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August 4, 2010

Environmental Quality Board
P.O. Box 8477
Harrisburg, PA 17105-8477

Dear Environmental Quality Board Members:

We would like to express our comments, objections, and suggestions regarding the proposed regulatory changes on oil and natural gas well safety in Pennsylvania.

We have enclosed some literature, including 3 CDs and 1 DVD for your review.

Personally, my family and I are 100% opposed to any oil and gas well drilling in Pennsylvania and would like the PA D.E.P. to issue a statewide moratorium on these oil and gas operations, before any more irreversible environmental contamination occurs.

We would like to see studies and a full environmental review of the cumulative effects of the

industrialization and on all aspects of oil and gas drilling in Pennsylvania, before any more PA D.E.P. drilling permits are granted.

Also, more stringent requirements need to be developed especially, regarding how to treat and properly disposed of (if possible,) the billions of gallons of toxic, salty, radioactive, carcinogenic wastewater that will be produced from these oil and gas wells. This treatment, at present, is woefully inadequate. For example, glycol ethers, present in wastewater, have no way of being filtered out!

Also, the toxic, carcinogenic, endocrine-disrupting effects of the fracking fluids, all of the other chemicals involved, as well as all of the volatile, organic gases produced from Underground need to be thoroughly assessed and evaluated properly.

The subsurface migration of the (roughly 70%) non-recovered toxic, radioactive, salty, cancer-causing, wastewater that is left underground needs to be studied as well, before any more permits are granted. When the layers of strata are destroyed and fractured, there no way to tell where the waste will go.

Gas Drilling is also a national issue. If the people do not get control of the water and lose control to this behemoth machinery, our species will be approaching its terminal phase. We already have enough people dying from cancer, and other diseases; much of this caused by environmental toxicity. (Please see the enclosed handouts).

After gas well drilling has occurred, and is contaminated the property is virtually worthless. In many areas, people are selling their land to the gas companies before any drilling commences.

In many of these cases, it will cost hundreds of billions of dollars to clean up the debris. In other cases, clean-up will be impossible.

In New York State, The New York State DEC itself has been less the truthful. It has "covered-up" spills and said that there were "no problems." Yet out of thirteen (13) wells tested for radioactivity, eleven (11) of the thirteen (13) wells tested "highly radioactive."

There is no way to mitigate this radioactivity and we know that this radioactivity is greatly enhanced by the pressured water at twenty-one thousand (21,000) p.s.i. and all the other products that are put in, most of them highly toxic. Together, they congeal and make the radioactivity much more intense and potent than it would normally be.

In Hickory, Pennsylvania, about four hundred (400) families, over one thousand (1000) people, are living on delivered water and they have been forced to sign a non-disclosure statement while their cattle are dying and the ones that are born, are being born blind or with cleft palates. We don't need to have that happen to us or our children here. Personally, we are drinking our own tap water from our own well. It tastes great! We do not use bottled water; also how do we know that the bottled water is safe and from a good clean source? We have had our water tested already and it has no problems. We want to keep it that way, too!

There is much dishonesty among the gas companies. Andrew Cuomo fined Fortuna Gas Corporation one hundred ninety-two thousand dollars ($192,000.00) because it told landowners that they could extend the gas leases without a landowner's permission.

As an addition to the two permits, gas companies should be held fully liable for any land, or property damage, water contamination, and any damages caused by air pollution from volatile organic chemicals caused via gas flaring, breather pipes, toxic flow-back ponds (evaporation) or from fumes caused by the drilling, production, storage, compressor stations, or by the transportation itself of the product.

Radioactivity in the brine in the flow-back liquid is present because of the clay minerals that compose the Marcellus Shale. There are uranium and radium, which produces radon gas, and other radioactive elements. The wastewater, the sludge, and the drilling tools get concentrated radioactivity. There is no way to dispose of the radioactivity.

There has been at least two hundred seventy (270) hazardous events in New York State. In its analysis, New York State DEC analyzed thirteen (13) samples at various natural gas well drilling sites and found Radium 226, a derivative of uranium at thousands (1000's) of times the safe limit for drinking water and almost three hundred (300) times the limit which is safe for discharge into the environment.

Also, gas well drilling employees should be monitored for radiation.

Radioactive waste is common in the brine discharge wastewater in which the shale has been soaking for centuries. In oil and gas drilling, radium is the most dangerous, because it

gives off toxic radon gas, and because it takes one thousand six hundred (1600) years to decay. Tests so far show that New York State and Pennsylvania measures far higher in radioactive materials than many other places and consequently the environmental review said that special processing and licensing may be required; and that more study is required before proceeding to answer these questions concerning radioactivity; more study is required and much needed. The DRBC, Pennsylvania's DEP and the New York State's DEC should analyze further how much radiation to which people may be exposed.

Wastewater presents a hazard to workers. All are exposed to it. In New York State, it is especially an acute problem because there are no disposal wells here. None are licensed to receive radioactive waste or Marcellus Shale wastewater of any kind. Indeed, most drilling wastewater is treated by industrial or municipal water treatment plants or discharged back into the public waterways. Our present wastewater plants are already challenged enough right now without having to deal with radioactive brine.

The DRBC, Pennsylvania's DEP and the New York State's DEC, if it does not stop this natural gas well drilling process from occurring, will destroy the quality of life here. Our water supply will be contaminated and depleted. Where is all of this water going to come from? We do not want this water mixed with a toxic brew (fracturing fluid) of chemicals to contaminate our ground and surface water supply. Where the gas company get its water should be regulated, even if it means monitoring where the gas company buys or gets its water. Too much water will have to be removed from the Delaware River and elsewhere for thousands of wells to sustain this industrialization.

Once the water is contaminated, it's too late then. A fine is just a proverbial "drop in the bucket" for the gas company, all of which have big bucks. One spill or other accident will do irreparable and irreversible harm.

Those who do not learn from past (or at present) mistakes, as in Dimock, Pennsylvania, are condemned to repeat it.

These present laws do not go far enough to protect us because the mitigation measures that the PA DEP are proposing are inadequate. The measures proposed will not work because the whole industrialization process of the natural gas industry is intrinsically intoxicating. We would not allow Al-Qaeda to come into our region and dump chemicals into the ground, disperse radioactive elements and contaminate everything- the air, the water, and the soil. With the gas drilling, storage, production, and transportation process, the destructive holding ponds could overflow when it rains, or could leak if the plastic liners are torn, and flow into the ground or surface water.

The evaporation of the volatile organic gases will pollute the air and cause health problems.

The DRBC, the Pennsylvania DEP and the New York State's DEC should take more time to study the total cumulative impacts of gas drilling. The peace and quiet of the area will be gone. So many people have worked hard to take care of the beautiful environment, our water resources, our farmland, our animals, trees, and plants, and nature itself, in general. It is outrageous that the New York State's DEC, the Pennsylvania DEP and the DRBC would allow an industry which is so polluting, with its hydraulic fracturing operations, especially, to come into The National Park Area along The Delaware River, The Catskill Park, The Catskill Forest, or anywhere else in NY State or Pennsylvania.

Please allow a cumulative environmental impact study to be implemented before the issuance of any more natural gas well permits before any irreversible damage caused by the natural gas well drilling occurs.

Where gas drilling has already commenced in Dimock, Pennsylvania, problems with water contamination have already occurred. The Pennsylvania Department of Environmental Protection has said that Houston-based Cabot Oil and Gas Corporation has polluted more than a dozen water wells while drilling for gas in Susquehanna County. One encased water well near Dimock, Pennsylvania, on the Fiorentino property, exploded last January due to a build-up of methane gas in the well; causing problems with several nearby wells. It is fortunate that no one was killed because of this!

