

Shale Gas Extraction & Drinking Water Contamination

- **Many cases of water contamination from shale gas drilling operations, which use high-volume hydraulic fracturing (HVHF), exist:** Thousands of problems, including spills, leaks, and the seepage of contaminants into drinking water supplies, have been documented around the country in conjunction with shale gas extraction by HVHF.^{1,2,3,4}
 - ▶ Notably, the EPA found fracking fluid in drinking wells in Pavillion, Wyoming⁵, and residents of Dimock, PA claim fracking fluid has contaminated their wells.⁶
 - ▶ Houses, water wells, and pipelines have exploded, and people have found methane levels in their water so high that they could light it on fire with a match.^{7,8,9}
- **No studies have demonstrated that gas extraction operations using HVHF do not cause water contamination:** The gas industry, many government officials, and many “news” reports still claim that HVHF does not cause water contamination despite (1) much evidence of the link between gas extraction operations using HVHF and drinking water contamination (see above), and (2) the fact that *no large-scale, science-based, non-industry funded study exists that analyzes the relationship between HVHF and contamination of water resources.*

Studies of HVHF contaminating drinking water are greatly hindered by the lack of public disclosure as to which chemicals are put down which individual gas wells, which makes tracing the chemicals difficult; and by gas industry exemptions from the federal Safe Drinking Water Act, which impede the EPA’s ability to investigate water contamination claims.

In 2010, both the EPA and the House Committee on Energy and Commerce under Senator Waxman initiated major studies on the health and environmental impacts of hydraulic fracturing.¹⁰
- **Hydrofracking is not an exact science:** When gas companies fracture the shale, they do not have complete control over where fractures will develop, so fracturing fluids and natural gas can move in unexpected directions,¹¹ ending up in aquifers and water wells.
- **Vast numbers of uncapped gas wells threaten aquifers and drinking wells:** 18,000 to 48,000 abandoned oil and gas wells that have not been capped exist in NY.¹² During hydrofracking and deep-well injection, the high pressure can force the toxic fluids up through any existing uncapped wells, contaminating aquifers and drinking wells.¹³

What is the Risk of Groundwater Contamination?

The estimated 1 to 2% accident rate would create 40 to 80 cases of groundwater contamination in Tompkins County, alone.

When tens of thousands of wells are drilled in a region, even a tiny error rate can result in hundreds of problems. Dr. Ron Bishop has obtained data from health officials across New York State and from several other states where gas drilling has taken place. From that data he calculated a 1 to 2% chance of groundwater contamination and a 5 to 8% chance of groundwater contamination or surface impacts (such as sedimentation of surface water or chemical pollution of soil, streams, or lakes).¹⁴ A 2007 Penn State study of 200 water wells near oil and gas wells found 8% contaminated.¹⁵

Contamination from just 1% of the 2,600¹⁶ to 4,000¹⁷ gas wells expected in Tompkins County would mean 26 to 40 separate cases of groundwater contamination, but it only takes one chemical spill to contaminate an aquifer and ruin the drinking water for an entire region. Once an aquifer is contaminated, it can rarely, if ever, be cleaned up. An error rate of this magnitude in the airline industry (1% of 8.8 million U.S. commercial domestic flights/year)¹⁸ would mean an unacceptable 88,000 crashes in the U.S. each year (241 per day).

Endnotes:

