

# The Un-Clean and Un-Natural Side of Natural Gas

by David J. Cyr

Natural gas isn't so clean, natural or green when the externalized costs are considered. Yes, gas burns cleaner in a boiler and therefore greener than oil, and way cleaner and greener than coal. However, its politicized "Energy Independence" usage is producing an un-clean net result; and the post-peak extraction process is un-natural. The rush to use natural gas as a "transition" fuel has serious negative environmental consequences. Merely relabeling dirty fossil fuel dependence to now be "green" and to represent "independence" doesn't actually make it green, nor provide real independence. Whenever a corporate solution to an environmental problem seems remarkably green, look into it again... much more carefully.

## The Un-Clean Side:

On a burned BTU basis, gas produces 29% less carbon dioxide than oil, and 44% less than coal. When it comes to sulfur dioxide, gas is 1,122 times cleaner than oil and 2,591 times cleaner than coal. However, natural gas only seems green, when compared to those other fossil fuels. It burns *cleaner*, but it is **not** *clean*.

While natural gas produces a smaller amount of greenhouse gases (GHGs) per joule delivered than oil or coal, gas emits a lot of GHGs too. Burning as much as possible of something producing relatively less GHGs is not the best way to reduce GHGs. The Intergovernmental Panel on Climate Change (IPCC) has determined that, in the absence of policies to promote low-carbon emission sources (which policies *are* effectively absent), by 2030 oil demand will have increased by 44% and gas demand will be approximately double what it was in 2002. CO2 emissions will consequently have then increased by 62%. So energy independence through an increased dependence on natural gas is not going to clean up the atmosphere and cool the planet.

## The Un-Natural Side:

The gas that's now being unconventionally extracted isn't lying there underground in big natural pools near the earth's surface, and it's not easy to collect. The days of getting natural gas the way it was done back in the 19th century are over. Easily gotten old conventional supplies of gas have been declining since 1973. That's why Halliburton developed a deep, high pressure, multiply horizontally bored and hydrofractured drilling process. It uses extreme measures to release remnants of gas, which while pervasive are locked very tightly within the actual matrix of dense stone deposits, such as shales. The Halliburton process essentially — rather like alchemy — converts stone into gas. But that's not all it does. Those unconventional natural gas drilling sites are hazardous waste production facilities.

Old conventional gas wells were not much different than water wells. They were simply vertical holes drilled not very deeply into the earth to tap into reservoirs of gas within cavities, or flowing through a relatively porous and permeable subsurface material. Some limited hydrofracture stimulation was done in the past to increase production in conventional gas wells. But compared with current techniques, those old wells used negligible quantities of chemicals, small quantities of water, and much less pressure.

Unconventional shale gas drilling is something totally different. The vertical holes are drilled far deeper. The bits are then turned to bore multiple horizontal holes over great distances. A large number of hazardous chemicals are combined with enormous quantities of good fresh water. That "slick water" mixture is used to flood the drilled holes. By means of huge diesel fuel burning air compressors, it's then pressurized up to 8,000 psi. That converts as much as a thousand times more water than traditionally used into toxic waste; while using 2 to 4 times greater pressure than any fracking done in old conventional wells. Far higher volumes of toxic fluids, and much higher pressure is used to make those fluids behave as powerful explosives to shatter stone formations that lie beneath water supplies. Those are important factors regarding the potential for unconventional drilling to contaminate water supplies, which it too often has done.

While the post-peak conventional gas production has been in continuous decline, energy companies have ramped up their hydrofractured horizontal drilling in western states. Use of the Halliburton process has increased by more than 300% from 1990 through 2008. The gas industry has already Iraqified much of the western states. While it continues to expand extraction there, it is also now invading and occupying the more populated east. It's moving up the Marcellus Shale Play, from West Virginia (the extraction industry friendly home of mountaintop removal), through Pennsylvania, and coming into Ohio and New York. The scale of the environmental assault is

rapidly increasing. The cumulative effect of what would eventually be hundreds of thousands of hazardous waste producing natural gas well sites must be considered.

