STUDENT READING 3

Fracking in North Dakota: Environmental Impact

The sections below include a discussion of the nationwide environmental impacts (air, water, and seismic) of fracking.

Hydraulic fracturing operations in progress

Air impacts

Given frequent changes in U.S. oil and gas operations nationwide, the types of energy extracted, the number of wells drilled during a given period, and varying regional factors, estimates on the nationwide impact of fracking on air quality are difficult to calculate. As with any type of energy production, steps during the process (extraction, transportation, and transportation) can produce air pollutants at varying levels depending on the level of operations in a particular area. Air pollution sources during fracking can include road and pipeline construction, well drilling and completion, and natural gas processing, transportation, and storage. The main pollutants released during the fracking process include volatile organic compounds (VOCs), nitrogen oxides, sulfur dioxide, and particulate matter. VOCs react with nitrogen oxides to produce ground-level ozone, also known as smog. These pollutants are regulated by the Environmental Protection Agency (EPA) and state agencies under the Clean Air Act.

Water impacts

A September 2015 study from researchers at Duke University found that fracking operators used approximately 250 billion gallons of water from 2005 to 2014 to extract oil and natural gas from hydraulically fracked wells. This accounted for less than 1 percent of total industrial water use in the United States. The study's authors argued, "While fracking an unconventional shale gas or oil well takes much more water than drilling a conventional oil or gas well, the study finds that compared to other energy extraction methods, fracking is less water-intensive in the long run." Further, the study's authors found that fracking operations produced approximately 210 billion gallons of wastewater. Specifically, the authors noted that hydraulically fracked oil wells produced half a barrel of wastewater for each barrel of oil produced. This is compared to a conventional oil well, which produced more than approximately three barrels of wastewater for each barrel of oil produced.

In December 2016, the Environmental Protection Agency (EPA) released a final report requested by Congress in 2010 on the impact of hydraulic fracturing (fracking) on drinking water resources. The EPA report stated that there was "scientific evidence that hydraulic fracturing activities can impact drinking water resources in the United States under some circumstances." Specifically, the EPA concluded that, in some circumstances, poorly constructed drilling wells and incorrect wastewater management affected drinking water resources, particularly near drilling sites. According to the report, effects on drinking water "ranged in severity, from temporary changes in water quality to contamination that made private drinking wells unusable." An earlier draft version of the report, released in June 2015, concluded that fracking had not resulted in any widespread or systemic impact on drinking water quality. That conclusion was deleted in the report's final version. The EPA concluded that its findings were limited in scope, reporting that "uncertainties and data gaps limited the EPA's ability to fully assess impacts to drinking water resources both locally and nationally."

Seismic events

The term *induced seismicity* (or *induced seismology*) refers to seismic events that occur at higher than normal rates due to human activity. Induced seismic events (e.g., smaller earthquakes and tremors) can be the result of mining, damming rivers, or injecting fluids into underground wells during fracking.

In 2014, the U.S. Geological Survey concluded the following:

> *USGS's studies suggest that the actual hydraulic fracturing process is only very rarely the direct cause of felt earthquakes. While hydraulic fracturing works by making thousands of extremely small 'microearthquakes,' they are, with just a few exceptions, too small to be felt; none have been large enough to cause structural damage. As noted previously, underground disposal of wastewater co-produced with oil and gas, enabled by hydraulic fracturing operations, has been linked to induced earthquakes.*

In 2016, the U.S. Geological Survey found that wastewater disposal, rather than fracking, was the main cause of an increase in earthquakes throughout the central United States from 2009 to 2013. According to the agency, wastewater disposal wells raise pressure levels more than fracked wells. Larger amounts of fluid are used in wastewater disposal wells than in fracked wells; thus, wastewater disposal wells are more likely to produce induced seismic events than fracked wells.

A 2015 study by the Environmental Protection Agency (EPA) identified three factors needed for a disposal well to induce seismic activities: sufficient pressure buildup due to the disposing of fluids, a fault of concern (a fault that is significantly stressed), and a path allowing increased pressure to move from a well to a fault. According to the EPA, as of 2015 few disposals wells had produced earthquakes with a magnitude above 4 on the Richter scale (for comparison, an earthquake with a magnitude of 3 is similar to the passage of a nearby truck).

Adapted from:

Ballotpedia. (n.d.). Fracking in North Dakota. Retrieved March 4, 2022, from https://ballotpedia.org/Fracking_in_North_Dakota