

11. NATURAL GAS - CHEAP NEW SOURCES?

“Natural gas will be cheap and plentiful for the foreseeable future” according to drillers of natural gas. (AP Energy Writer - Jonathan Fahey 10/13/10). Not too many years ago gas prices were expected to climb as reserves dwindled. However, technology has discovered a way to cheaply release natural gas from the abundant supply of shale in the United States.

In the 1990s, the price of natural gas was at about \$2.00 per 1,000 cubic feet and the price increased to nearly \$15.00 in 2005. It is now about \$3.50 partly due to the recession and because drillers have learned to make a profit by effectively removing natural gas from gas bubbles trapped in shale. The Massachusetts Institute of Technology recently determined that “80 years' worth of global natural gas consumption could be developed profitably with a gas price of \$4 or below.” <<http://respondpower.com/EnergyNews/tabid/90/articleType/ArticleView/articleId/43/Natural-Gas-Elbows-Its-Way-to-Center-Stage--The-Journal-News.aspx>>

In the US, most natural gas is found in highly porous and permeable reservoirs which can be harvested by vertical wells. Shale gas, however, remains trapped in tiny bubbles in the organic-rich shale formed from sedimentary deposits of mud, silt, clay and organic matter on the floors of shallow seas. Special drilling technology has been developed to drill below the surface for perhaps a mile and a half to penetrate the shale layer, then the drill bit can be turned to a horizontal drilling position to keep drilling into the shale sedimentary layer.

On October 13, 2010, even Fox News reported in a special program titled: “*Natural gas elbows its way to center stage*” that “By unlocking decades' worth of natural-gas deposits deep underground across the United States, drillers have ensured that natural gas will be cheap and plentiful for the foreseeable future. It's a reversal from a few years ago that is transforming the energy industry.” <<http://www.foxnews.com/us/2010/10/13/natural-gas-elbows-way-center-stage-st-ld-writethru>>

Because of this new technology, it has been estimated that there has been an increase of 35 percent for our natural gas reserves in its 44-year history. A reserve report in 2006 estimated a reserve of 1,532 trillion cubic feet and that rose to 2,074 trillion cubic feet in 2008. <<http://www.thenewamerican.com/index.php/economy/sectors-mainmenu-46/1270>>

WHO WOULDN'T WANT CHEAPER NATURAL GAS?

There's one little hang-up with this new drilling process that provides a dark side to this promising technology. It involves drilling deep underground and injecting massive amounts of chemical-laced water mixed with sand to permeate and fracture the rock to free the gas from a seam of shale rock. The process is called hydraulic fracturing or “fracking” for short.

What magic potion is in that “chemical-laced” water? Drilling companies do not want to disclose what they use, but the material is designed to break up the shale and release the gas.

“The oil and gas industry is the only industry in America that is allowed by EPA to inject known hazardous materials -- unchecked -- directly into or adjacent to underground drinking water supplies...This exemption from the SDWA (Safe Drinking Water Act) has become known as the ‘Halliburton loophole’ because it is widely perceived to have come about as a result of the

efforts of Vice President Dick Cheney's Energy Task Force.” <<http://www.earthworksaction.org/halliburton.cfm>>

The EPA has sent requests to nine companies asking them to respond by informing the EPA about what is used in this toxic mixture. It appears that eight companies will comply, but one of the nine, Halliburton, “threatened to cease natural-gas operations in Colorado if regulators there persisted in demanding the chemical recipe.” <<http://www.dcbureau.org/20100916818/Bulldog-Blog/epa-requests-fracking-chemicals-from-nine-companies.html>>

Schlumberger Limited (NYSE:SLB) is the world's leading oilfield services company supplying technology, information solutions and integrated project management that optimize reservoir performance for customers working in the oil and gas industry. Their “Experience in thousands of wells has helped us develop a proven approach to successful shale gas projects.”

Schlumberger is speaking from the industry’s point of view and provides a positive approach to gas shale fracking. <http://www.slb.com/services/industry_challenges/unconventional_gas/shale_gas.aspx?entry=ad_google_ShaleGas&gclid=CKmSuPO_v6UCFYSK4AodhxANYA>

WHERE CAN I SEE THE ENTIRE PICTURE?

There is a 30 minute documentation of: “Shale Gas and America’s Future” by American Clean Skies Foundation - 750 1st Street NE, Suite 1100, Washington DC 20002 which can be viewed at: <<http://www.shalegasfuture.com>> The documentation covers most of the details, but be alert to the details about the chemicals used in the chemical-laced mixture.

WHO IS CONCERNED?

The Sierra Club: Executive Director, Michael Brune, visited Pennsylvania in November of 2010 and was interviewed in an episode of 60 Minutes about drilling for shale gas using “fracking.” He showed concern about the exemption of fracking from the Safe Drinking Water Act, parts of the Clean Air Act, the National Environmental Policy Act, as well as our country’s hazardous waste and cleanup laws.

