

# Fracking Regulations Cannot Protect Maryland

## *A Ban is the Only Rational Option*

Fracking regulations cannot protect the health of Maryland residents or their environment. The complex industrial technologies and processes required to extract gas from shale rock deep below the Earth's surface and bring it to market lead to a wide array of negative effects. There are now over 900 peer-reviewed publications on the impacts of unconventional gas development and production (UGDP), ranging from climate effects to earthquakes, community disruption and environmental contamination.<sup>1</sup> **Of the studies looking specifically at public health impacts, the majority show risks or actual harms.**

In November 2016, Maryland published draft fracking regulations. The Maryland Department of the Environment (MDE) can begin issuing permits as early as October 2017. **Due to the complexities of unconventional gas development and production, the inherent technical and scientific limitations, and the fragmented and incomplete nature of the regulatory process, no regulatory framework can adequately protect public health and the environment over time.**

### Engineering Limitations

**The structural integrity of wells and infrastructure is impossible to guarantee over time.**

#### WELL LEAKS

Well leakage is an intractable problem that has plagued the gas industry for decades, both with conventional and unconventional wells. Despite the best efforts of the scientists and engineers in the field, no permanent solutions exist. Over time, cement will fail and steel casings will leak. *Adding an extra layer of cement as recommended in Maryland's draft regulations does not solve the problem over the long term.*

**Industry publications suggest that roughly five percent of wells leak within the first few years and the rate rises as high as 50 percent by 15 years out.**<sup>2</sup> Recent analyses in Pennsylvania corroborate these rates of well leakage, despite stricter regulations and reported improvements in technique.<sup>3</sup> The rate of leakage from unconventional wells is higher than from conventional wells.<sup>4</sup> Once these wells are in place, they are permanent structures that can create conduits for the flow of gases and liquids into the environment, some of which may be toxic or radioactive for decades, even after production ceases and wells are plugged. Methane continues to leak from hundreds of thousands of oil and gas wells in Pennsylvania alone.<sup>5</sup> **No regulatory framework can solve a problem that industry cannot fix.**

### Conventional Versus Unconventional Gas Development and Production (UGDP)

When compared to conventional gas development, UGDP requires:

- significantly more fluids and toxic chemicals that can leak or spill in more locations
- significantly more diesel truck traffic that creates dangerous road conditions and emits air pollutants
- significantly more compressor stations, pipelines, processing units, storage facilities and other ancillary infrastructure, all of which pose health risks and damage the environment both during construction and throughout operations, potentially into the distant future

Relative to conventional gas development, UGDP also produces:

- significantly larger volumes of toxic wastes that must be permanently stored
- more greenhouse gases that exacerbate climate disruption

## AGING INFRASTRUCTURE

Regulations cannot adequately protect against the corrosion and degradation of UGDP infrastructure, such as pipelines, storage vessels and compressor stations. This is not a hypothetical risk, as the nation learned last year with the catastrophe at the Aliso Canyon underground gas storage facility in California.

The majority of the facility's wells were half a century old, many corroding and failing, yet in active use for storage of gas. **A single leak in one of these wells could not be stopped for four months, resulting in the release into the atmosphere of roughly 90,000 metric tons of methane, a potent greenhouse gas.** Thousands of families were relocated, schools were closed, and residents still suffer "nausea, nosebleeds, and rashes" over nine months later.<sup>6</sup>

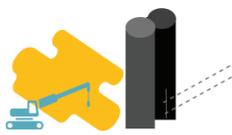
**Inadequate long-term monitoring and maintenance of wells, pipelines and other UGDP infrastructure leave future generations vulnerable to catastrophic failures.**

## Industry History and Political Influence

Industry's historic disregard for community safety and its political influence further compromise the effectiveness of regulations and increase public vulnerability. The oil and gas industry has gained exemptions from six major federal environmental laws, including the Safe Drinking Water Act, the Clean Air Act and toxic reporting and hazardous waste cleanup laws.