Most of the chemicals used in these drilling operations are extremely dangerous and toxic to humans, wildlife, and the environment. Methanol is one example. Methanol, which gas operators use as an antifreeze in pipes, is considered hazardous by national and international fire, health and safety agencies. It is fatal to humans who swallow as little as 4 ounces; 2 teaspoons can cause blindness. Also, state and federal storage regulations for hazardous chemicals do not bar companies from storing large quantities in open air without fences, even when small children live next door.

Another example of a toxic chemical that is used in a gas well drilling operation is 2-butoxyl-ethanol or 2-B.E. It is tasteless, odorless, and colorless and is very water soluble. In Colorado, this chemical was found in water wells near gas drilling operations. People there were experiencing problems with blood in their urine. 2-B.E. causes the fat to dissolve out of the red blood cell, causing lysis, and death of the red blood cell. Another lady in this area developed a tumor on her adrenal gland, causing life-threatening high blood pressure problems. This research was conducted by Dr. Theo Colburn.

In Hickory, Pennsylvania, when a concrete casing cracked and the liner encompassing a holding pond full of brine and chemicals leaked, it spread into the streams and ponds; killing fish and all other aquatic forms of life. Mr. Ron Gulla, who leased his property to a gas company, now has no more fish living in his pond or streams! Even the cattails surrounding his pond were killed by the toxic spill!

Although we are 100% opposed to any oil and natural gas well operations in Pennsylvania, we would also like to share some information presented by Mayor Calvin Tillman of Dish, Texas, which is in the heart of gas well operations in the Barnett Shale. These measures, called "Green Completions," would help to minimize the environmental contamination of the air, water, and soil.

He has been recognized for his environmental stewardship by being awarded the Texas Star award.

The issue of permitting gas drilling using the current materials and technologies associated with "fracking" is such a determinative issue for us that it will determine the character of economic development and quality of life of the region for decades to come. It is truly a transformative issue. Mayor Tillman bases his experiences upon what happened to the environment in his town and is now certain that the disadvantages of gas drilling far outweigh the advantages. He does not want Pennsylvania to be plagued by the same mistakes.

With a gas well, after drilling and "fracking" the well starts producing. There is some condensate (liquid) that goes into a tank at the well head, and the vapor goes into a gathering line. The gathering line feeds into a transmission line, and it goes to another unit where they treat the gas and remove all of the impurities of the gas; it does not come out of the ground as a clean, burning hydrocarbon, it has to go through a process to get to that point. It's done through a dehydration process, it gets odorized and gets ready to be shipped to market.

In Dish, Texas there are five (5) separate compressor stations and each of these sites were independently permitted. They were permitted by a "permit by rule," whereby they can emit a certain emissions threshold. They fill out an application, send it in, and when they get it back they do not take into account the other permits. So individually each of these sites are eligible for permit by rule, because they fall below a certain threshold but collectively, however, they are above the threshold in volatile, organic compounds like benzene, toluene, ethyl-benzene, methane, xylene and other carcinogens, mutagens, neurotoxins, and other endocrine disruptors. There is a major problem that happened in Dish, Texas and should not be repeated here in Pennsylvania. People were having severe health problems because of this. We should test for total aggregate amounts of chemicals in the air in a certain area. There were chemicals present and hundreds of times the effective screening levels for exposure. Children and pregnant women were even more susceptible. Also, animals and vegetation were dying as well.

In fact, childhood asthma is 3.5 times higher in the area of the Barnett Shale where natural gas drilling has occurred than in other areas of the country where there is no gas drilling.

Humans and other living organisms should have a right to live in a safe environment, free from public and private causes of harm.

Compressor stations can be noisy, like a lawnmower 24 hours a day, 7 days a week. (It's about 85 decibels). But Mayor Tillman recommends the gas companies to completely enclose or completely surround with sound walls all compressor stations for noise abatement. All compression units therefore can be made to sound no louder than an air conditioner. This will improve the quality of life around these sites, plus minimize any sleep disturbances.

Mayor Tillman also recommends limiting the number of pipelines which go through a town. Each gas company should collaborate with the other companies to minimize the scarring of the landscape and use one large pipeline for all of the companies working in a area to minimize the "trenching-out" effect of an area. With modern technology, it does not have to be this way with all these gas well pad sites and multiple pipelines!

Mayor Tillman also recommends no open pits for flo-back wastewater at the drilling site, but recommends that all gas drilling companies be mandated to use a close loop system in place where the wastewater is put back into the pipeline and/or put into enclosed steel tanks, when it is no longer usable.

Another recommendation by Mayor Tillman is to mandate "no gas flaring." The flaring of pipes to "dry" the "wet" gas does not need to be done, and that gas companies nor landowners, who've signed a gas lease, are not getting paid for this product when flaring occurs. They can out this gas back into the pipeline and sell it. According to him, it saves five (5) days of burning the gas and saves money. Obviously, it saves the environment by eliminating toxic volatile organic gases from getting into the air, like what is happening now on the Mississippi River in "cancer alley" in Louisiana.

Also recommended by Mayor Tillman are mandatory vapor recovery units. On a gas well pad site, there will be some tanks. On top of these tanks are vents. With an infrared camera, you can see emissions boiling out, but it is invisible to the naked eye. These emissions can be run through a vapor recovery unit, which will split it up again. It will put the liquid back into the tank and put the gas back into the pipeline. Again, there is more salable product. It may take about three (3) years to pay for itself, but the gas company should be mandated to have a vapor recovery unit to increase its profits and protect the environment from toxic emissions. (Incidentally, one of the gas wells drilled in Dish, Texas has a $200,000.00 fence around it. If a gas company can pay $200,000.00 for a fence, they should be mandated to have vapor recovery units.)

Another recommendation of the mayor are installing dehydrators. When a gas goes through a compressor station, there are dehydrators present on the well site. The dehydrators remove all of the impurities that are in the gas; the old glycol dehydrators are the cheapest and what the gas companies will want to use. The glycol dehydrator will take all of the impurities and dump them overboard into the environment. But what should be required instead, is a zero emissions dehydrator, which does a better job. With this, again, there is more salable product and a cleaner environment.

Still, another recommendation by Mayor Tillman are mandatory pneumatic valves. Whenever there are pipelines, there are junctions in the metal. With an infrared camera, at these junctions in the pipelines, one can see gases boiling out.
With pneumatic valves, you can cut out a lot of these volatile toxic emissions.

In summary, these following measures are called "Green Completions" and are highly

recommended by Mayor Tillman:

1. Permitting by total aggregate levels of volatile gas in an area, not just individual permitting by rule (no permitting by individual compressor units.)
2. Completely enclosed compressor units and/or compressor units covered with sound walls.
3. Collaborative use of a single pipeline by various companies to minimize landscape scarring.
4. No open pits permitted; only closed-loop systems allowed.
5. No gas flaring.
6. Mandatory vapor recovery units.
7. Compulsory zero emission dehydrators.
8. Mandatory pneumatic valves.

