Fall 2009

O.U.E. Update

A Publication of Organizations United for the Environment

A SPECIAL ISSUE ON GAS DRILLING IN THE MARCELLUS SHALE DEPOSITS

It is increasingly evident that there can be serious environmental consequences when drilling for gas, an activity ongoing now in the Marcellus Shale deposits in our region. The most prominent and energetic group currently working in our area to protect us from these consequences is the Responsible Drilling Alliance (RDA) located in Williamsport**.** RDA is an all-volunteer citizen's organization dedicated to understanding the implications of gas exploration and advocating for a sustainable relationship with it. After meeting with its Steering Committee, the OUE Board decided to give RDA access to the pages of our newsletter to provide our readers an overview of the problems posed by drilling for gas in the Marcellus. We also decided to distribute our fall/winter issue about a month early because of the urgency of RDA's message. The article below was written by Jon Bogle, one of RDA's co-founders, and a member of its Board of Directors. Other Board members are Deborah Caulkins, Robbie Cross, Dr. Thomas Fiero, Ralph Kisberg, Barry O'Connell, Janey Richardson, and Mark Szybist.

Shaleshock

Environmentally, natural gas as fuel has long been touted as the "best fossil fuel," superior to oil and coal. After all, gas burns clean without soot and produces less CO2, carbon monoxide, and fewer sulfur compounds. However, there are two ends to the gas stream. Although the user's end is clean, the production process is extremely destructive to the environment. The entire state of Pennsylvania, including our region, is fast becoming host to this intense, industrialized production stage.

The gas industry, like all large economic interests, has the transactional ethics of a ten- year old. They want what they want. They will whine, bully, and manipulate to get it. If they make a mess, they will not admit to it or clean it up. *Unlike* the average ten-year old, the gas industry possesses vast financial resources. The gas industry spent a million dollars on lobbying expenses in the first six months of this year.[1] The just concluded state budget process shows the industry's power. The severance tax on gas extraction did not pass, but selling drilling rights in the state forest did. Most troubling is that DEP, the agency that serves as the primary source of regulation for the gas industry, had its budget cut by 27%. This was the largest single cut of any state agency, and it is bound to bring significant layoffs just at a time when we need more rather than fewer DEP staff to oversee burgeoning gas industry activities.

There are three major areas of concern with gas well drilling, and we will deal with the first two here:

Pollution of rivers, streams and aquifers by inadequately regulated discharges; spills and leaks from impoundment ponds; chemical spills at drilling sites; and millions of gallons of toxic water left behind deep in the well itself.

Major amounts of air pollutants from venting of storage containers, flaring of wells, leaking equipment, and diesel powered compressors, pumps, and vehicles.

Industrialization of our landscape with the loss of property values, tourist and recreation business, agriculture, and our quality of life. (Barb Jarmoska addresses this kind of assault in the next article.)

Other parts of the country have already experienced these negative outcomes when the standard drilling technology, known as hydrofracturing, or simply "fracking" – described below —has been used. The gas industry has been intensively drilling in the West where they have had access to federal lands and Indian reservations. Proper stewardship and regulation could eliminate the potential for much more damage, yet gas-drilling companies have gained immunity from nearly all federal environmental regulations. Regulatory responsibility has thus shifted to state governments.

Water Issues

Heavy industry lobbying is the principle reason for the removal of drilling and fracking from federal Clean Drinking Water regulation in 2005. Halliburton is a major supplier of fracking chemicals and equipment to the gas drilling industry, and EPA's action has been termed the "Halliburton exemption."

Many of us have, for decades, participated in efforts to recapture a measure of the natural vitality of streams degraded by acid mine drainage during the exploration of coal. It is essential that we again focus on these water issues. Our concerns about water are exacerbated by the secrecy ("trade secrets") of the gas industry about the chemicals they inject into the wells during the fracking process and the resulting wastewater that returns to the surface.

How does fracking occur? For each well, the drillers take three to five million gallons of water out of our rivers, streams, and aquifers and mix that with a cocktail of chemicals, (some benign, some poisonous, many unknown). They inject this mix into the well bore at 6000 to 9000

pounds per square inch. The pressure fractures the dense shale and releases the gas.

