THE RISKS OF FRACKING -- THE TOXIC SELTZER BOTTLE

By Charlie N.,

INTRODUCTION

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The oil and gas industry often overstates the rewards of unconventional gas and oil extraction (fracking) and understates the risks. Hydraulic fracturing (fracking) is an extreme technology that is inherently dangerous to the environment. The safety and economy of this technology are not settled issues. The film *GASLAND* attempted to educate the public about this technology. If the film inflamed public opinion, it was because of the facts it presented and the interviews with the people affected by fracking.

THE RISKS

In a nutshell, fracking poses environmental contamination risks to the environment: water, air, and earth with corresponding threats to human, animal and plant life. Fracking also emits destructive greenhouse gas that worsens climate change. It fosters continuing and increased use of fossil fuels and delays the inevitable switch to renewable energy.

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Methane contamination of drinking water is a proven danger [“Hydraulic Fracturing for Natural Gas Pollutes Water Wells”, *Scientific American,* May 9, 2011]. But there are many other more insidious risks. One such risk comes from the "flow-back" fracturing fluid, a toxic mix of water, chemicals and naturally occurring materials from the earth. Each well requires millions of gallons of water, mixed with sand and a site-specific “cocktail” of chemical compounds. All of these chemicals have not been publicly identified; the gas/oil industry claims some are trade secrets. This lack of transparency makes it difficult to test aquifers for contamination. When humans and animals near drilling operations get sick, doctors and vets are at a diagnostic disadvantage without knowing the potential toxins in the environment.

Since this technology has been given special exemptions to the Federal clean air and water acts (the “Halliburton” loop-hole), monitoring for contamination and unsafe procedures is largely left to individual state environmental agencies, many of which do not have the funds/staff to adequately monitor thousands of wells.

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HYDRAULIC FRACTURING PHASE – LOSS OF CLEAN WATER RISK

Fracking fluid is forced down each well by powerful pumps, typically 8000 feet down and horizontally another 5,000 – 10,000 feet to open fissures in shale rock. A single well pad can have up to 16 separate wells. Multiply thousands of wells by an average of 5 million gallons of fresh water per well, and realize that BILLIONS of gallons of water are contaminated with toxic chemicals. Much of this toxic fluid, up to 80%, remains in the earth forever, a constant threat of migrating pollution. The remaining fluid erupts from the well with the released gas in the production phase of the operations – at this point the area of land around the well is like a giant **toxic seltzer bottle**! Being shaken, this flow-back fluid is toxic waste that must be kept in pools and isolated from the environment. Its disposal is a big problem, fraught with the dangers of spills and leaks. This is NORMAL operating procedure.

MORE COMPLEX POLLUTION

Millions of cubic feet of natural gas are vented out to the air in this phase; the shaken seltzer bottle has to be uncapped – again, normal operating procedure. Additionally, the flow-back fluid, aka "produced water," brings up naturally occurring salts, heavy metals and minerals from the shale, some of which are radioactive. Purifying this water is not feasible; in the past, drillers trucked it from Pennsylvania to Ohio where it was injected back into the earth. If there is a way to decontaminate this fluid, what is it? Even if it were possible, it would be extremely costly, both in dollars and energy. Some drillers truck some of this fluid to recycling facilities where the solids are removed, but this does not decontaminate it. It merely enables the drillers to re-use the fluid in future fracking operations. And the removed solids are toxic and must be disposed of safely.

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UNCONVENTIONAL VS. CONVENTIONAL

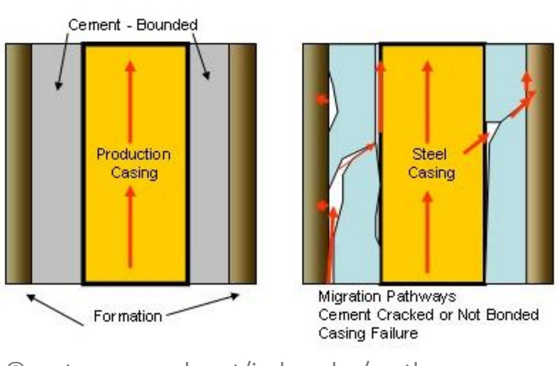
A major problem with shale gas extraction is the absolute need for many more wells to extract gas compared to conventional methods. All the problems associated with drilling *any* type of gas or oil well are multiplied because of the sheer quantity and length of the wells (the total length of a well pipe is typically about 8000 feet vertically plus another 10,000 feet horizontally). The gas is everywhere in deep shale rock and so drillers must drill everywhere. Unconventional gas wells must be closer together than conventional wells because the gas is tightly held by the shale and the fissures are limited by the thickness of the shale layer. The Marcellus shale layer in Pennsylvania is typically 300 feet thick. A horizontal well bore in the middle of the layer should not fracture more than the extent of the shale thickness to reduce loss of gas product to the surrounding earth (and to prevent toxic fluids from seeping into the surrounding earth). Therefore, this technology requires many more wells to produce the same amount of gas obtained from one conventional well drilled in porous sandstone.

There are thousands of square miles of Marcellus shale (more than 100,000 sq. mi. in six states). Energy company spokesmen estimate the need for 20,000 wells to extract gas from the Marcellus in Pennsylvania alone; some say 50,000.

THE RISK OF GREENHOUSE GAS

For each well, over 1000 trucks will come and go. The huge amounts of water, and chemicals must be transported to the well pad. Also some 15,000-20,000 feet of steel pipe are needed for each well – much more than for conventional wells. And there's all that concrete for sealing the well bore casings. There will be large amounts of diesel fuel used for power generation, heavy equipment and massive fracking fluid pumps – all adding heat-trapping CO_2 to the atmosphere. Millions of cubic feet of natural gas (primarily methane) are vented in the operation and methane is worse than CO_2 in its global warming effect. Claims that gas provides cleaner energy than coal do not take all these factors into account.

Air pollution is also caused by evaporative sprayers and venting of volatile organic compounds (VOCs) in the gas-fluid separators and condensate tanks. These heavy industrial equipment components are necessary for removing unwanted (and dangerous) compounds from the gas product as it first comes out of the well. Anti-pollution features on these systems will add much greater costs to the operation. Monitoring for safe operation will cost even more. State DEPs are not staffed or funded for these tasks.



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CONCRETE SEALING RISKS

A well-known risk is casing cement seal failure. Over time the cement develops cracks. Industry data shows a 5% concrete failure rate in new wells. As the well ages, the failure rate climbs to 30% after 10 years and 50% after 25 years. And who will be checking these thousands of wells for decades to come after they are no longer productive and supposedly sealed off?

Claims that shale gas will decrease our domestic energy costs and dependence on foreign oil are pipe dreams. The big energy companies are building pipelines to transport this product to seaports to sell in the global market. Big energy will achieve higher profits; the public will be stuck with the mess for centuries – privatized profits, socialized costs.