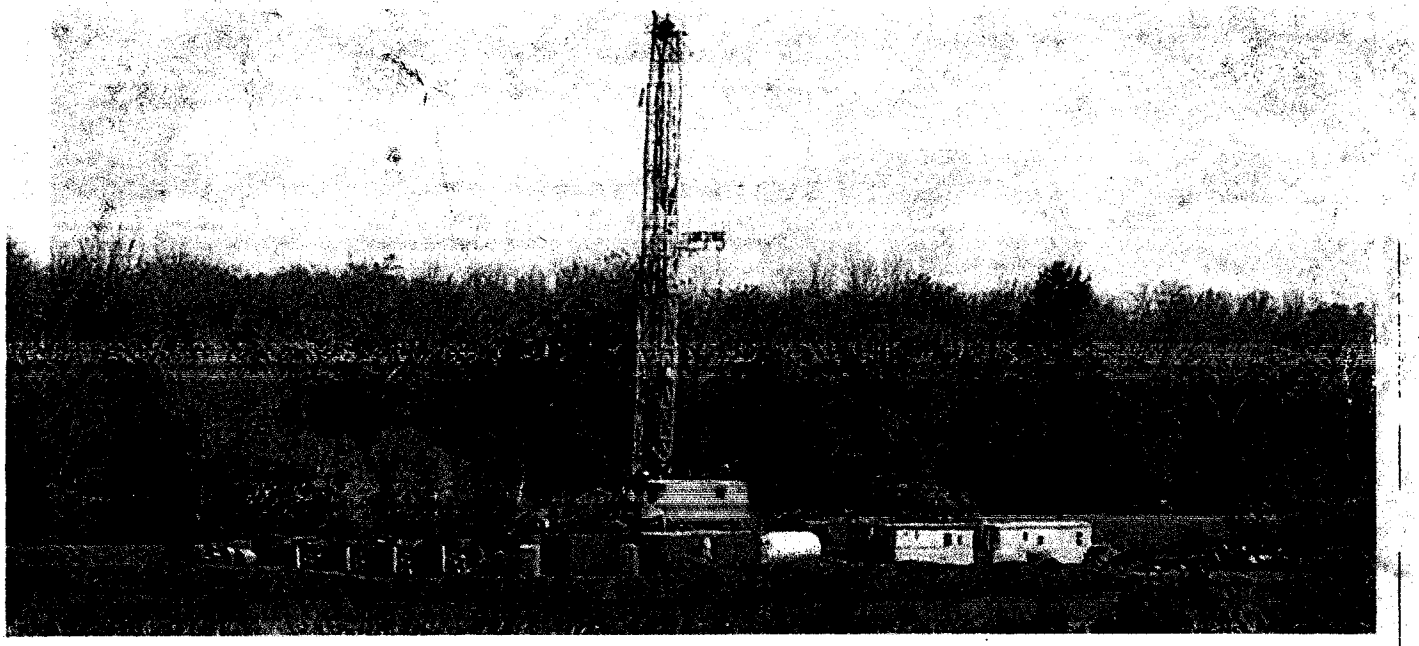
Some other common sense measures recommended by Mayor Tillman are keeping gas wells and gas pipelines away from homes, schools and populated areas.

Still, though, we hope that the PA DEP members will stop and really think for a moment on what could be allowed to happen here in the State of Pennsylvania with this whole gas well industrialization process as mentioned before in the letter, if it is allowed to proceed. We do not want anyone to have to move out of this beautiful area of Pennsylvania and New York, as others have had to do in other parts of the country, because of contamination and quality of life and health issues caused by gas well operations. Our way of life, which is so precious to us, will never be the same, but destroyed forever!

Once these gas well operations begin, one will not be able to use his/her land in the same way that one was using it before the gas well operations arrived. For example, (with soil, air, and water contamination, there will be no more gardening or farming, as for hunting, they'll be no more animals around to hunt. With fishing, the water will be contaminated and the fish dead. We could go on indefinitely with examples. Please do not allow this to happen here in this State of Pennsylvania and issue a one hundred percent (100%) total ban on natural gas well drilling within the entire State of Pennsylvania. Please follow the DRBC's mission statement for special protection waters in the Delaware River by "Keeping Clean Water Clean!"

Sincerely,
Dr. Thomas M. Yatsonsky
Dr. Thomas M. Yatsonsky

Diana L. Yatsonsky
Diana L. Yatsonsky



ONE DOWN. 25,000 TO GO.

You are looking at the first gas drilling site in the upper Delaware River Basin. If gas companies get their way, they plan over 25,000 more. Drilling rigs are stationed about every 25 acres, with 5 acres of land cleared for each rig. One rig takes 5 million gallons of water just to drill the initial well and 4.5 million gallons a year to operate. Taken from local ponds and rivers this would directly impact the Delaware River flow. The rigs stand 120 to 140 feet tall and run on 1,500 horsepower diesel engines 24 hours a day.

If that doesn't wake you up, consider this: Changes to EPA regulations in 2005 exempt gas companies from revealing over 250 toxic chemicals they use to fracture the shale to release the gas. Chemicals known to cause cancer, respiratory and neurological illnesses, organ damage and birth defects. Families around the country have had to leave their homes because of contaminated water and air from gas drilling in shale conditions exactly like those in our area.

What to do: Go to DamascusCitizens.org and sign our online petition that demands a moratorium on gas drilling in our area until there is an Environmental Impact Study. And find out how to contact your elected representatives.

Damascus Citizens for Sustainability, a non-profit organization. Send your donations to: PO Box 147, Milanville, PA 18443

www.DamascusCitizens.org

MEET YOUR NEW NEIGHBORS

Energy companies are about to change the upper Delaware River Basin forever. Changes to EPA regulations in 2005 have exempted gas drillers from revealing over 250 toxic chemicals they use to fracture shale to release the gas. Chemicals known to cause cancer, respiratory and neurological illnesses, organ damage, as well as developmental problems in children and birth defects.

If they get their way they plan to drill over 25,000 gas wells, potentially contaminating an irreplaceable watershed that is the only source of unfiltered drinking water for 5% of the nation, including New York City and Philadelphia.

Countless Americans from around the country have had to move because of contaminated drinking water and air from drilling for gas in shale conditions exactly like those in our area. With little public discussion gas prospectors are quickly and quietly signing leases with landowners before the truth comes out.

What to do: Go to DamascusCitizens.org and sign our online petition that demands a moratorium on gas drilling in our area until there is an Environmental Impact Study. And find out how to contact your elected representatives.

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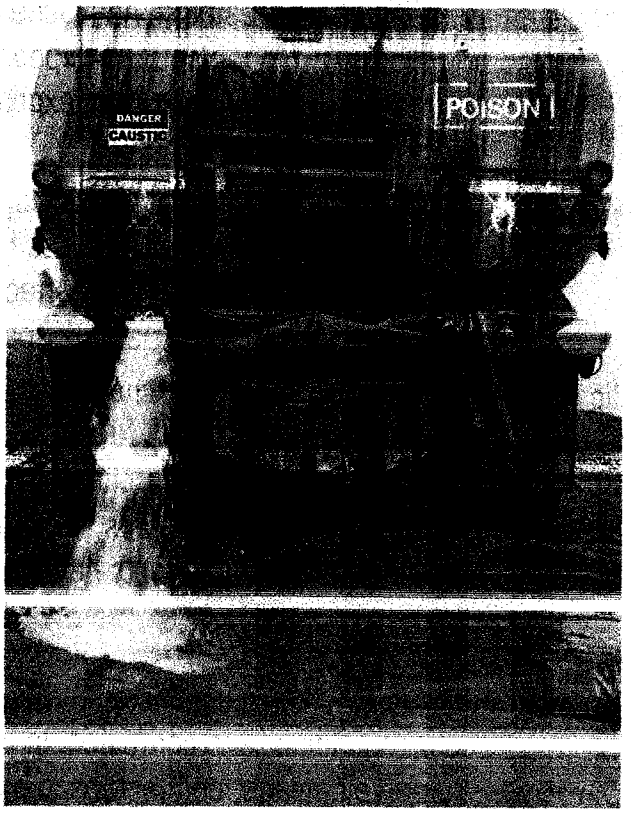
IF THERE EVER WAS A NEED FOR A MORATORIUM, THIS IS IT.