In western states where it has been used for decades, the atrocious environmental impacts of the Halliburton process have become clearly evident in air, ground and water contamination. Effects upon plants and animals are more insidiously revealed over time. Government environmental agencies, which should protect us, have enabled industry to deny that this process has adverse health consequences, because its causative potential for harm hasn't and isn't being adequately studied before those agencies permit the harm to be done. As the use of that environmentally destructive process now spreads into the more densely populated eastern states, under current (reactive to economic collapse) political conditions that favor maximum extraction, its impact upon the lives and health of people will be far greater than ever before... greater both in the degree of negative health impact and greater in the number of people effected.

#### **Public Seduction By Obfuscation And Bribery:**

Drillers and government regulatory agencies facilitating the surge in use of the Halliburton drilling process claim that chemicals are used in insignificant quantities. They say various combinations of the many chemicals used for numerous purposes only amount to a total of about 1% of the "slick water" hydrofracking fluids used. But, while an old style conventional gas well drilling would use a few thousand gallons of water, and little to no chemicals; by contrast, an unconventional deep horizontal shale gas well uses (dependent upon various factors) between 2 and 9 million gallons of fresh water. Only 1% of the "slick water" fluid volumes being chemicals may seem insignificant, but it is 1% of truly enormous volumes. 1% of the 2 to 9 million gallons of water used per well becomes between 20,000 to 90,000 gallons of chemicals used for each well site. And all the millions of gallons of fresh water, being the 99% ingredient in "slick water" used per well in the Halliburton process, is converted into toxic waste by the 1% of "proprietary secret" chemicals added. Then that toxic "slick water" recipe is mixed in with a lot of very nasty stuff that lies down there deep within the earth, which the hydrofracturing releases from the stone along with the gas. That nasty natural stuff like benzene, toluene, ethyl benzene, and xylene; radioactive materials; hydrogen sulfide; arsenic and mercury is pumped up out of the drill holes as so called "produced water" (highly hazardous liquid/solid waste). Those contaminants are dumped into open evaporation pools used to reduce the volume of hazardous waste to be inconveniently and expensively disposed of somewhere else, other than in the air.

Gas men filter into communities in advance of drilling to privately proffer lease agreements. Signing landowners get up front bonus money and promises of great riches to come from future gas production royalties. That incites a feverish greed, particularly in economically depressed areas. The possible lessors and local officials are blinded to the negative environmental and societal impacts which will accompany that money. People who warn of hazards are labeled "extremists" for being cautious.

Bright and cheerfully optimistic TV advertisements assure viewers that gas corporations are going to bring about a wonderful energy independence for America, by using new technologies providing amazing quantities of domestic "green" energy production. They don't mention the invasive scale of the number of well sites that will be required to achieve that; nor their expropriation from the Commons of enormous quantities of fresh water, which water is more valuable than the gas it will be squandered to get; nor the staggering amount of hazardous waste that their "new technology" produces.

Having been fossil fuel dedicated for nearly two centuries now, the energy industry's *new and improved "green"* solution is to extract as much cleaner (natural gas) fossil fuel as possible, as soon as possible, by any means possible; and to get it all profitably burned up as fast as possible. With its relentless media saturation advertising campaign, the energy industry has greenwashed its government facilitated plan to stubbornly maintain our national dependence upon fossil fuels. Natural gas is not carbon neutral. And an extraordinary increase in the extraction rate of natural gas, using the Halliburton process, will also extraordinarily increase the production of pollution from hazardous waste. That will make what was less dirty, when used less, far more dirty, when used excessively. Petroleum corporations, and the political campaign contribution purchased governments they own, are using a misinformation campaign promoting the use of natural gas for the purpose of delaying, for at least another generation, any really serious societal effort to either conserve or truly transition away from fossil fuels.

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