The Marcellus Shale is a 400 million year old sea bottom deposit, and it is loaded with a variety of salts, metals, complex hydrocarbons, and low levels of radioactive radium. The frack water, drilling tailings, and drilling mud return to the surface and are stored in settlement ponds. About 40% to 50% percent of the frack water comes back immediately; the rest perks out over time. The longer the water remains in the shale, the more chemicals and salts it absorbs. The water takes on heavy metals, complex hydrocarbons, and a salt concentration many times that of the ocean.

In 2008, after huddling with the gas industry – and without any environmental organizations being represented — the PA Department of Environmental published an " interim strategy" for dealing with this wastewater. This strategy required private companies who applied for discharge to remove the turbidity (tailing and drilling mud), the heavy metals, any oils, and less certain, some of the fracking and dissolved chemicals. All the salts, however, would be discharged into the river.

Currently there are ten permit applications before DEP in our region regarding treatment of gas industry waste water. The application farthest along is the TerrAqua Resource Management proposal at Water Tower Square in Williamsport. On October 31st, the DEP tentatively approved a permit, subject to 60 days of public comment, that allows TerrAqua to process frack fluids but *not* to discharge them into the river.

Pennsylvania rivers included in the Ohio River system that were already getting discharges of gas wastewater have exhibited problems. The Monongahela River has gone above its limits for total dissolved solids (TDS, predominately a mixture of salts), for drinking water three times in the last twelve months. DEP has stated, "Water quality analyses performed for the major watersheds of the Commonwealth to date show that many of the rivers and streams of Pennsylvania have a very limited ability to assimilate additional TDS, sulfates and chlorides."[2] The same document stated more specifically that analyses conducted by DEP on the West Branch of the Susquehanna River and the Moshannon River watersheds show they are severely limited in the capacity to assimilate new loads of TDS and sulfates.

More disconcerting is that levels of bromides, an element of gas wastewater, were high in the Monongahela. Bromides react with ozone and other disinfectants in water treatment plants to produce secondary chemicals harmful to health; one of the worst is bromate, a known carcinogen. Other bromide compounds affect reproductive health. Health warnings were issued for all customers of water systems that depend on the Monongahela.

A new set of proposed DEP regulations, which would be effective January 2011 would limit the outflow of effluents to the maximum potable intake standards. This would require the treatment plants to remove nearly all the salts. Salt isn't cheap or easy to get out of water: if it were, we would not have a burgeoning world water shortage.

Needless to say, the gas industry is deeply involved in crafting these proposed changes. It may be significant that DEP is planning a meeting on this issue to be held in State College, which is not the regional headquarters and is not on the river. If the meeting were held locally, the presence of our growing activist movement would be more evident.

Air Issues

Air pollution may actually be the greatest environmental and health risk to come from gas exploration. Besides the venting of methane, a global warming gas with twenty times the effect of CO2, the industry vents off massive amounts of Volatile Organic Compounds, (VOCs). These VOCs mix with nitrogen in the air in the presence of sunlight to form smog and ozone. Some of the VOCs are toxic and carcinogens in their own right.

The obvious analogy is to the emission controls on you car. Cars now emit a very small fraction of the VOCs they did just a generation ago. This was accomplished primarily by tubing that vacuumed the VOCs and fed them into the engine to be burned. The VOCs that the gas industry dumps into the atmosphere could be captured and either added to the gas stream, condensed out and sold, or contained. Some of this activity could actually turn a profit for the industry. However, their attention is focused elsewhere, and no one is making them do it.

Results at the Barnett Shale deposit in the Fort Worth area of Texas are a harbinger of what we could experience here. Drilling there has been going on for eight or nine years with a number of very adverse consequences for the environment and quality of life in the region. In January of this year, Al Armendariz, Ph.D., of the Department of Environmental and Civil Engineering at Southern Methodist University, produced a study on the air pollution caused by the gas industry in the Fort Worth region. At the time of his study there were 7700 wells in the region, a number we could reach here in north central PA in a very short time.