With very little public discussion energy companies are planning to drill over 25,000 gas wells in the upper Delaware River Basin, potentially contaminating the only source of unfiltered drinking water for over 5% of the nation, including New York City and Philadelphia. Over 15 million people.



Changes to EPA regulations in 2005 exempt energy companies from revealing over 250 toxic chemicals they use to fracture shale while drilling for gas. Chemicals that are known to cause cancer, respiratory illnesses, organ damage and birth defects.

Drilling gas wells in shale conditions like those in the upper Delaware River Basin produces a lot of toxic waste. If allowed, hundreds of trucks will be carrying millions of gallons of this waste over our roads, making hundreds of trips each week just to drill one gas well. Without proper oversight, they could potentially dump it anywhere, including local streams. Gas prospectors are quickly and quietly signing leases with landowners before the truth comes out.

What to do: Go to DamascusCitizens.org and sign our online petition that demands a moratorium on gas drilling in our area until there is an Environmental Impact Study. And find out how to contact your elected representatives.

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Toxic Chemicals Released During Oil and Gas Operations

Pollutant	Known Negative Health Effects
Arsenic	Chronic arsenic exposure can cause damage to blood vessels, a sensation of "pins and needles" in hands and feet, darkening and thickening of the skin, and skin redness. It is a known human carcinogen, and can cause cancer of the skin, lungs, bladder, liver, kidney, and prostate.
Hydrogen Sulfide	Hydrogen sulfide has been linked to irritation of the eyes, nose, and throat, difficulty in breathing, headaches, dizziness, nausea, and vomiting. Low-level exposure might also lead to poor attention span, poor memory, and impaired motor function. Short-term exposure at high concentrations can lead to loss of consciousness and death.
Mercury	Mercury can permanently damage the brain, kidneys, and developing fetus and may result in tremors, changes in vision or hearing, and memory problems. Even in low doses, mercury may affect an infant's development, delaying walking and talking, shortening attention span and causing learning disabilities.
Polycyclic Aromatic Hydrocarbons	Several of the polycyclic aromatic hydrocarbons (PAHs) that can be found in crude oil have caused tumors in laboratory animals and are considered possible or probable human carcinogens. Studies of people have found that individuals exposed for long periods to mixtures that contain PAHs can also develop cancer. In addition, animal tests have found reproductive problems and birth defects.
Volatile Organic Compounds (VOCs)	
Acetone	Acetone can cause nose, throat, lung, and eye irritation, headaches, light-headedness, and confusion. In animals it has been linked to kidney, liver, and nerve damage, and increased birth defects.
Benzene	Benzene is a known human carcinogen and causes leukemia.
Ethylbenzene	Ethylbenzene can cause dizziness, throat and eye irritation, respiratory problems, fatigue and headaches. It has been linked to tumors and birth defects in animals, as well as to damage in the nervous system, liver, and kidneys.
Toluene	Toluene can cause fatigue, confusion, weakness, memory loss, nausea, hearing loss, central nervous system damage, and may cause kidney damage. It is also known to cause birth defects and reproductive harm.*
Xylene	Xylene can cause headaches, dizziness, confusion, balance changes, irritation of the skin, eyes, nose, and throat, breathing difficulty, memory difficulties, stomach discomfort, and possibly changes in the liver and kidneys.
Radioactive Substances	
Radium	Radium is a known human carcinogen, causing bone, liver, and breast cancer.
Radon	Radon can cause an increased incidence of lung diseases such as emphysema, as well as lung cancer.

* State of California Environmental Protection Agency, "Chemicals known to the state to cause cancer or reproductive toxicity," (1 June 2007), available at: http://www.oehha.ca.gov/prop65/prop65_list/Newlist.html.

Monday, June 12, 2006

Oil and Gas Drilling May Be Killing You - Part I

So, you think that natural gas is a 'clean fuel'? Well, think again. In fact, it may be killing you right now.

As natural gas drilling explodes around the western United States, very few people seem to be asking: what are the potential public health issues associated with this new form of industrialization? **This is part one of a two-part series** on the health effects of natural gas drilling in the United States and what that means to the families who are increasingly in the path of this monstrous and unstudied enterprise. What will be the effects of natural gas drilling on our collective health? What will this mean for our health care system in the near future?

Will this industry result in a host of multi-generational diseases and health afflictions unparallel in American history?

Yes. An awesome and dangerous experiment is being enacted on the American people without a hint of discussion, forewarning or consideration. A toxic stew is being deliberately injected into our air, drinking water and blood streams without our knowledge or consent. We are all at risk.

In **Part I**, I will describe the different points of air, soil and water contamination that occur during drilling and production. Then I will discuss some of the toxins associated with this industry and the effects they have on the human body. This afternoon, in **Part II**, I will describe the actual, on the ground impacts many families are encountering at the hands of this largely unregulated industry.

> "Higher levels of ethane than we've seen in any city samples ever taken."
> - From a UC Irvine study of a CBM field in poor and rural northwestern NM
>
> "We were surprised"
> - New Mexico Environment Dept. Official upon review of the UC Irvine study

SURPRISED?!?!? Natural gas development is one of the most toxic industries we have in our nation today. Natural gas and its sister coalbed methane (CBM) are typically located in pockets deep underground. Obtaining these gases involved drilling into these rock formations and releasing the gas so that it can be pumped or allowed to flow to the surface. Both air and water pollution occurs at all stages of this development. Lets look at the stages of drilling one by one and analyze the pollution released at each stage.

1. Drilling: During the drilling process, "drilling mud" is circulated into the borehole to keep the drill bit cool and lubricated. This fluid also serves to bring the rock debris from the drilling to the surface. During completion of the drilling, these muds are typically removed.

Potential Contamination: Air pollution is released at all stages of development. These

pollutants typically included benzene, toluene, formaldehyde, methane, hydrogen sulfide, nitrogen oxides, hydrocarbons, sulfur dioxide and particulate matter. In most states, oil and gas operations are not required to obtain air quality permits nor have emission controls. Thus, the amount and type of pollutants from the nearly 100,000 wells across the country are not known. What is known is that these chemicals and toxins can cause asthma, cancer, severe and permanent neurological damage, pulmonary reduction, coronary problems, endocrine disruption and debilitating headaches.

Gas released by the drilling is flared into the air, setting the first stage of health effects associated with production. Exhaust fumes from drilling equipment also contaminate air. The "drilling muds" are typically stored in pits on site. These pits are generally unregulated. Often, they are dumped in bermed pools and then bulldozed over after completion. These muds contain chemical additives, salts, metals, hydrocarbons, radioactive materials and undisclosed proprietary chemicals – all of which can sterilize the soil and be lifted into the atmosphere. These contaminants often leach into the soil or spill out of the storage pits contaminating both underground and surface water.

2. Stimulation and Hydraulic Fracturing: to obtain the gas from the underground geology, it is often necessary to "fracture" the target formation. This involves pumping high-pressure fluids into the rock formation that holds the gas. The point here is to fracture the geology to allow the gas to flow out into the well casing. Generally, these fluids, which may include diesel fuel and other highly toxic chemicals, flow back into the well casing to be pumped to the surface while sand or recycled glass balls are pumped into the structure to keep the formation open.

