Hearings expose health hazards in natural gas extraction

Philip Guelpa
28 September 2010

Recently concluded US Environmental Protection Agency (EPA) hearings at locations around the United States have yielded substantial information about the dangers to human health and the environment posed by the natural gas extraction process known as hydraulic fracturing, or hydrofracking. The final hearings in the series, held last week in Binghamton, New York, had to be postponed twice in order to make arrangements to accommodate the large numbers of participants.

EPA is conducting these hearings as part of the congressionally mandated preparation of a review of the hydrofracking process, which is in use in a number of areas around the country. Hydrofracking has the potential to unlock large, but otherwise difficult to retrieve supplies of natural gas from extensive shale beds located in various regions across North America. This large energy potential, along with deep-water oil drilling and other energy initiatives, fits into US strategic plans to establish domestic "energy independence," while seeking military control over foreign sources of gas and oil, notably in the Middle East and Central Asia so as to gain leverage over international rivals.

As seen in the recent BP oil disaster in the Gulf of Mexico, this strategic drive, promoted by drastic weakening of government oversight, combined with the corporate quest for maximum profits, has severe consequences for human health and economic well being, while causing substantial damage to the environment. The controversy over the use of hydrofracking, which is currently focused most sharply on New York State, exemplifies the primacy of US corporate interests over all other considerations.

Hydraulic fracturing (hydrofracking) is used to access natural gas trapped in shale deposits. This process allows retrieval of gas that is unavailable by more conventional extraction methods. It is more complex than the simple drilling of a vertical well to tap an underground pocket of gas. The process involves horizontal drilling within deeply buried shale beds, followed by the high pressure injection of water, mixed with sand and a variety of chemicals (many are known carcinogens), to fracture the rock (hence the term "fracking") and release the gas. Millions of gallons of water are needed for each well.

Hydrofracking has the potential to make available large amounts of natural gas. The Marcellus Shale, a bedrock formation that extends across a large area of the eastern United States, including portions of New York, Pennsylvania, Ohio and West Virginia, has been estimated to contain more than 500 trillion cubic feet of natural gas. Potentially, hydrofracking could recover as much as 50 trillion cubic feet. This would be sufficient to supply the entire East Coast of the US for 50 years. Given the close proximity of the source to areas of demand, delivery costs would be low and profitability high.

Energy companies have increasingly resorted to this method as more easily accessible sources have been exhausted. However, the process is complex and poses multiple risks to the environment and to people living in the vicinity. First, given the use of several million gallons of water for each well, multiplied by the potential of thousands of wells being drilled, the impact on water resources is likely to be major. Next, there is the risk of leakage of the hydrofracking fluid into the surrounding groundwater, potentially entering aquifers, which could spread contamination over wide areas. This fluid contains a variety of toxic chemicals, including known carcinogens. Much of the fracking fluid remains in the ground once the gas extraction process is complete. Numerous cases of contamination of domestic water wells have been reported. Leakage of gas into the ground has also been reported, including one well-publicized incident in which water from a kitchen faucet ignited due to its high gas content.

The toxic wastewater created when a portion of the fracking fluid is removed from the well is another major source of concern. Not only does it contain the dangerous chemicals added as part of the hydrofracking process, but in some cases radioactive material that occurs naturally in the bedrock becomes suspended in the fluid and is brought to the surface. A recent report by the New York State Department of Environmental Conservation (DEC) revealed that samples of wastewater contained radium-226 in quantities as much as 267 times what are considered safe levels.

Safe storage and disposal of the wastewater are significant problems. The gas-containing shale deposits extend over large, mostly rural areas. Local wastewater treatment facilities have inadequate capacities to cope with major increases in volume and are not designed to deal with the exotic contaminants contained in the hydrofracking waste. The need for temporary containment facilities and long-distance hauling of contaminated fluid multiply the potential for disastrous leaks and spills into the environment.

Hydrofracking is effectively on hold in New York, pending a review by DEC of its supplemental Generic Environmental Impact Statement, which had been criticized for numerous deficiencies. DEC has held its own series of public meetings and received more than 13,000 comments after an 800-page draft version of the document was released last Sept. 30. There is no fixed date for publication of the revised report.