The Natural Resources Defense Council (NRDC): is concerned with the threat of chemical contamination with multiple chemicals including friction reducers, biocides, surfactants, and scale inhibitors. They are especially concerned with effects of chemicals to the soil from normal drilling practices, leaks, spills or other releases that can contaminate surface and underground water supplies with a variety of adverse health effects including contributing to cancer. <<http://www.nrdc.org/land/files/marcellus.pdf>>

The Union of Concerned Scientists: They:

- agree that the gas industry should not be exempt from the Federal Clean Water and Safe Drinking Water Acts but should disclose what is in their mix of chemicals used for fracking;
- have concerns about the ability of local wastewater facilities to properly treat the produced fracking water;

- state that more than 20,000 shale wells have been drilled nationwide in the last ten years.
- recognize the potential health and environmental impacts on the quality and quantity of local water sources:

1. A single hydro-fracked well can require several million gallons per treatment--dozens of times what is used in conventional vertical drilling. Withdrawing this amount of water over a short period of time can strain local water sources.

2. After extraction, an additional 400 million gallons of water per day are consumed for natural gas refining and pipeline operations.<http://www.ucsusa.org/clean_energy/technology_and_impacts/energy_technologies/water-energy-electricity-natural-gas.html>

The Endocrine Disruption Exchange: President of the Exchange, Dr. Theo Colborn, has found that 37 percent of the chemicals found in a national survey are endocrine disruptors. “These are the chemicals that can get into the pregnant woman and enter the womb, while her baby is developing in her womb, and alter how those children are born “ – simple things like ADHD, autism, diabetes, obesity, early testicular cancer, endometriosis. These are all endocrine-driven disorders that we’re very concerned about.” <http://www.democracynow.org/2010/4/14/world_renowned_scientist_dr_theo_colborn>

Earthjustice: Outside of the State of New York, “gas drilling has proceeded at a breakneck pace, predictably accompanied by poisoned water, catastrophic explosions, dying livestock and other gloomy harbingers.” <<http://unearthed.earthjustice.org/blog/2010-november/fracking-murder-mystery>>

Mother Nature Network - MNN: Federal environmental officials found drinking water contamination in at least three water wells around Pavillion, Wyoming, where chemicals were used in gas fracking. Scientists also found traces of other contaminants, including oil, gas or metals in 11 of 39 wells tested there since March of 2010. When one resident found his well water contaminated with methane gas, hydrocarbons, lead and copper, he drilled a new water well, it also showed contaminants. <<http://www.mnn.com/lifestyle/health-well-being/stories/epa-chemicals-found-in-wyo-drinking-water-might-be-from-fracking>>

Scientific American: Reported that drilling for natural gas has caused explosions, polluted aquifers and even produced “burning water” with many documented cases. In Dimock several drinking water wells have exploded and nine others were found with so much gas that one homeowner was told to open a window if he planned to take a bath. <<http://www.scientificamerican.com/article.cfm?id=natural-gas-make-water-burn>>

Earthworks: Is not certain which chemicals are used for shale gas fracturing, but they know that coalbed fracturing treatments “include potentially toxic substances such as **diesel fuel**, which contains **benzene**, **ethylbenzene**, **toluene**, **xylene**, **naphthalene** and other chemicals; **polycyclic aromatic hydrocarbons**; **methanol**; **formaldehyde**; **ethylene glycol**; **glycol ethers**; **hydrochloric acid**; and **sodium hydroxide**.” **Very small quantities of chemicals such as benzene, which causes cancer, are capable of contaminating millions of gallons of water.**

Earthworks is not only concerned with dangerous fracking chemicals that are used, but are also concerned with the amount of water that is used. The following are three educated estimates of the amount of water required for the one-time fracking process:

1. The "Railroad Commission of Texas, slickwater fracturing of a Barnett shale vertical well can use more than 1.2 million gallons (28,000 barrels) of water, while the fracturing of a horizontal well can use more than 3.5 million gallons (over 83,000 barrels) of water."

2. "Devon Energy reports that its Barnett Shale horizontal wells in the Fort Worth Basin require approximately 3.5 million gallons of fresh water."

3. "Researchers at Texas A&M University estimate that horizontal wells, undergoing multi-stage fracs, can use between 5 and 6 million gallons of water."

<<http://www.earthworksaction.org/pubs/OGAPMarcellusShaleReport-6-12-08.pdf>> and
<<http://www.earthworksaction.org/FracingDetails.cfm#CHEMICALS>>

The State of New York: The New York State Assembly has approved a six month moratorium on the natural gas drilling technique known as hydrofracking. Both the New York Department of Environmental Conservation and the U.S. Environmental Protection Agency are studying the environmental impact of hydrofracking. Legislation now heads to Governor David Paterson who has until the end of the year (2010) to sign it. <<http://michiganmessenger.com/44329/new-york-passes-hydrofracking-moratorium>>

WHAT'S IN THE MIXTURE?