Potential Contamination: exhaust fumes from heavy equipment, flaring from venting of unused gas, wastes stored in pits typically contains volatile chemicals that escape into the atmosphere. Surface spills of the fracturing fluid us not uncommon. Fracturing fluids may be inadvertently injected into or come in contact with fresh water aquifers. These fluids may include biocides, diesel fuel, acids, metals, ethylene glycol, corrosion inhibitors and dozens of other chemicals. Waste fluids stored above ground in pits may contaminate surface or groundwater if pits leak or overflow.

Hydraulic fracturing is one of the more dangerous aspects of natural gas production. Americans get over half their drinking water from underground sources, especially in the rural West where most of this drilling is occurring. In 2005, industry was granted an exemption from the Safe Drinking Water Act making this the only industry allowed to directly inject toxic fluids directly into your drinking water without oversight from the EPA. Few of the chemicals used in fracturing are required to be reported. Therefore, neither the government nor the public can evaluate the risks or the consequences of exposure to these chemicals.

3. Produced water: Particularly in regards to CBM drilling millions of gallons of water must be removed from the aquifer before methane will flow into the well casing (this complete depletion of groundwater, so vital in the arid West, is a serious matter to be dealt with in and of itself, but I will avoid this here to keep us focused). Over time as the aquifer is depleted the amount of water rising to the surface decrease. In conventional natural gas operations, however, water production often increases with

time as the oil and gas are depleted. Produced water is piped of trucked to disposal ponds or underground injection wells – or, tragically, discharged on land or into surface waters.

Potential Contamination: When stored in open pits, volatile hydrocarbons like benzene escape into the air. The depletion of shallow aquifers may result in the migration of methane and H2S (a known neuro-toxin) from the soil into the air. Exhaust is created from water pumps powered by diesel fuel. Salts, metals, hydrocarbons and other chemical additives in the produced water will contaminate the soil if spilled on the surface or placed in unlined or leaky storage pits. The same pollutants can also escape and contaminate waters through pipeline breakages, leaks or movement of produced waters once reinvested into the freshwater aquifer.

4. Separation and Dehydration: once the gas in brought to the surface, it generally has to be separated from heavier hydrocarbons such as water, oil and natural gas liquids.

Potential Contamination: dehydrators and separators vent huge amounts of methane and other volatile organic compounds. Again, pits and storage tanks often leak or overflow, contaminating the soil. Wastewater often contains dissolved hydrocarbons, sands, salts, metals and other toxins that can contaminate surface and groundwater.

5. Gas Compression: to get the gas to market, it is placed in a pipeline that has to be pressurized to force it to its endpoint. Diesel or natural gas fired engine typically power this compression. Compression can occur both at the well site or at a central compression facility.

Potential Contamination: engine exhaust, venting of unused gas, spills, leaks.

Human Health at Risk

For a closer look, lets take just five of the hundreds if not thousands of chemicals associated with natural gas development.

- **Hydrogen Sulfide**: H2S is typically associated with natural gas and CBM formations. This is the gas that smells like rotten eggs. H2S seriously aggravates existing respiratory conditions, causes central nervous system problems, spontaneous abortions, and cardiovascular system difficulties and, according to the research of Dr. Kaye Kilburn and others, can seriously and permanently damage neurological functions.

- **BTEX**: Benzene, toluene, ethyl benzene and xylenes: Benzene and its associated chemicals are known carcinogens. Toluene may affect the reproductive and central nervous systems with ethylbenze and xylene may have respiratory and neurological effects.

- **Heavy Metals**: e.g. arsenic, barium, cadmium, chromium, lead, mercury, etc.: these metals, which show up in the drilling muds, the vented gas fumes and the fracturing fluids, have a number of different health consequences such as skin problems, hair loss, kidney damage, high blood pressure, increased cancer, neurological damage and more.

- **Nitrogen Oxides**: NOx typically react with VOCs to form ground level ozone and smog with can trigger asthma and other respiratory problems. These can also react with other chemicals to for particulate pollution, which can damage lungs and cause respiratory illness, heart conditions and premature death. They are also known to react with common organic chemicals to form toxins that may cause biological mutations.

- **Sulfur Dioxide**: SO2, which typically comes from engine exhaust, reacts with other chemicals used in the drilling process to for particulate pollution with, as noted above, can damage lungs; cause respiratory illness, heart conditions and premature death.

'Not a big deal', you may say. 'Hey, these oil and gas wells are so small that they can't emit THAT much pollution. In fact, they emit such small amounts that they aren't even required to be permitted.'

Well (no pun intended), they do emit a lot. And then there is the fact that there are 10,000-20,000 of these wells in an oil or gas field. These are unregulated wells. In the Farmington, NM area for example (this is the San Juan Basin, one of the larger producing areas of natural gas in the nation), this comes to an estimated 40,000 tons of unregulated toxins pumped into the air every year. 64% of VOCs in Farmington and over 50% of NOx in Farmington comes from the gas fields that surround and penetrate the city. **This is an NOx equivalent of 3.5 MILLION CARS DRIVING 12,500 MILES A YEAR!**

Serious stuff folks. Farmington, NM has one of the fastest growing rates of childhood asthma in the nation. 84ppb (parts per billion) is the legal limit for ozone. 50-60ppb can cause serious health problems. In the summer of 2000, Farmington had 9 days where the ozone level was less than 50ppb. In 2001, it was 4 days. In 2002, 0 days.

> "Children living in communities with higher concentrations of acid vapor, ozone, NO2 and particulate matter have significantly reduced lung growth and development."
> - NM Dept. of Health, 2005

Duh. Ya think?

> "We have more students with asthma every year."
> - 4th Grade Teacher, Aztec, NM (near Farmington)

> "Those with the worst asthma started to suffer and "good" air quality levels as designated by the EPA."
> - Journal of the AMA, October, 2003

> "We don't believe in that."
> - Industry representative at a public hearing in Farmington, NM after a physican spoke about the health effects of even low-level ozone have detrimental effects on people.

HEY [redacted]! **This isn't faith-based science here.** Its not a question of belief. In fact, a 1ppb increase in ozone can add $20/year/person to a communities health cost.

The fact is…

Natural gas and CBM development have severe and detrimental effects on wildlife populations, local economies and social norms – as well as on human health. All this, for a relatively small amount of gas that has essentially no effect on our nation's energy supply.

What we see happening now is a massive and dangerous experiment on the health of the American people – largely without their knowledge and without regulatory oversight. A public health catastrophe is being hoisted on the American people. Some effects are instantaneous but others will not become apparent for a decade or more. By then, this industry will be long gone and the crippling and expensive health effects of oil and gas development will be left for the rest of us to deal with.

This afternoon, I will highlight some individual examples of the consequences of this public health experiment.

Sources:

- http://www.ogap.org/
- http://www.sanjuancitizens.org/
- http://www.s-o-solutions.org/
- http://www.wcel.org/
- http://www.vallevidal.org

Posted by environmentalist at 10:00:00. Filed under: environment

• Go ahead: say your piece

•

Comments

2 comments

[1]
GREAT PIECE – I can't wait for part two – I am so tired of oil/gas hacks talking about 'clean' natural gas. In my mind that's right up there with 'clean coal'; a complete oxymoron. Sadly, it's been sold to the American people pretty well – and only helps to perpetuate our dependence on dirty energy sources. Thanks for the piece.

Posted by dirt at Monday, June 12, 2006 11:10:33

[2]
Part II this afternoon...

