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Health Risks of Hydraulic Fracturing: Harm on the Farm

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The process of hydraulic fracturing, or “fracking,”^a is a newer and more dangerous version of natural gas and oil extraction. Hydraulic fracturing requires the high-pressure pumping of millions of gallons of a chemical mixture, called hydraulic fracturing fluid, into the ground in order to fracture shale rock formations and extract fossil fuels. Hydraulic fracturing fluid is highly toxic to human and animal life, as “many of the chemicals... should not be ingested at any concentration.”¹

The scientific literature shows that the health of farm animals and wildlife has been harmed by exposure to hydraulic fracturing fluid. Why highlight these incidents?

Animals live in and breathe outside air and drink directly from ponds, streams and puddles. Additionally, their shorter reproductive cycles mean that toxin-induced infertility manifests sooner. **If nature is polluted, then animals show it first.**

Chemical exposures that harm farm animals and wild animals raise concern about health risks for people living near fracking sites, as the animals use the same water and breathe the same air as humans. Another, indirect concern for human health also exists: in multiple known cases of

chemical exposure, cows continued to produce dairy and meat for human consumption, although it remained untested for chemical contaminants.²

These cases are an important part of the growing body of evidence indicating that hydraulic fracturing poses serious threats to human health. Unfortunately, public health studies of fracking-related health effects have been complicated by factors such as so-called medical “gag rules,”³ nondisclosure agreements in private settlements between farmers and industry,⁴ and the refusal of some oil and gas companies to disclose the identity of the chemicals they use in hydraulic fracturing. Animals can be used as indicators,

then, of the potential for harm to health from fracking-related chemical spills, water contamination and air emissions.



Animal Exposure to Toxic Chemicals

M. Bamberger and R. E. Oswald, veterinary and molecular medicine experts from Cornell University, respectively, interviewed 24 farmers near active fracking

sites. They found that “of the seven cattle farms studied in most detail, 50 percent of the herd, on average, was affected by death and failure of survivors to breed.”²

In one farm Bamberger and Oswald studied, 60 head of cattle drank from a creek next to a road

toxics, gas or oil processing, disposal of wastes, flaring, light and noise pollution, social stressors and intensive cargo truck traffic. All are potential sources of harm to human and animal health.

^a “Fracking” is a term commonly used to describe both the intensive process of hydraulic fracturing, and the associated operations related to unconventional oil and gas extraction. This includes land clearing, well drilling, construction of the well casing, wastewater extraction and storage in open-air pits, release of air

legally used⁵ for wastewater runoff, while 36 drank clean water. Of the 60, “21 died and 16 failed to produce calves the following spring. Of the 36 that were not exposed, no health problems were observed, and only one cow failed to breed.”²

The Louisiana Department of Environmental Protection documented a 2009 case of 17 cows dropping dead within hours after drinking spilled hydraulic fracturing fluid.⁶

In 2010, 28 cows in Pennsylvania were quarantined after a leaking waste container left a puddle of hydraulic fracturing fluid in their field.⁷ A year later, the released cows gave birth to “dead or extremely weak” calves, which the farm owner called “abominable.”⁸

Broader Effects on Cows

As early as 2001, air pollution caused by discharge of gas from fracking sites was linked with health risks. Thousands of cows in western Canada, one of the original epicenters of fracking, had significantly increased rates of stillbirth and calf mortality linked to hydrogen sulfide released after natural gas extraction.⁹

Throughout Pennsylvania, increased fracking activity has been closely correlated with decreased dairy production.¹⁰ While a direct link is difficult to establish, the correlation illustrates the need for greater caution about, and investigation into, the adverse effects of fracking.