Even though drilling companies would like to keep their "protected trade secret," several organizations have been able to determine some of the ingredients. They are:

A National Law Firm named Parker Waichman Alonso LLP, "Many of the chemicals used in shale gas drilling, such as **benzene**, are hazardous. Long-term exposure to such chemicals can have serious health consequences." They have a complaint against a drilling company that alleges that "**methane, ethane, barium** and other harmful substances entered into and contaminated" a drinking water supply. <<http://www.yourlawyer.com/articles/read/18211>>

Wolf Eagle Environmental, in August of 2010, sampled air in the Texas town of DISH and "confirmed the presence in high concentrations of **carcinogenic and neurotoxin compounds** in ambient air near and/or on residential properties." <http://www.yourlawyer.com/topics/overview/hydraulic_fracturing_fracking>

The Texas Railroad Commission, in June 2010, tested samples that showed **arsenic, barium, chromium, lead and selenium** in a residential water well in DISH. The tainted water turned up at a home in DISH shortly after a nearby gas well was drilled. <http://www.yourlawyer.com/topics/overview/hydraulic_fracturing_fracking>

Theo Colborn, PhD, the director of the Endocrine Disruption Exchange in Paonia, Colorado, recently "identified 65 chemicals that are probable components of the injection fluids

used by shale gas drillers. These chemicals included **benzene, glycol-ethers, toluene, 2-(2-methoxyethoxy) ethanol, and nonylphenols**. All of these chemicals have been linked to health disorders when human exposure is too high.” Dr. Colburn and his fellow researchers have been able to put together a database that lists 944 products that are now being used in states where natural gas activity is taking place. <http://www.yourlawyer.com/topics/overview/hydraulic_fracturing_fracking?gclid=CLSf1JOOwKUCFcTb4Aodr0MLXw> OR <<http://7bends.com/2010/05/26/world-renowned-scientist-illuminates-health-effects-of-water-contamination-from-fracking>>

Theo Colborn, Carol Kwiatkowski, Kim Schultz and Mary Bachran found that fracking not only pollutes the ground water system wherever the process is undertaken, but also pollutes the air. The chemicals used in fracking range from **methanol to Tetramethylammonium chloride, with over a thousand other chemicals** used in natural gas operations across the United States.” <<http://www.digitaljournal.com/article/297727>>

There are residences near gas wells where an abundance of natural gas is mixed with drinking well water. The gas is so abundant that it is possible to burn the water from a household drinking faucet. This phenomenon can be viewed in the “Gasland” documentary at: <http://www.huffingtonpost.com/2010/06/21/gasland-documentary-shows_n_619840.html> or <http://1trickpony.cachefly.net/gas/pdf/Affirming_Gasland_Sept_2010.pdf>

The Natural Resources Defense Council (NRDC) suspects: friction reducers, biocides, surfactants, and scale inhibitors. <<http://www.nrdc.org/land/files/marcellus.pdf>>

The EPA: Found **methane gas, hydrocarbons, lead and copper** in well water near Pavillion, Wyoming, which the EPA suspects came from chemical fracking. In an earlier study in 2004, the EPA found “compounds called **adamantanes**, a natural hydrocarbon found in gas that can be used to fingerprint its origin, and **2-BE**, listed as a common fracturing fluid” in their research report on hydraulic fracturing. That compound was identified with 97 percent certainty. 2-BE was suspected by environmental groups in a drilling-related contamination case in Colorado.

Many more examples could be cited, but the above statements indicate that the drilling companies should not be allowed to continue haphazardly fracking shale deposits for natural gas. Once a fresh water aquifer is contaminated with toxic materials, it could be contaminated forever.

A CONFESSION?

Two of the world's largest oil-field services companies have acknowledged to the Energy and Commerce Committee headed by Democrat Henry Waxman of California that they used diesel in hydraulic fracturing after telling federal regulators they would stop injecting the fuel near underground water supplies.

“Halliburton and BJ Services acknowledged in January 2008 that they had used diesel in the controversial process that has expanded access to vast natural gas plays.” <<http://www.nytimes.com/gwire/2010/02/19/19greenwire-two-oil-field-companies-acknowledge-fracking-w-90863.html>>

WHAT DOES WIPL RECOMMEND?

In Dimock, Pennsylvania, where more than 60 natural gas wells have been drilled, drinking water has been contaminated and radioactive water sits in holding ponds on farmers' land.

Learning from Dimock's experience, New York has a bill pending in the statehouse that would place a moratorium on natural gas drilling in New York until May 15, 2011. <<http://www.onearth.org/community-blog/lessons-from-dimock-pa-calling-for-a-moratorium-on-natural-gas-drilling-in-new-york>>

Cheap natural gas? At what price? What price will we pay for potable water if our aquifers are contaminated from fracking fluids? Where will we obtain our potable water in the future? Where will we get water for purposes other than drinking?

Before we consider burning any fossil fuel, we should use all other alternatives (See our website Position Papers: FOSSIL FUELS - Too Valuable to Burn).

If there is a need to drill for this valuable natural resource, can we be certain that shale gas fracking will not contaminate our fresh water aquifers? If that can be ascertained, then perhaps we could progress with releasing this trapped shale gas. Until we know with more certainty that there will not be any environmental damage, WIPL would prefer a moratorium on this technology.

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