Dr. Armendariz concluded:

> During the summer, VOC emissions will increase, raising the NOx + VOC total to 307 tpd, (tons per day) greater than the combined emissions from the major airports and on-road motor vehicles in the Dallas-Fort Worth metropolitan area (6.3 million people). Emissions in 2009 of air toxic compounds from Barnett Shale activities will be approximately 6 tpd on an annual average, with peak summer emissions of 17 tpd.
>
> Emissions of greenhouse gases like carbon dioxide and methane will be approximately 33,000 CO2 equivalent tons per day. This is roughly comparable to the greenhouse gas emissions expected from two 750 MW coal-fired power plants.[3]

Dr. Armendariz also offers these additional cost-effective solutions:

- The use of "green completions" to capture methane and VOC compounds during well completions.
- Phasing in of electric motors as an alternative to internal-combustion engines to drive gas compressors.
- Control of VOC emissions from condensate tanks with vapor recovery units.
- Replacement of high-bleed pneumatic valves and fittings on the pipeline networks with no-bleed alternatives.

One thing we can add to Dr. Armendariz's is sealing the tops of wastewater impoundments to keep vapors in and wildlife out.

Not surprisingly, the gas industry hated the study by Dr. Armendariz and attacked its statistics. Interestingly, the Texas Department of Environmental Quality essentially confirmed the Armendariz report with its own study. However, the Texas DEQ failed to step in, claiming the prevailing winds wouldn't take the toxic air into the metro-

politan area and trip federal air regulations. Besides, it would be "unfair to target this one industry." The gas and oil industry owns Texas.

Dish, Texas, a Sacrifice Zone

Dish, Texas, a small town in the rural region of the Barnett Shale, has had the extreme bad luck to be crossed with 11 compressor stations, 19 natural gas pipelines and 3 metering stations in two square miles.[4] The cumulative effect is why the mayor, Calvin Tillman, calls his town "a sacrifice zone for gas drilling." The citizens of Dish are trapped because their houses have lost value and they are afraid of their water and air. Mayor Tillman has been very vocal in his opinion that the value of the gas extracted is less than the damage to the economy.

Despite assurances by the gas industry and the state officials that tests showed no problem with air quality, the town council had an independent study done. Dish is a flat, windy place, one where you would not expect air pollution problems. Yet, the study revealed high concentrations of toxic air emissions, including neurotoxins and carcinogens on or near residential properties. It indicated that many of the compounds in the air exceeded by as much as ten times the short-term exposure criteria screening levels established by the Texas Commission of Environmental Quality regulations, and also exceeded such long-term effects.

The Texas Oil & Gas Accountability Project is a new non-profit group in the Dallas-Ft. Worth region, and the mayor of Dish, Texas is on its steering committee. TGAP, as it is called, has launched a Health Assessment in which it is gathering information from citizens in the area about health symptoms and impacts. (TGAP's web site is a particularly good source of information about all the pollution threats posed by gas well drilling.)

The Earthjustice Law Suit Filed Against EPA

Earthjustice is a non-profit public interest law firm, which has been involved in a number of these kinds of issues, including studying the TerrAqua permit application in Williamsport. On January 15, 2000, Earthjustice issued the following press release related to the threat of oil and gas drilling, one that provides an emphatic summary to pollution problems that arise from such activity.

> Denver, CO — Conservation groups have filed suit against the U.S. Environmental Protection Agency over its failure to protect communities and the climate from air pollution emitted nationwide by oil and gas drilling.
>
> Under the Clean Air Act, the EPA is required to review and update clean air regulations every eight years. EPA has failed to update two sets of clean air regulations it originally issued in 1985 and 1999, and has failed altogether to issue a required third set of regulations. The result is a number of oil and gas operations and pollutants spewed by those operations are not limited in any way. Even oil and gas operations covered by the outdated regulations are not required to use the latest technologies to safeguard public health and the climate." [5]

Chemicals emitted during drilling, processing and transport

For another way to describe the environmental threat of oil and gas drilling, we will end this article with a listing and description of the toxic chemicals that such operations routinely thrust into the environment.

BTEX compounds. BTEX stands for benzene, toluene, ethylbenzene, and xylene, a group of compounds that also belong to the broader category of volatile organic compounds, VOCs. Benzene is a known carcinogen and has also been shown to cause blood disorders and to impact the central nervous and reproductive systems. Toluene may affect the reproductive and central nervous systems.

Carbon monoxide (CO). Carbon monoxide is emitted during flaring and from the operation of machinery at oil and gas development sites. It inhibits the blood's ability to carry oxygen, and can cause dizziness, unconsciousness, and death.