There is no 'clean coal' as you point out. In fact, "clean and cheap" coal come at a very high price. As do all our energy needs.

12/12/2008 STATEMENT BEFORE NEW YORK CITY COUNCIL
DAMASCUS CITIZENS FOR SUSTAINABILITY

[www. DamascusCitizens.org]

We thank Councilman **James Gennaro** for his call to BAN gas drilling by "hydraulic-fracturing" within the New York City Watershed. This morning we will present details about the Pittsburgh metropolitan area's drinking water systems - and outline a series of events that must not be allowed to occur in the Watershed Region. Our Watershed is a treasured asset -- as it provides drinking water to over 25 million people -- including the 8-million citizens of New York City.

Water is our most precious commodity - but the nation's water supply is now threatened. An example of this is a recent contact we received from Pittsburgh residents to tell us that the **Pittsburgh Water Authority** had issued an emergency warning -- that due to gas drilling related practices - their drinking water supply is unsafe and residents should use bottled water until further notice.

TIME LINE

Earlier this spring Damascus Citizens for Sustainability began to communicate with grass-roots groups across America. We were told that drilling activity had begun in Hickory, PA -- and there were many citizens there who were describing the same problems being experienced by people in other states where "hydraulic-fracturing" was taking place. We sent a video team to Hickory, PA to collect first-hand testimonials -- these video testimonials have been seen by over 13,000 viewers online at [www.YouTube.com/GasDrillingTruth]. Three of these testimonials state clearly that the drilling wastewater was being taken from Hickory, PA to northern West Virginia.

At that time, shortly before leaving her position as Secretary of the Pennsylvania Department of Environmental Protection [PA-DEP], **Kathleen McGinty** issued an executive order prohibiting Pennsylvania sewage treatment facilities from accepting wastewater from sites where "hydraulic-fracturing" was being performed. As a result, most of the industry wastewater from Hickory and other locations within Pennsylvania, was transported to sewage treatment plants along the Monongahela River in West Virginia. This practice provided a steady income source -- and most facilities began taking up to 20% or more of their total processing capacity from drilling companies operating in Pennsylvania.

On October 31, 2008 ***The Pittsburgh Post-Gazette*** reported that "the state received reports of high levels of contaminants in a 70-mile stretch of the Monongahela River - which flows north from West Virginia towards Pennsylvania. Since 350,000 people get their drinking water from this part of the Monongahela, the PA-DEP called for the use of bottled water for customers of 11 public water suppliers in the Pittsburgh metropolitan area -- particularly those whose tap water smelled foul and tasted bad."

The cause of the alarm was TDS -- "total dissolved solids." In early October, the Army Corps of Engineers began a release of additional river water through dams to dilute the TDS levels. But we ask -- what was the cause of the sudden and dangerous rise in levels of "total dissolved solids"? Answer: the sewage treatment plants were unable to process the fracturing fluids without causing a rise in TDS because gas drilling wastewater contains toxic chemicals, biocides, and heavy metals that municipal treatment plants CAN NOT PROCESS out.

Now the ever-increasing flow of drilling wastewater is being trucked to points further south and west -- since the PA-DEP has now ordered all treatment facilities along the Monongahela River to no longer accept drilling wastewater. Since no records are required to track what happens to this wastewater, it is not clear how it is being disposed. Drillers are creating millions of gallons more wastewater than existing treatment plants are able to process.

Additionally, ***WTAE-TV*** Pittsburgh presented a comprehensive investigative report about how drillers are also taking massive amounts of water from rivers, streams, and reservoirs. For instance, water haulers are at the Monongahela River so frequently they sometimes leave their hoses behind at the water's edge. And a hose -- attached to a diesel pump -- takes water from the river continuously. The hose runs up the bank and into tanker trucks. It also splits off into tanker trucks standing in a line. In fact, nine tanker trucks each holding 180,000 gallons fill up 24/7. For some Marcellus Shale gas wells, these trucks will come back and refill with water 40 times causing a substantially reduced river flow which also contributes to the problem by causing the percentage of contaminants to be higher in the remaining water flow.

CONCLUSION:

The above outline only describes what occured at "the back-end" of the gas drilling process by "hydraulic-fracturing". **John Hanger**, PA-DEP Acting Secretary recently stated that "Each drilling operation in the Marcellus Shale will require substantial volumes of water, much more than conventional drilling operations They need more water because they have to drill much deeper, sometimes a mile-and-a-half deep, and they use hydraulics to fracture the Marcellus Shale and release the natural gas trapped beneath it." Each well can require as much as 6 million gallons of water mixed with up to 10,000 gallons of "proprietary" toxic chemicals.

But the wastewater being trucked away -- is just that water which "returns to the surface." At least 30% of the drilling wastewater remains in the ground -- sometimes 100% remains in the ground [even industry says this in their data]. Former NYC-DEP Commissioner, **Al Appleton** says that "over time this highly toxic wastewater will find its way into the aquifers and find its way to the surface through "spring-fed water migration."

Overwhelming evidence and much science now exists to prove that the type of gas drilling proposed for the watershed region - **made possible by total federal deregulation** - causes contaminated drinking water, and carcinogens in the farmland and food chain. Experts have calculated that over 10,000 gas wells are allowed by existing laws -- and will be drilled in the Upper Delaware Watershed, which includes all of the New York City Watershed System.

Thus we urgently request the New York City Council pass a resolution calling for a BAN on gas drilling by "hydraulic-fracturing" within the New York City Watershed.

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WTAE-TV 6-MINUTE. -- FULL-SCREEN VIDEO:

http://www.thepittsburghchannel.com/video/17976058/index.html

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THE TRUTH ABOUT NATURAL SHALE GAS EXTRACTION IN THE UPPER DELAWARE RIVER WATERSHED

What You Need to Know

Drilling for natural gas in Marcellus and other shales requires special extraction and development methods. These special methods include:

- Hydraulic fracturing: "Fracking" (or "fracing") is the practice of injecting fluid and sand into the rock formation to open fractures to release gas. Fracking markedly boosts production. Fracking fluids contain chemicals, many of them hazardous and carcinogenic - up to 154 hazardous contaminants (State of New Mexico).[1] In PA, public records show that formaldehyde, a human carcinogen, acids, pesticides that are toxic to fish and aquatic life, and at least 85 other hazardous materials are added to the fracking water being used (PADEP).[2] The drilling and fracking processes introduce chemicals into the well and also disturb, distribute, and bring to the surface chemicals/minerals from beneath called "flowback" (such as salts, sulfides, and "normally occurring radioactive materials" or NORMS, which occur in the region; NORMS have required decontamination elsewhere such as at 140 sites since 2005 in Texas's Barnett Shale).[3] The wastewater is stored in open pits at the well site posing air and water pollution risks.
- Horizontal drilling: The well bore is directed down and extended horizontally to access the shale (usually about a mile down and at least a mile horizontally). This expands the amount of gas that can be recovered from each well. It takes between 2 and 9 million gallons of water to frack a deep horizontal well.[4] Multiple wells are often developed on each pad requiring 3-5 acre pads, miles of driveways and feeder pipelines, noisy and brightly lit construction sites, increased stormwater runoff, fragmented habitats, air polluting machinery and thousands of truck trips to the site.