- ¹ A listing of many news reports and studies of contaminated water is posted at:
[http://www.tcgasmap.org/default.asp?metatags_Action=Find\('PID','8'\)#Water Contamination](http://www.tcgasmap.org/default.asp?metatags_Action=Find('PID','8')#Water%20Contamination)
- ² McConnell, S. Sept. 22, 2009. "Third Natural Gas Chemical Spill Reported." *The Wayne Independent*.
<http://www.wayneindependent.com/news/x1699593258/Third-natural-gas-chemical-spill-reported>
- ³ Lustgarten, A. November 13, 2008. "Buried Secrets: Is Natural Gas Drilling Endangering U.S. Water Supplies?" *ProPublica*. <http://www.propublica.org/feature/buried-secrets-is-natural-gas-drilling-endangering-us-water-supplies-1113>
- ⁴ Thyne, G. December 20, 2008. "Review of Phase II Hydrogeologic Study." (Report prepared for Garfield County, Colorado.) http://s3.amazonaws.com/propublica/assets/methane/thyne_review.pdf
- ⁵ Lustgarten, A. Sept. 1, 2010. "Feds Warn Residents Near Wyoming Gas Drilling Sites Not to Drink Their Water ." *ProPublica*. <http://www.propublica.org/article/feds-warn-residents-near-wyoming-gas-drilling-sites-not-to-drink-their-wate>
- ⁶ Rubinkam, Michael & Mary Esch. Sept. 15, 2010. "Lawsuit: Gas Drilling Fluid Ruined PA Water Wells." *Philly.com, Business*.
http://www.philly.com/philly/wires/ap/business/20100915_ap_lawsuitgasdrillingfluidruinedpawaterwells.html
- ⁷ Lustgarten, A. July 31, 2009. "Water Problems From Drilling Are More Frequent Than PA Officials Said." *ProPublica*. <http://www.propublica.org/feature/water-problems-from-drilling-are-more-frequent-than-officials-said-731>
- ⁸ Lustgarten, A. April 22, 2009. "Colorado Study Links Methane in Water to Drilling." *ProPublica*.
<http://www.propublica.org/feature/colorado-study-links-methane-in-water-drilling-422>
- ⁹ See <http://vimeo.com/4680635> for a video of a homeowner lighting his tap water on fire.
- ¹⁰ See [http://www.tcgasmap.org/default.asp?metatags_Action=Find\('PID','8'\)#Legislative Issues](http://www.tcgasmap.org/default.asp?metatags_Action=Find('PID','8')#Legislative%20Issues) and [http://www.tcgasmap.org/media/Scoping Document for EPA Hydraulic Fracturing Study 4-1-10.pdf](http://www.tcgasmap.org/media/Scoping%20Document%20for%20EPA%20Hydraulic%20Fracturing%20Study%204-1-10.pdf)
- ¹¹ Quotes from industry research scientists on the uncertainty in hydraulic fracturing:
[http://www.tcgasmap.org/media/Hydraulic Fracturing Predicting Difficulties Industry Source.pdf](http://www.tcgasmap.org/media/Hydraulic%20Fracturing%20Predicting%20Difficulties%20Industry%20Source.pdf)
- ¹² Interstate Oil and Gas Compact Commission. September 1994. "IOGCC/EPA Review of Oil and Gas Exploration and Production Waste Management Regulatory Programs: New York State Review."
[http://www.strongerinc.org/documents/New York Initial Review 9-1994.pdf](http://www.strongerinc.org/documents/New%20York%20Initial%20Review%209-1994.pdf) (See p. 42)
- ¹³ <http://splashdownpa.blogspot.com/2009/10/letter-from-wilma-subra-to-new-york.html>
(See "A Letter from Wilma Subra to New York State," and the section titled "Hydraulic Fracturing.")
- ¹⁴ Dr. Ron Bishop, private communication. Officials were asked about incidents of groundwater contamination and surface problems (chemical pollution of soil, sedimentation, and similar issues).
- ¹⁵ Clark, J., B. R. Swistock, and S. Clemens. 2007. Unpublished data collected from 200 private water wells in McKean County, noted in: <http://resources.cas.psu.edu/WaterResources/pdfs/gasdrilling.pdf>
- ¹⁶ The recent prediction of there being a 50% chance of 489 trillion cubic feet of gas being produced over 50 years from the entire Marcellus Shale [Engelder, T. 2009. Marcellus 2008: Report Card on the Breakout Year for Gas Production in the Appalachian Basin. *Fort Worth Basin Oil & Gas Magazine*] requires a well pad every square mile with 8 wells per pad over 70% of the Marcellus shale formation. This scenario results in 2,600 wells for Tompkins County, alone. [Tompkins County total land area = 305,250 acres; 70% of this is 213,675 acres. Assuming a well pad with 8 wells every square mile (640 acres) results in 2,600 wells.]
- ¹⁷ No hard figures exist for the number of wells that will be drilled. Administrators in Tompkins County expect 4,000 wells. See the draft SGEIS comments by the Tompkins County Planning Dept.
[http://www.tcgasmap.org/media/Town of Ithaca Comments on Draft SGEIS.pdf](http://www.tcgasmap.org/media/Town%20of%20Ithaca%20Comments%20on%20Draft%20SGEIS.pdf)
- ¹⁸ http://www.bts.gov/press_releases/2009/bts058_09/html/bts058_09.html#table_07
(See Table 7: 6,630,500 flights in the first 9 months of 2009 translates to 8.8 million per year.)