Hydrogen sulfide (H2S). Hydrogen sulfide occurs naturally in some oil and gas formations. When oil or gas is extracted from these formations, H2S may be released when gas is vented, when there is incomplete combustion of flared gas, or via fugitive emissions from equipment. Hydrogen sulfide is a toxic gas that has a characteristic rotten egg odor at low concentrations. It is lethal if inhaled at high concentrations.

Natural Gas. Natural gas is released during venting operations, or when there are leaks in equipment used during oil and gas development. In addition to methane, natural gas typically contains other hydrocarbons such as ethane, propane, butane, and pentanes. Raw natural gas may also contain hazardous air pollutants such as benzene, toluene, ethylbenzene, xylenes and hexanes, hydrogen sulfide (H2S), and carbon dioxide.

Nitrogen Oxides (NOx). NOx are formed during the combustion of fossil fuels, which causes a chemical reaction between nitrogen (which occurs naturally in the atmosphere) and oxygen. Nitrogen dioxide, one of the NOx chemicals, is a criteria pollutant regulated by the EPA, and can be seen, along with other particles in polluted air, as a reddish-brown haze.

Ozone. Ozone itself is not released during oil and gas development. But some of the main compounds that combine to form ozone are released from oil and gas operations. Ozone, when found at ground level, is also referred to as "smog," When inhaled, this can cause or aggravate respiratory ailments such as asthma.

Sulfur dioxide (SO2). Sulfur dioxide is formed when fossil fuels containing sulfur are burned. SO2 is regulated by the EPA as a criteria air pollutant, and along with NOx, is a principal contributor to acid rain. Sulfur dioxide reacts with other chemicals to form particulate pollution, which can damage lungs and cause respiratory illness, heart conditions, and premature death.

Volatile organic compounds (VOCs). VOCs are carbon-containing substances that readily evaporate into the air. They can combine with nitrogen oxides to form ground-level ozone, which can cause respiratory ailments such as asthma, and decreased lung function. Examples of VOCs are benzene and toluene.◆

[1] The Center for Responsive Politics; www.opensecrets.org.

[2] "Notice of Proposed Rulemaking," Department of Environmental Protection, Environmental Quality Board. (25 Pa. Code Chapter 95) *Wastewater Treatment Requirements; Preamble*.

[3] "Emissions from Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements;" report by: Al Armendariz, Ph.D.; January 26, 2009 http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf.

[4] A letter from Calvin Tillman, Mayor of DISH, TX; March 12, 2009; http://txsharon.blogspot.com.

[5] "Groups Sue EPA For Not Protecting Citizens From Oil," *Gas Drilling*; January 15, 2009; www.earthjustice.org.

Visit www.responsibledrillingalliance.org and become a member of RDA. You can also request to be added to our informational email list by contacting us at: responsibledrillingalliance@comcast.net. Also, please consider sending a contribution to help fund our activities. Responsible Drilling Alliance, PO Box 502, Williamsport PA 17703.

Brian Laverty

As we went to press with this issue, we were told of the passing of Brian Laverty, an old friend and a dedicated environmentalist. Brian was an OUE Board member who played a crucial role in the Burner Battle in the early 1990s. Among other such efforts, he was an active member of the Pennsylvania Environmental network and was the first Green Party Member to be voted into public office in Pennsylvania, as a Blossburg Borough Councilman. In all this work, Brian was friendly, dependable, energetic, and tenacious, We will miss Brian, and our condolences go out to his family.

The Painful Job of Knowing

We asked Barb Jarmoska, a member of the Board of Directors of Responsible Drilling Alliance, to send us the following article when we discovered the threat now posed to her and her family by gas exploration in the Marcellus shale deposits

There is a threat at my doorstep that causes me to fluctuate between cowering in fear, basking in denial and screaming in outrage. I don't know how to do battle with so great an enemy. What great irony, as for 30 years, I have been a messenger of good health and well-being.

These days, when I'm not strategizing to confront this threat, I am spending many hours planning how I might gather my family, pull up stakes and find a new home state. We are no longer safe here. The DEP has given a permit for a gas exploration to Pennsylvania General Electric Company, LLC to build two well pads and drill multiple wells at the top of the mountain where I live. If any of you have ever driven up Wallis Run Road off Rt. 87 N. and hiked to Jacoby Falls – it's the same mountain.

