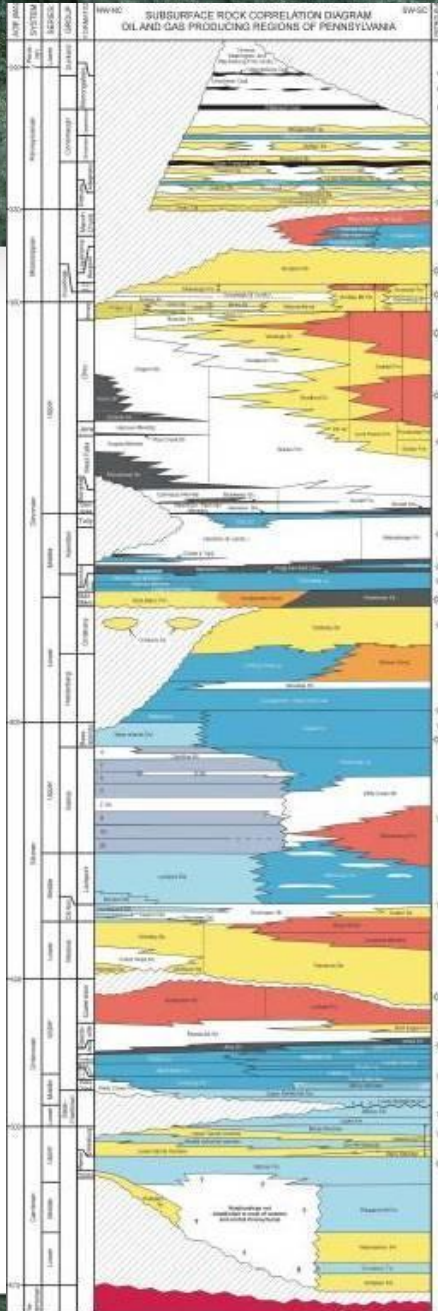
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# Why?



Pennsylvania's old Oil and Gas laws govern everything below the Onondaga layer. Those laws permit forced pooling.

Marcellus sits directly atop the Onondaga layer, thus has been spared forced pooling.



# Orphaned & Abandoned Wells

Over 325,000 oil and gas wells were drilled statewide between 1859 and 2000, according to the Independent Petroleum Association of America.



The DEP has information on 184,000 of them. Well hunters go out with digital cameras and GPS devices to locate and record the wells.



# Capping O&A Wells

Funding to cap wells comes from:

- Fees built into new oil and gas permits

- Funds collected for regulatory violations

- Taxpayer-funded Growing Greener grants

Prior to the gas boom, the DEP estimated that it would take 160 years to cap all wells.

