

Shale gas development (SGD), also known as fracking, requires large quantities of water throughout the drilling process. It's estimated that, to frack a single well, between 14 million and 39 million gallons of water must be used.<sup>1</sup> This water is usually taken from local water sources and trucked or piped to the well pad.

In areas with limited resources of freshwater, SGD may place a burden on communities by impacting the amount of water that residents have for themselves or livestock and may also threaten the quality of local waterways. SGD processes can contaminate groundwater, making well water unsafe for consumption. When this occurs, residents are left with the burden of finding alternative sources of water for drinking, cooking, showering, and other uses.



*A water impoundment at a shale gas drilling site. Image courtesy of Bob Donnan.*

### **WHAT IS TOXIC WASTE FROM SGD COMPRISED OF?**

Hydraulic fracturing fluid (HFF) is a mixture of water, chemicals (such as methanol, ethylene glycol, and biocides), and proppants (fine sand) used in shale gas drilling operations. HFF is forced down the wellbore at high pressure in order to fracture the shale and free the gas. As pressure is released, some of the HFF returns to the surface along with naturally occurring materials from the earth, including brine, radioactive materials, gases, and metals. This combination of materials is called flowback and produced water. It is considered highly toxic. Some of the injected fluids are proprietary, so we don't even know what they are.

### **HOW DOES TOXIC WASTE FROM SGD CONTAMINATE WATER?**

There are several ways that toxic waste can get into the watershed:

- Inadequately treated HFF waste can discharge into surface water.
- Spills during the well drilling process can result in large volumes or high concentrations of chemicals leeching into groundwater.
- Injection of HFF waste into storage wells can lead to gases or liquids contaminating groundwater.
- Insufficient disposal or storage of HFF waste in unlined pits can lead to contaminated groundwater.
- Accidents, spills, or leaks during transportation can result in toxic chemicals entering surface water.

## WHAT ARE THE HEALTH CONCERNS FROM CONTAMINATED WATER?

In 2016, the Environmental Protection Agency (EPA) released a study on the impacts from fracking on drinking water resources in the U.S.<sup>2</sup> The study conducted independent research and reviewed data from over 1,200 sources between 2000 and 2013. The research highlights that there are possible health risks from exposure to waterborne chemicals from SGD activities. Health risks include:

- Cancer
- Immune system effects
- Changes in body weight
- Changes in blood chemistry
- Heart damage
- Brain damage
- Liver and kidney toxicity
- Reproductive and developmental toxicity

The EPA also notes that inorganic substances in the wastewater originating in the shale—including chloride, bromine, iodine, and ammonium—can contribute to the formation of disinfection byproducts during wastewater treatment. These byproducts can unintentionally impact public water quality. Long-term exposure to the byproducts can result in an increased risk of:

- Cancer
- Anemia
- Liver and kidney issues
- Central nervous system issues

Many other studies show a correlation between SGD and public health.<sup>3</sup>



Photo courtesy of Ted Auch, FracTracker Alliance, 2015.

## WHAT CAN YOU DO?

- Be aware of SGD wells near your home, work, or schools. You can check nearby facilities at [oilandgasthreatmap.com/threat-map](http://oilandgasthreatmap.com/threat-map).
- If you use well water, have your well tested yearly. If you notice any changes in taste, color, or smell, stop using the water immediately and have it tested as soon as possible. Be sure to vent your bathroom with an exhaust fan when showering.
- For more information on well water monitoring and testing, visit [EHP's website](#) or the EPA's guide on [private drinking water wells](#).
- If you swim, fish, or recreate in streams or rivers, be aware of sewage treatment plant discharge point locations. If the sewage treatment plant accepts landfill leachate, the discharge may be a point of exposure to radioactive waste.
- Contact your [elected officials](#). Urge them to protect precious water resources and to advocate for [public disclosure of all chemicals](#) operators use in drilling and hydraulic fracturing before they are used on-site.

<sup>1</sup> Wilson, K. (2023, September 8). *Pennsylvania Watersheds At Risk: Drought and Fracking*. FracTracker Alliance. <https://www.fracktracker.org/2023/09/pennsylvania-watersheds-at-risk-drought-and-fracking/>

<sup>2</sup> U.S. Environmental Protection Agency. (2016). *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*. EPA/600/R-16/236F, 2016.

<sup>3</sup> Environmental Health Project. (2023, May). *Health Impacts of Shale Gas Development: A Collection of Research*. [https://www.environmentalhealthproject.org/\\_files/ugd/a9ce25\\_feddfe7415ba4d3b894e94821aa40aab.pdf](https://www.environmentalhealthproject.org/_files/ugd/a9ce25_feddfe7415ba4d3b894e94821aa40aab.pdf)

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