Poisoning of River Wildlife

Farm animals are not the only ones to suffer harm from exposure to hydraulic fracturing chemicals. After a Kentucky fracking site spilled hydraulic fracturing fluid into a neighboring creek, “the discharges killed virtually all aquatic wildlife”¹¹ in the area. Fish that survived the spill “developed gill lesions, and suffered liver and spleen damage.”¹²



A large spill of hydraulic fracturing fluid near a major river could put millions of people's health at risk.³

PSR's Conclusion: Ban Fracking

Based on the dangerous toxicity of chemicals used in hydraulic fracturing and their multiple environmental health impacts, as well as the powerful impacts methane has on the climate – it is a potent greenhouse gas, 86 times more powerful than carbon dioxide during its first 20 years in the atmosphere – **Physicians for Social Responsibility calls for a ban on fracking and a rapid transition to cleaner, healthier, carbon-free sources of energy.** As we make that transition, the oil and gas industry must make significant changes in their operations, including: These changes would include (although would not be limited to) the following:

- Full and timely public disclosure of the chemicals and chemical mixtures they use, amounts of waste generated, and procedures used for waste disposal;
- Appropriate strategies to manage safely the threats to health and the environment, with costs assumed by industry; and
- Independent testing of water supplies and bodies of water during and after fracking, and full and timely public disclosure of findings.

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- ² Bamberger, M., & Oswald, R. E., "Impacts of Gas Drilling on Human and Animal Health" *New Solutions* 22: 51-77 (2012).
- ³ Tsou, W., "The Big Secret? Fracking Fluids," *Environmental Health Policy Institute* (2012). <<http://www.psr.org/environment-and-health/environmental-health-policy-institute/responses/the-big-secret-fracking-fluids.html>>.
- ⁴ Efstathiou, J., & Drajem, M., "Drillers Silence Fracking Claims With Sealed Settlements," *Bloomberg.com*. Bloomberg, 6 June 2013. <<http://www.bloomberg.com/news/2013-06-06/drillers-silence-fracking-claims-with-sealed-settlements.html>>.
- ⁵ Breiner, A., "What Cows Can Tell Us About The Dangers Of Fracking." *ThinkProgress*. 19 Sept. 2013. <<http://thinkprogress.org/climate/2013/09/19/2652731/cows-fracking-safety/>>.
- ⁶ Mall, A., "How toxic are hydraulic fracturing fluids? Ask Louisiana.," *Switchboard: Natural Resource Defense Council Staff Blog*. 26 August 2009. <http://switchboard.nrdc.org/blogs/amall/how_toxic_are_hydraulic_fractu.html>
- ⁷ "Pennsylvania quarantine cattle over gas drilling fluid," *Reuters*. Thomson Reuters, 1 July 2010. <<http://www.reuters.com/article/2010/07/01/us-pennsylvania-natgas-cattle-idUSTRE66058L20100701>>.
- ⁸ Susan, P., "Burning Questions: Quarantined Cows Give Birth to Dead Calves." *NPR StateImpact*. N.p., 27 Sept. 2011. <<http://stateimpact.npr.org/pennsylvania/2011/09/27/burning-questions-quarantined-cows-give-birth-to-dead-calves/>>.
- ⁹ Waldner, C.L. et al., "Associations Between Oil- and Gas-Well Sites, Processing Facilities, Flaring, and Beef Cattle Reproduction and Calf Mortality in Western Canada," *Preventative Veterinary Medicine* 50 (July 19, 2001): 1–17.
- ¹⁰ Finkel et al., "Marcellus Shale Drilling's Impact on the Dairy Industry in Pennsylvania: A Descriptive Report," *New Solutions* 23(1): 189-201 (2013).
- ¹¹ U.S. Fish and Wildlife Service, Office of Law Enforcement. *U.S. v. Nami Resources Company, LLC*. 2009. <<http://www.fws.gov/home/feature/2009/pdf/NamiInvestigation.pdf?>>
- ¹² Papoulias, D.M., & Velasco, A.L., "Histopathological Analysis of Fish from Acorn Fork Creek, Kentucky, Exposed to Hydraulic Fracturing Fluid Releases," *Southeastern Naturalist*, Volume 12, Special Issue 4 (2013): 92–11