The only access road to this remote, beautiful and wildlife-rich area is Butternut Grove, a narrow, "no outlet" road that goes past my driveway and dead ends at the top of the mountain. Many days, not a single car drives by during my 2-mile walk along this road. The dog trots off-leash beside me, and neighbors who do drive by slow down and wave. The Loyalsock Creek is just over the bank, a stone's throw from the road. My daily walk, as well as other simple acts of country, creek side life (such as helping children catch and release crayfish and tadpoles, feeding deer and wild turkeys, and watching great blue herons, ducks and an occasional bald eagle) are poised to end.

The lives of all Butternut Grove residents will be forever changed at the hands of the corporation claiming the right to send its trucks up the road, to foul the air with diesel fumes, to generate noise, to disturb the ecosystem on the mountain, to haul truckloads of toxic fracking chemicals up and millions of gallons of toxic water back down. This same company also wants to pump over one million gallons per day from the Loyalsock, a beautiful creek that begins in Sullivan County and travels 64 miles on its way to the West Branch of the Susquehanna, providing recreation for hundreds of fishermen, kayakers, inner-tubers, swimmers and summer-cabin dwellers, offering water that dances and glimmers and supports abundant fish, amphibian, bird and wildlife - water that PGEC plans to mix with cancer-causing chemicals and force at great pressure into the Marcellus shale.

My grandfather bought these 20 acres with their mile-long creek frontage in 1933. The memories my family has made here are priceless and my grandchildren are the 5th generation to run in the meadow, swim in the creek and hike in the nearby woods. In our increasingly transient society, roots this deep are precious and rare. And yet, in order to protect our health and welfare, my children and I are talking seriously of abandoning our heritage and leaving the area. We are devastated to find ourselves having to entertain such a decision.

Though you may not currently see evidence of the gas well drilling industry in your own front yard, you will be impacted. There is no escape. Our air and our water, our land and our way of life are under siege. If you are unaware of what is happening, ignorance is not a bliss that will last. As a reader of OUE's newsletter, you know that. If you have never seen a gas well pad, view the homepage photo at www.un-naturalgas.org

You now understand why I accepted the invitation of Jon Bogle, author of the previous article, to join the Responsible Drilling Alliance, and why we are seeking members with the widest possible concerns, interests and ideologies. We welcome parents and grandparents, hunters, fishermen, farmers, hikers, teachers, truckers, those who have leased their land to a gas company, and those who refused. We invite each and every one of you to join us. Please visit www.responsibledrillingalliance.org and become a member of RDA.

John Kenneth Galbraith said, "The conventional view serves to protect us from the painful job of thinking." The conventional view on the gas industry is that it will boost PA's sagging economy and be closely regulated by the Department of Environmental Protection. The conventional view is a lie.

Please help us stem the toxic tsunami now rising at our collective doorstep. ◆

Barb Jarmoska is the founder and owner of Freshlife in Williamsport. She also provides wellness coaching services and sponsors events at Possibilities, her retreat on the Loyalsock Creek north of Montoursville. www.possibilitesretreat.org.

OUE MEETING PLACE

We meet at the second floor meeting room of the Mondragón Bookstore in Lewisburg, at 111 Market Street. The public is welcome to attend these meetings, which occur at 7:00 PM the first Monday of every month.

OUE Publications Committee: Editor, Charles Sackrey; Associate Editors, Linda Godfrey, Sally Lauver, Thom Lauver and Clyde Peeling; Distribution, Bessie Bush and Linda Godfrey.

Organizations United for the Environment
P.O. Box 193, Allenwood, PA 17810 Phone and Fax (570) 523-0010

OUE is a grass-roots organization dedicated to protecting the environment. As a non-profit, charitable organization, OUE is crucially dependent on our readers' donations to continue its work, and you can help us along with a tax-deductible contribution. Donations are used to fund efforts such as the *Ban the Burner* campaign in the early 1990s, activities of *The Task Force on Hog Factories*, alternative energy projects that will be built at local schools, and for public education. Our web site is: www.ouenews.org. Please send your comments to: editor@ouenews.org.