The industry also has a long record of violations, of evading responsibility, of hiding information and of misleading the public on issues ranging from contamination of water wells to the impacts of fossil fuels on the climate.<sup>14,15</sup> *State agencies are no match for this powerful industry.*

## Complexities of UGDP Make Regulation Impossible



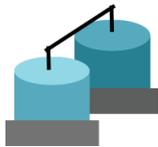
Silica Mining



Drilling & Hydraulic Fracturing



Diesel Trucks



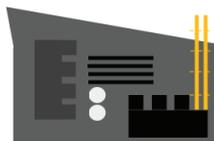
Storage Tanks



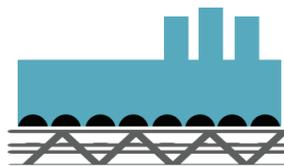
Flaring



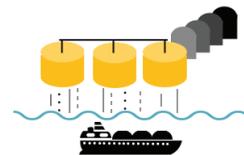
Pipelines



Compressor Stations



Processing Plants



LNG Terminals

\* not to scale

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From the mining of the silica to the drilling, fracking, processing, distribution and storage of various compounds, wastes, and the gas itself, toxic chemicals are emitted, contaminating air, water and soil. Toxicants can enter the human body through skin contact, respiration or ingestion, leading to a wide array of adverse health effects. Excessive noise and light pollution, community disruption and other stressors add to short-term, longer-term and cumulative impacts. The complexity requires a level of oversight that cannot be reasonably guaranteed by government agencies.

## Scientific Limitations and Uncertainties

There are too many unknowns and variables in the chemistry and physics of UGDP, and in the geology and hydrology of the earth, to be able to adequately regulate or control these activities.

### TOXIC EXPOSURES

There is a lack of complete information about the toxicities and interactions of the chemicals used in the drilling and hydraulic fracturing of wells. While many of the chemicals in fracking fluids are known to have carcinogenic, neurotoxic or endocrine-disrupting properties, most simply have not been evaluated for toxicities. **A recent Yale study specifically analyzing carcinogenic risks, for example, found that over 80 percent of the more than 1,000 chemicals identified as potential water contaminants or air pollutants have not been evaluated for carcinogenicity.**<sup>7</sup>

The chemicals injected into wells not only interact with each other but also mix with heavy metals and naturally occurring radioactive materials underground where temperature and pressure changes may affect chemical reactions. Some of these fluids return to the surface as flowback or produced waters and must be processed or permanently stored. Spills or leaks during transport, from well failures, or from compromised storage containers may contaminate water and soil, posing health risks to humans and animals. These chemicals may also volatilize and disperse in the air where they can be inhaled. **No regulations can protect the public when the identities and toxicities of many chemicals used and emitted remain unknown.**

### EARTHQUAKES

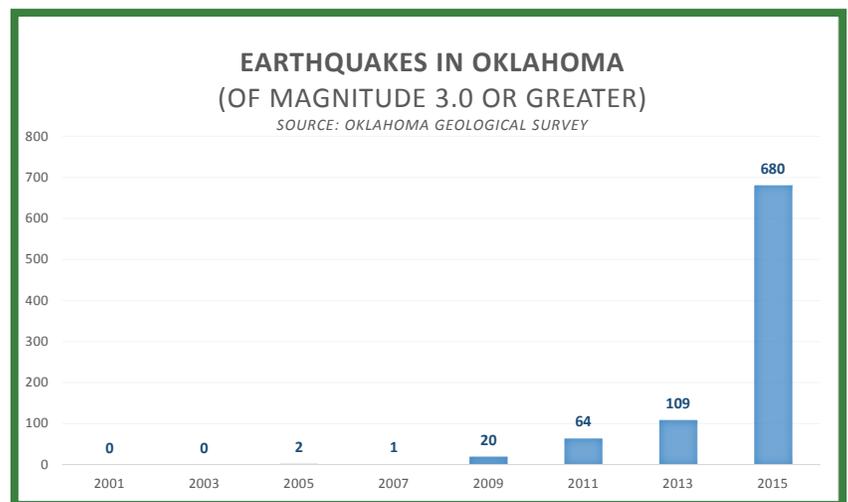
Earthquakes are an additional emerging risk that cannot be managed adequately through regulations. **Earthquakes result both from injecting waste fluids deep underground for storage and from the process of hydraulic fracturing itself.** For years, industry denied any connection between UGDP and earthquakes, but now the evidence is unequivocal.