Gas companies are taking advantage of the depressed economy in upstate New York to entice local people into supporting hydrofracking with the promise of lease money and the potential for jobs. Sharp differences have been expressed between those residents concerned with likely environmental degradation and those who see this as an

economic opportunity. These differences express, in part, divisions between relatively well-off residents, who want to protect their property values, and those, especially in the economically hard-hit western part of the state, for whom the money from drilling leases would provide much-needed cash. New York Governor Paterson has expressed support for allowing hydrofracking because of the additional revenues this would generate to help make up for the substantial state budget deficit. However, the recent experience with hydrofracking immediately to the south in Pennsylvania, where drilling in the Marcellus Shale has been underway for several years, demonstrates that the costs substantially outweigh the benefits.

Residents from Dimock Township, Susquehanna County, in northeastern Pennsylvania, stated at the recent EPA hearings that tests have confirmed toxic contamination of domestic wells. The identified chemicals include ethylene glycol, propylene glycol, and toluene, which are known to have toxic effects. The most likely source is the fluids used as part of the hydrofracking process underway at nearby gas wells. In 2008, tests in Lenox Township, also in Susquehanna County, found elevated levels of barium, strontium, and manganese in water from domestic wells within 2,000 feet of a hydrofracking operation. Dimock is also the location where home tap water became inflammable, apparently due to groundwater contamination from gas drilling. At least two groups of local residents in Susquehanna County are suing Texas-based gas drilling companies for alleged contamination of their drinking water. While repeatedly denying responsibility, companies are, in a number of such cases, providing bottled water to affected households.

Concerns regarding the potential effects of hydrofracking on water supplies have been raised beyond the immediate drilling localities. Roughly half of New York State's population, including New York City and adjacent areas, and Philadelphia and its surroundings, a total of approximately 17 million people, rely on the Hudson and Delaware River drainages for their drinking water. The New York City Department of Environmental Protection has taken a strong position against allowing hydrofracking in these areas.

The environmental organization Riverkeeper, a watchdog group that focuses on the Hudson River watershed, has released a report, entitled *Fractured Communities*, which identifies more than 100 examples from around the US of environmental contamination due to gas drilling operations, primarily hydrofracking. The report concludes that:

"Federal and state regulators have documented significant environmental impacts resulting from industrial gas drilling operations nationwide. These impacts include contamination to groundwater, drinking water, surface water, air and soil and result from changes in land use, roadbuilding, water withdrawals, improper cementing and casing of wells, over-pressurized wells, gas migration from new and abandoned wells, the inability of wastewater treatment plants to treat flowback and produced water, underground injection of brine wastewater, improper erosion and sediment controls, truck traffic, compressor stations, as well as accidents and spills."

A previous EPA study, released in 2004, found that hydrofracking was safe. However, that conclusion has been severely criticized as being heavily biased by an industry-dominated review panel. The new study is not expected to be completed until 2012. The 2004 report was used by Congress, in another blatant example of subservience to the energy industry, to exempt hydrofracking from the Safe Drinking Water Act, leaving oversight of this process to the states, which tend to have weaker regulatory mechanisms and are more easily overwhelmed by corporate pressure.

Companies involved in hydrofracking have mounted massive public relations and lobbying campaigns to minimize its environmental and public health risks and to pressure legislators and government agencies to permit their drilling operations to proceed with minimal regulation. They have, for example, strongly resisted disclosure of information regarding the toxic chemicals used in the fracking fluid and repeatedly denied that their operations are the source when such substances are discovered in the drinking water of nearby residential wells. The companies have also claimed that hydrofracking has been safely used for many decades. This is highly disingenuous since the vast majority of those earlier operations were simple vertical wells in which the fracking procedure was limited in scope and the volume of fracking fluid small compared to the extensive horizontal fracturing now being undertaken. The substantial amount of wastewater generated by the latter procedure creates an exponentially greater risk to the environment and human health. The profitability of hydrofracking in the Marcellus Shale would be significantly impacted if all of the "hidden" costs were fully taken into account.

In addition to the heavy influence of industry on politicians and regulatory agencies, a recent study by ProPublica reveals that the Pennsylvania state Office of Homeland Security has been conducting surveillance of anti-hydrofracking groups and passing the information on to the industry. This is done under the guise of "protecting critical infrastructure" and has the effect of intimidating opponents of the gas companies. These actions are of a piece with the extensive collaboration by the federal government with BP in suppressing information and limiting access to the Gulf oil disaster.

As with the deepwater oil drilling industry, gas hydrofracking pushes the limits of safe technology. The industry's drive to cut corners at every step in order to maximize profits, combined with grossly under-resourced and politically compromised government review agencies, is a recipe for environmental disaster and severe effects on human health. A safe and rational use of oil and gas resources will only be possible when the energy industry is taken out of the hands of the giant corporations and placed under the democratic control of the working class.