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Eng 109-03

6 Dec. 2016

### We Are Fracked

Imagine waking up one morning, and realizing that it was no longer safe to use your water supply because it was contaminated by the explosive gas methane. Just that happened in 2009 when fifteen families from the town of Dimock, Pennsylvania filed a federal lawsuit against Cabot Oil & Gas for contaminating their drinking water with methane. The incident in Dimock is just one example of water contamination caused by hydraulic fracturing. There is a chance of groundwater contamination if natural gas companies are allowed to frack in Maryland. Hydraulic fracturing, or fracking, is used to extract underground sources of oil or natural gas. Natural gas consists of primarily methane, which according to the Environmental Protection Agency has an impact on climate change that is 25 times greater than carbon dioxide (“Overview of Greenhouse Gases”). The process of fracking begins with drilling a deep underground well several miles long to reach layers of shale rock, which contains numerous tiny pockets of natural gas. However there are several issues with fracking. The process of fracking is attributed to causing many environmental issues. For one, fracking operations have been linked to earthquakes in certain areas. Also, fracking companies use hazardous chemicals in their slickwater mixtures to assist in the extraction process. These chemicals can seep into ground water, and contaminate drinking water for nearby residents. A ban for fracking in Maryland is the only way to protect the health of our environment and our citizens. **Therefore, Maryland**

should ban fracking, due to scientific evidence that proves fracking causes earthquakes, contamination of groundwater, and pollution of the environment.

One of the most hazardous consequences of fracking is earthquakes. The United States Geological Survey, or USGS, has discovered that fracking causes increased seismic activity in places such as Oklahoma, where there has been a high concentration of fracking operations. The USGS reports that when slickwater is injected into an unstable area such as a stressed fault, increased seismic activity can occur (USGS). Fracking advocates argue that during fracking operations the seismic activity is minimal, and normally less than minus two ( $M_L -2$ ) magnitude on the Richter scale (“Fracking and Earthquakes”). Although this may be the case in some areas, authors Amir Mansour Farahbod, Honn Kao, Dan M. Walker, and John F. Cassidy from The Geological Survey of Canada and British Columbia Oil and Gas Institute found in a study of the Horn River Basin evidence of higher readings of seismic activity caused from fracking operations. Farahbod et al. report that as fracking operations expanded from 2007 to 2011, the magnitude of seismic events increased from  $M_L 2.9$  to  $M_L 3.6$  (Farahbod et al. 112). The last thing Maryland needs is increased seismic activity, which would damage homes, businesses, and infrastructure.

Apart from causing earthquakes, fracking has also been linked to causing several cases of water contamination. In most cases, water contamination occurs from slickwater. Slickwater is a mixture comprised of 95% fresh water, 4% sand to help prop open the cracks, and less than 1% chemical additives that do a variety of tasks. (Steliga 2186). However, the chemical additives include potent carcinogens and toxic substances, which permanently contaminates drinking water. Fracking advocates argue that wells that are properly designed and constructed present no risk to groundwater (“Groundwater Protection”). This is safe when it works, but in reality the

well casings can leak close to the surface, where there is not a thick layer of rock to protect water sources. However, injecting slickwater deep underground is not the only way that groundwater can become contaminated. Fracking operations often use surface pits to store slickwater after it has been used in a fracking operation. These pits can easily leak or burst, allowing the slickwater to absorb into the ground water reservoirs. Rainfall can also fill up the pits and allow slickwater to wash into nearby streams. Any of these incidents can easily allow for fracking slickwater to absorb into the ground and contaminate water sources. However, there are proven instances where the process of injecting slickwater underground has caused the contamination of groundwater for small towns.

The most publicized case of water contamination caused by fracking occurred in the small town of Dimock, Pennsylvania. As *State Impact* reports, in 2009 fifteen families from Dimock filed suit against Cabot Oil & Gas Company for contaminating their drinking water supply. Since the filing of the suit, investigations have found more than 130 drilling violations at Cabot's fracking wells in Dimock (*State Impact*). The Environmental Protection Agency conducted tests at Dimock and reported that there were high levels of methane, plus another gas called ethane. Ethane is another type of natural gas that only is found in pockets of natural gas deep underground, and not from natural gas pockets close to the surface ("Dimock, PA Fracking: EPA Water Samples Contained 'Dangerous' Levels of Methane"). The fact that water tests can identify differences between water contamination of natural methane and contamination from fracking operations puts an end to claims by fracking companies that fracking cannot contaminate water sources.