Because wastewater from fracking is contaminated with hydrocarbons, toxic chemicals and radioactive materials, companies must dispose of it. They frequently do so by injecting it deep underground. In Oklahoma and other states, wells injected with large amounts of fracking wastewater are causing more and stronger earthquakes.<sup>8</sup> The 5.8 magnitude earthquake in Oklahoma on Sept. 3, 2016 was the state's worst on record and affected five neighboring states.<sup>9,10</sup>

Injecting high volumes of water, chemicals and sand to extract natural gas can also cause earthquakes. In December 2015, for example, British Columbia experienced a 4.6 magnitude quake, and in January 2016, Alberta experienced a 4.8 magnitude quake, both of which were associated with hydraulic fracturing nearby.<sup>11,12</sup> **Earthquakes are an unacceptable risk of UGDP that regulations cannot prevent.**

### Underground Unknowns

- Fracking wells extend miles underground, both vertically and horizontally, often in regions with undocumented faults. Regulations cannot protect us from earthquakes and seismic activity.
- Regulations also cannot protect us from the migration of toxic and radioactive compounds into our aquifers and drinking water that may occur slowly over time and be difficult to detect and nearly impossible to clean up.



## Climate Disruption

Natural gas is often touted as a “bridge fuel” between coal and renewable energy, but this is inaccurate. Both methane and carbon dioxide are emitted during production and use of fracked gas, and regulations cannot reduce these emissions to the extent necessary to address climate change.

Methane, the primary component of natural gas, is a potent greenhouse gas that enters the atmosphere during almost every phase of the UGDP lifecycle, from drilling and fracking, to distribution and storage, to end-use at power plants or individual homes. **Methane emission rates are so high that UGDP is likely as bad or worse for climate than coal or oil.**<sup>13</sup> While there are techniques for decreasing methane emissions, it is technically impossible to reduce emissions to zero, the standard that must be met in the current era of accelerating climate change. Furthermore, UGDP requires billions of dollars of infrastructure development that will lock Maryland into additional decades of fossil fuel dependence. ***Climate change is a public health emergency that requires all sectors of society to begin to wind down the use of fossil fuels and to transition to the efficient use of clean renewable energy sources as quickly as possible.***

## Incomplete and Inadequate Oversight

In Maryland, most of the public focus has been on the drilling and hydraulic fracturing processes and related infrastructure on or near the well pad. But **the threats to public health and the environment occur all along the lifecycle of gas development and production**, extending way beyond the well pad and even across state lines. Different parts of the infrastructure are regulated by different agencies, some at the federal level. Maryland state regulators do not have complete jurisdiction over all stages of the process, including truck traffic, parts of the pipeline infrastructure, and aspects of gas and wastewater storage. In other words, **the state is creating risks to public health and the environment, while assuming only partial responsibility for oversight. State regulation is incomplete, and therefore, inadequate.**

## Where Do We Go From Here?

Not all new technology is beneficial. We now know that unconventional gas development and production is a hazardous industrial activity that threatens human health and safety, and the environment. The policy implications are clear:

- **In states where fracking has not yet begun, it should not be permitted.**
- In states where it is already being widely deployed, existing regulations should be tightened while processes are developed for a rapid phaseout, taking great care to plug and responsibly abandon existing wells, while providing a just employment transition for workers.

**Chesapeake PSR is actively working to permanently ban fracking in Maryland, while supporting a rapid transition to an economy based on the efficient use of resources and clean renewable energy.**

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