These practices have impacts:

Environmental pollution is reported around the country near natural gas wells either from spills, accidents or well development practices[5]. However, gas drilling is exempt from many provisions of federal environmental laws.[6] Virtually no human health studies are underway to assess the impacts on people. For instance, the situation is so severe that in Colorado a Health Impact Assessment has been called for due to pollution problems there.[7] Examples of pollution:

- In Dimock Twp., Susquehanna Co., PA natural gas (methane) has intruded into the local water, fouling water wells and forcing homes on water tanks after a water well exploded in January, 2009.[8] In September, 2009, 3 spills of fracturing fluids occurred; 2 entered Stevens Creek, causing a fish kill. In Western PA and West Virginia, 30 miles of Dunkard Creek that borders both states was ruined in a weeks-long disaster that came to a head in September, 2009; 161 species of fish, mussels, and salamanders died in the stream, which flows to the Monongahela River. A health emergency occurred in the fall of 2008 and again this year in the Monongahela from an overload of gas drilling wastewater that led to a bottled water advisory for 325,000 people, including Pittsburgh. In Bradford Twp., McKean Co., PADEP found Schreiner Oil and Gas responsible for contaminating at least 7 water supplies with methane and/or high levels of iron and manganese, ruining local wells.[9]

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[1] www.emnrd.state.nm.us/OCD
[2] Don Hopey, "State concerned about waste water from new gas wells", Pittsburgh Post Gazette, 12.21.08 and http://www.riverreporter.com/issues/08-12-18/frac.pdf
[3] "Radioactive Waste Surfaces at Texas Gas Sites", Peggy Heinkel-Wolfe, Denton Record-Chronicle, 11.11.07.
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- In Susquehanna Co., diesel spills related to gas drilling by Cabot dumped 100 gal., 800 gal. and 100 gal. of fuel on the ground in 3 separate incidents.[10] In McKean Co., PADEP found Schreiner committing pit and other gas well violations, endangering the community and environment.
- In Pavillion, Wyoming, the USEPA has investigated contamination of 11 water wells near Encana Corp. gas wells that had been developed with hydrofracking. Methane and 2-butoxyethanol phosphate were found by EPA.
- In an incident in Louisiana, 20 cattle died from drinking fluid next to a hydrofracked natural gas well.
- In Hickory, PA, farmer Ron Gulla's fish pond has been polluted and polluted runoff continues to ruin his farm[11]; PADEP says the lack of pre-drilling condition data lets Range Resources off the hook. PA's shale region is experiencing pollution from natural gas storage facilities, pipelines and gas wells[12].
- In Arkansas, two major wastewater companies were shut down after high salt levels were found in a reservoir and fish kills occurred in a local creek.[13]
- Newsweek recounted a fracturing fluid spill that sent a worker to the hospital and is being investigated as the cause of his nurse's near death illness[14].
- Hydrogeologists discovered benzene 1,500 times the level safe for people in a water well near hydrofracked natural gas well fields in Wyoming.
- Hundreds of water contamination reports are documented in CO, Alabama, Ohio, Texas, and PA.[15]

Wastewater from natural gas development, high in total dissolved solids, salts and containing toxins and "flowback" chemicals, must be disposed of but there are not enough facilities in the Marcellus Shale region. Sewage plants can't handle the contaminated waste. A water quality emergency has arisen in the Monongahela River in PA due to discharge of inadequately treated drilling wastewater.[16] Injection wells and mines are being considered as disposal sites; PADEP's "TDS strategy" allows interim permitting while standards and rules are worked out for how to dispose of the wastewater.

Explosions, accidents, fires, and emergencies come with natural gas exploration and well development. These are not planned but require municipal emergency response. But in some ways municipalities are being prevented from having controls over gas drilling operations within their borders -- gas companies are suing Pennsylvania towns to stop local regulation, such as stormwater, wellhead, floodplain and zoning ordinances.[17] Examples of emergencies:

- In Leidy Township, Clinton County, PA, a gas well exploded into flames Sept. 14, 2008; special firefighters from Texas were brought in to contain the fire, which was expected to burn for weeks.[18]
- In Appomattox County, also on September 14, a Williams Gas Co. pipeline that runs from the Gulf Coast to New York exploded without warning, destroying 2 homes and damaging 6 others, hurting 5 people, causing the evacuation of a neighborhood of hundreds, and leaving a 50 foot crater behind.[19]
- In Greene County, PA a worker was killed and another badly injured when a coalbed methane gas well exploded.[20]
- In Dallas-Ft. Worth, Texas, drilling in shale by Chesapeake Corp. may have caused earthquakes. Wells drilled deep to store flowback water from natural gas wells are blamed for inducing earthquakes according to geoscientists.[21]
- In Ohio, one home exploded, another home narrowly averted an explosion, and 46 wells in the area are contaminated by methane gas that leaked from a Ohio Valley Gas Company well into the aquifer. The problem is still unresolved and homes are on bottled water and some are vacated while water lines are built to the neighborhood.[22]

What you can do: Get more info. and sign up for action alerts at www.delawareriverkeeper.org

PROTECT OUR CLEAN WATER! WE CANNOT SACRIFICE WATER FOR GAS!

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[10] http://www.riverreporter.com/issues/09-03-12/news-gasglance.html
[11] http://uk.reuters.com/article/environmentNews/idUKTRE5422TG20090503?sp=true
[12] http://uk.reuters.com/article/environmentNews/idUKTRE5422TG20090503?sp=true
[13] Lauren Trager, "Department of Environmental Quality Tells Two Wastewater Companies to Shut Down", KARK News, 12.15.08
[14] Jim Moscou, "A Toxic Spew?" Newsweek, 8.20.08.
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[16] PADEP News Release 10.22.08, "DEP investigates source of elevated total dissolved solids in Monongahela River", http://www.ahs.dep.state.pa.us/newsreleases/default.asp?ID=5337&varQueryType=Detail
[17] Brief of Amici Curiae, Nockamixon Township, the Delaware Riverkeeper, Delaware Riverkeeper Network, American Littoral Society, and Damascus Citizens for Sustainability in Support of Appellants, In the Supreme Court of Pennsylvania, Western District, July 8, 2008.
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[19] Candice Nelson, Carrie Sidener, "Gas Company Talks to Families about Explosion", WSLS and Lynchburg News and Advance Reporter, 9.16.08, and Candice Nelson, "Community Moves Forward after Appomattox Explosion", 9.16.08.
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[21] Thomas Korosec and Jim Polsen, Cehsapeake Water Wells May Have Caused Earthquakes, Bloomberg.com, 8.14.09.
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Guest:

Abrahm Lustgarten, reporter for investigative news website ProPublica. He

Fracking and the Environment: Natural Gas Drilling, Hydraulic Fracturing and Water Contamination

Read-Erro

Gas drilling companies such as Halliburton say the gas drilling technique known as hydraulic fracturing, or "fracking," is safe, but opponents contend it pollutes groundwater with dangerous substances. Now, new evidence has emerged possibly linking natural gas drilling to groundwater contamination. ProPublica journalist Abrahm Lustgarten reports federal officials in Wyoming have found that at least three water wells contain chemicals used in hydraulic fracturing. [includes rush transcript]

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Guest:

Abrahm Lustgarten, reporter for investigative news website ProPublica. He has been covering this issue very closely for the past year and has broken a number of stories.

Rush Transcript

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Related Links

- Buried Secrets: Gas Drilling's Environmental Threat (ProPublica)

JUAN GONZALEZ: We turn now to another story about water. New evidence has emerged possibly linking natural gas drilling to groundwater contamination. ProPublica reports federal officials in Wyoming have found that at least three water wells contain chemicals used in the natural gas drilling process of hydraulic fracturing.