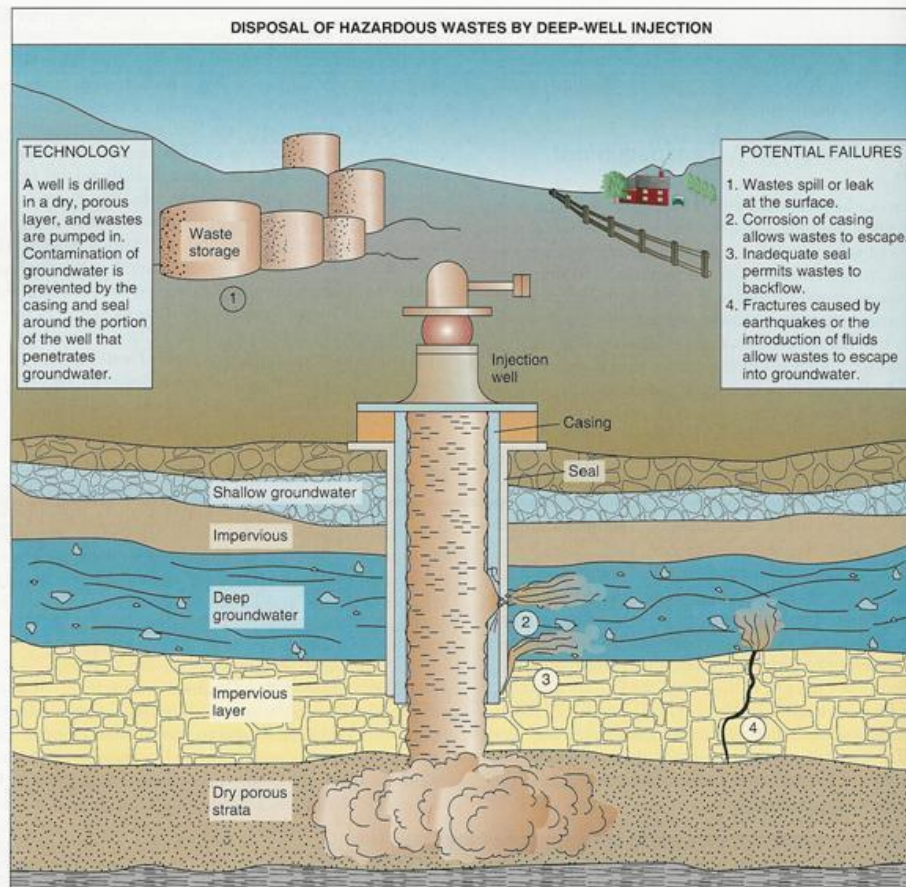


# Decommissioned Wells

- Carnegie-Mellon study estimates cost of capping a well at \$100,000
- The deeper the well, the higher the cost.
- In Dimock, PA, three wells causing well water contamination were capped. The average price per well was over \$700,000.
- Well bonding is set at \$10,000 for deep wells in Act 13.