Hydraulic fracturing companies claim that fracking their technology continues to improve, and so does its safety. Even so, the public still sees negative images of fracking broadcasted by

media and environmentalists. One of the most famous images associated with fracking is a scene from the movie *Gasland* directed by Josh Fox. In the movie, Josh interviews one resident named Jeff Walker, who demonstrates how he can light the water that comes out of his kitchen faucet on fire with a lighter. While this scene has drawn a lot of attention, it has also received criticism from fracking advocates, who claim that flammable water can be caused by a drinking well being drilled into natural methane pockets. As the New York Times states, natural gas pockets called “drift gas” can exist closer to the surface (Brantley & Meyendorff). However this was not the case in the town of Dimock, and several other towns across the nation that have unsafe ground water after fracking operations in their area contaminated water sources.

Not only does fracking contaminate groundwater, but it also uses enormous volumes of water to extract the gas. According to Chen, Al-Wadei, Kennedy, and Terry, a single fracking well can require up to 2.3–3.8 million gallons (8.7–14.4 million liters) of water per each well that is fracked (“Paving the Future with Fracking”). This amount of water required to frack is not a sustainable way to harvest energy. Water is crucial to life, and it is also an extremely precious resource. In an informative video about fracking by Kurzgesagt, they state the amount of water used for a single fracking operation is equal to the daily consumption of 65, 000 Americans (Kurzgesagt). Before a fracking operation, toxic chemicals are added to the slickwater, and afterwards it can be contaminated with the gas or oil. The fracking slickwater that has been used in an operation is distributed in many ways after a frack. The slickwater may be stored in above ground pits, which can allow slickwater to and seep into aquifers or streams. The frack slickwater can also be loaded onto trucks and sprayed onto dirt roads leading to the fracking wells, to control dust. This can runoff into water bodies or be absorbed into the ground and contaminate underground water sources. In some cases, the slickwater is pumped back into the

well for storage. The fracking industry was originally allowed to dispose of the fracking slickwater by using local waste water treatment plants, however treatment plants are not equipped to handle the hazardous components (Brantley & Meyendorff). Here in Maryland, we would require several very expensive plants just to handle the amount of waste water from fracking, and all of the contaminants would still not be removed.

Fracking advocates argue that natural gas companies have begun to recycle slickwater and use it for multiple operations (Chen 6). Indeed, states like Pennsylvania introduced new regulations in 2011, stating that Pennsylvania companies now recycle 90 percent of the frack slickwater to frack more shale (Brantley & Meyendorff). This is good news, but not every state follows this technique. In many regions of the United States approximately 98% of all fracking slickwater is disposed of by injection back into the original frack wells (Chen 6). There is no national regulation of how to handle the frack slickwaters, because each region has geological and political differences. More regions must push to force companies to recycle their fracking slickwaters. Maryland is still affected by water consumption and contamination by fracking in other states, because water follows a worldwide cycle. Contaminated water that leaks into a tributary in Northern Pennsylvania will eventually flow down into the Chesapeake Bay. Maryland can do its part to ban fracking, so pollution from fracking will not affect states around us.

However, fracking does not just cause pollution of groundwater. Fracking operations can affect the whole environment, including the food we eat and the air we breathe. Fracking operations release methane into the air during extraction, and release a lot of CO<sub>2</sub> per well that is drilled. Each fracking operation requires four massive diesel engines that run constantly during

the drilling and actual fracking. Each fracking operation also needs many trucks to bring water, sand and other chemicals, which adds up the emittance of pollution from fossil fuels.

A very important reason fracking must be banned in Maryland is because fracking would negatively impact the cherished Chesapeake Bay. According to the Chesapeake Bay Program, the Chesapeake Bay is the largest estuary in the United States, and third largest in the world. The Bay watershed reaches 524 miles, from New York to Virginia (“Facts & Figures”). Given the track record of fracking operations, destruction of the Bay’s resources and pollution of its water would be inevitable. Not only is the Bay at risk, but all of Maryland’s beautiful features are vulnerable and must be protected. The Appalachian Mountains in Western Maryland are some of the most beautiful and enjoyed features of Maryland. Fracking could cost millions to towns and areas that rely heavily on tourism related income.

Advocates of fracking state that natural gas is the perfect “transition” fuel for the US energy economy to replace coal and oil. Fracking advocates also think that fracking is the key to the United States energy independence. However, each day that humans continue to use fossil fuels will only continue to dig a deeper hole for the fate of humanity. Advocates of fracking also claim that environmentalists, activists, and scientists are wrong about the dangers of fracking. It is obvious why fracking companies would claim this, because it affects their profit margin. The people that advocate for fighting climate change and banning fracking have no agenda, they want to make the world a better place for future generations. The people that support fracking also believe that the world is not ready for a switch to renewable energy. However, continuing to use fossil fuels through methods such as fracking only prolongs the time it takes us to achieve a future where energy is derived solely from renewable and sustainable sources. Fracking must be banned in Maryland, and renewable energy must be heavily invested in so we can prevent any

further damage caused by fracking. If we allow fracking companies to invade our state, then we are truly fracked.

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