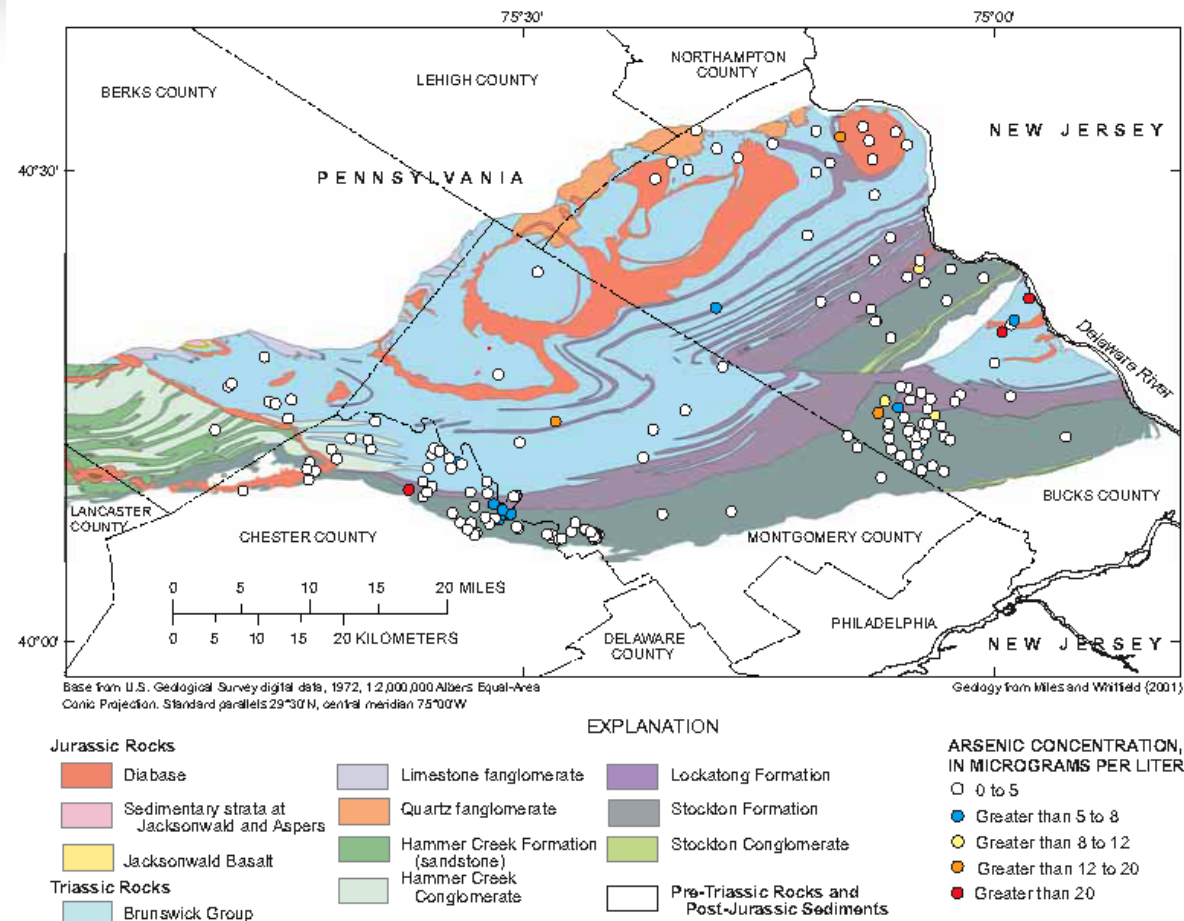
# Deep Well Injection



▲ **FIGURE 20-5 Deep-well injection.** This technique is used for the disposal of large amounts of liquid wastes. The concept is that toxic wastes may be drained into dry, porous strata below ground, where they may reside harmlessly "forever." However, as the figure shows, failures can occur and allow the liquid wastes to contaminate groundwater. (Adapted with permission from Environmental Action, 1525 New Hampshire Ave., N.W., Washington, D.C. 20036.)



# South Newark Basin



Source: USGS



# The Rules Don't Apply Here

- State Senator Chuck McIlhinney (R-Bucks) in an op-ed the day after the law was enacted

“As we worked to craft a compromise, **protecting the environment and preserving local zoning control were two of my primary concerns. The final legislation accomplished these goals**, earning the support of Pennsylvania Association of Township Supervisors, other local government organizations and the state’s Growing Greener Coalition. While not perfect, it is a balanced and thoughtful approach to protecting our environment and regulating an industry that is here to stay in Pennsylvania. **It does not affect Bucks County’s townships, like Nockamixon Township.** It would only pertain to non-conventional wells.”

When he finally understood the law he helped pass, he vowed to “fix” the law, not to better protect the environment nor restore local control, but to exclude Bucks County. He did nothing, until...



# The USGS Speaks Again

- At the end of June, the USGS made headlines when it announced that there was a considerable amount of shale gas in the South Newark Basin that extends from the Hudson Valley, through New Jersey, and into southern Pennsylvania.
- The specific formations said to contain gas are the Lockatong and Stockton formations that run through Bucks and Montgomery Counties, aka McIlhinney's district.



# The Fake Moratorium

- The USGS announcement came out just as the state budget was coming to a vote. It must be passed by June 30<sup>th</sup>.
- A procedural bill called the Fiscal Code bill must be passed along with the budget to lay out the rules and procedures for spending the money. Because it has to pass, it's the perfect bill to load with pork.
- McIlhinney added a South Newark Basin moratorium to the bill, a fake moratorium that says that studies must be done before drilling can commence. A real moratorium would put many more conditions and demands in place.
- Once again, McIlhinney went to the press. He said he made good on his vow to protect Bucks from Act 13. Not true. Bucks and the rest of his district is still subject to gas drilling operations – pipelines, compressor stations, etc. – related to Marcellus & Utica drilling.



Thank You!

감사합니다 Natick  
Danke Ευχαριστίες Dalu  
Thank You Köszönöm  
Tack  
Спасибо Dank Gracias  
谢谢 Merci Seé  
ありがとう

Grazie

Obrigado

For more information, visit [www.gastruth.org!](http://www.gastruth.org!)