The Wyoming study marks the first time the Environmental Protection Agency has undertaken its own water analysis in response to complaints of contamination in drilling areas. Residents in Pavilion, Wyoming have complained for years that their water wells turned sour and reeked of fuel vapors shortly after drilling took place nearby.

ProPublica reports precise details about the nature and cause of the contamination have been difficult for scientists to collect, in part because the identity of the chemicals used by the gas industry for drilling and fracturing are protected as trade secrets.

AMY GOODMAN: Gas drilling companies, such as Halliburton, say the gas drilling technique known as hydraulic fracturing, or "fracking," is safe, but opponents contend it pollutes groundwater with dangerous substances. Here in New York, many politicians and residents have expressed concern that natural gas drilling in upstate and in Pennsylvania could contaminate New York City's drinking water supplies.

In a moment, we'll be joined by reporter Abrahm Lustgarten of ProPublica, who has been closely tracking this story. But first we want to play an excerpt from a new documentary called *Split Estate* by Debra Anderson. The documentary examines the impact the oil and gas drilling boom has had in the Rocky Mountain West. This part deals with Garfield County, Colorado.

> **NARRATOR:** In 2004, some residents in Garfield County began to complain that they were getting sick as a result of the drilling activities in their neighborhoods. A young woman from Silt, Laura Amos, was one of the earliest and loudest voices.
> **LAURA AMOS:** As everyone in this room probably knows, my groundwater has been contaminated with methane, Williams Fork gas. There are a lot of people in this room with contamination and pollution issues. So, who then is responsible to me for that loss of my welfare, if it's not you, the gas commission?
> **GAS COMMISSIONER:** If a well is drilled next to your residence or near your residence within the legal setbacks, and there's a perceived or real impact on your property value, we don't address that.
> **NARRATOR:** In 2001, gas wells were drilled using the fracking technique a mere 500 feet from the Amos home. Underground, the drilling breached their water well, causing their drinking water to fill with grey sediment and fizz like soda pop. The Colorado Oil and Gas Conservation Commission tested the water well and found methane but said it was safe. But they warned the Amoses to keep a window open, so the methane gas wouldn't build up and cause an explosion in their home. The Amoses stopped drinking the water but continued to bathe in it.
> **UNIDENTIFIED:** A young woman called me from Garfield County and said that she had developed a rare adrenal tumor, that she had had this incident with her well. That was the beginning. I mean, when she called, it just sent chills up and down my spine. She had been breast-feeding her daughter through the period when they were using the water that they were told was safe. She was bathing her baby in the water in their home. They were breathing the stuff that was coming into their house.

NARRATOR: She later found out that a chemical that had been used in the 2001 fracking has been linked to adrenal gland tumors. When she went to EnCana, they denied using it on that well or any other. Months later, the Oil and Gas Commission admitted that it had been used after all.

UNIDENTIFIED: Laura was told her water was safe, and we found out later they never tested it for 2BE. They waited 'til four years after the incident to go back to see if possibly they could find some. That was long gone.

She spoke to other people in her neighborhood. She began to see if anybody else was having the kind of health problems she had. And then others began telling me about people they heard about. And I was just amazed at the numbers of people that were involved. And I thought, this is maybe a serious problem. What is going on over there?

NARRATOR: After years of mounting medical bills, devalued property and diminishing options, Laura agreed to a monetary settlement with EnCana Corporation, the company responsible for her problems. The settlement stipulated she stop telling her story publicly, which is why she was not interviewed for this film. Many family stories like hers will never be told because of company settlements that require silence.

AMY GOODMAN: An excerpt from the documentary *Split Estate* by Debra Anderson. When we come back from break, we'll be joined by a reporter who has been investigating the issue of fracking around the country and the pollution of the nation's water supply. Stay with us.

[break]

AMY GOODMAN: We're joined by Abrahm Lustgarten, covers issues around natural gas drilling for ProPublica. Juan?

JUAN GONZALEZ: Well, Abrahm, tell us first, how does this fracking actually work?

ABRAHM LUSTGARTEN: It's used to extract oil and gas both, very deep underground, in some cases, 10,000 feet or 13,000 feet underground. And in the current exploration plays, we're looking at tight sands, or shale, that hold the gas in tiny little bubbles, and it can't really flow freely. So the oil and gas industry will drill a well, and they'll pump down millions of gallons of liquid, which is sand and water and then these chemicals that I've been looking at. And they'll pump it down under thousands of pounds of pressure to essentially fracture and break up, obliterate, the rock underneath and let the gas flow back out and come back up to the surface.

JUAN GONZALEZ: And the chemicals that are involved that you say you've been investigating?

ABRAHM LUSTGARTEN: Yeah, it's very difficult to know exactly what they are. At this point, the industry has released partial lists. They say that they're mostly complete, but they won't go on the record and say that it represents every single chemical that they've used. In the past, it's included diesel fuel. That's been phased out to rely more on methanol. And then there are a number of soaps and surfactants and lubricants and all sorts of things that they use to essentially engineer the viscosity of the fluid. They want it to go down into the hole as a fairly thick substance and then, you know, on command, they want it to release and get out of the way, so the gas can flow right back up past it. And it's chemicals that does all of that.

JUAN GONZALEZ: So, in essence, the chemicals then—the residuals then flow into whatever groundwater supply may be in the region, right?

ABRAHM LUSTGARTEN: Well, that's what's been very difficult to know. Records are not kept about what amount of fluid and chemicals is taken back out of the well, not in any state where drilling is allowed in the United States. There are geologists who are quite concerned about how far these

chemicals and these fluids can travel underground. And then there are these numerous correlative instances of contamination across the country. And until now, it's been very, very difficult to know whether it's the actual fracturing process that's caused this contamination or something else. And it's partially because there's so much secrecy around the fracturing process itself.

AMY GOODMAN: Tell us about the main areas affected in the country.

ABRAHM LUSTGARTEN: Well, it's almost everywhere you look where there's drilling. There's drilling in thirty-one states. Drilling has been happening in Wyoming and Colorado for many years. Probably the most intensive development in the country, at least in the early stages, was there. And that's where you've begun to see quite a bit of problems with the water. And these are largely due to spills sometimes or waste streams that are leaked out into the soil and get into water supplies. And sometimes it's completely mysterious. The documentary clip showed a woman whose well exploded the same day or within a few days of this intensive pressure being pumped into the ground nearby, which implies some kind of geological connection. There have been problems with water in New Mexico, in Wyoming, in Louisiana, in New York, in Pennsylvania.

AMY GOODMAN: The latest Wyoming EPA study?

ABRAHM LUSTGARTEN: In Pavilion, Wyoming, where some of these earliest complaints originated, the EPA has just earlier this year undertaken, for the first time, a real investigation into what's happening with the water there. They didn't go in to investigate the gas industry or hydraulic fracturing, but it is the first time that they've actually decided that they would test water in response to complaints about water. And they've gone in and tested for the broadest array of pollutants with as much objectivity as they could muster. They've looked for pesticides and agricultural influences and any other influence on the water supply.

And EPA folks tell me that they're quite surprised, but what they found in their preliminary reports—and they're not finished with this study, but they found a couple substances that seem to be linked to gas drilling, and one of them is a substance called 2-butoxyethanol that is used—not exclusively, but is used—in hydraulic fracturing. And it's also found in some cleaning supplies and some things we use around the house. But it appears to be, at this point, a strong circumstantial link to hydraulic fracturing.

JUAN GONZALEZ: And what are the main companies that are involved in this drilling?

ABRAHM LUSTGARTEN: Well, the industry works in a funny kind of way, depending on multiple tiers of contractors. So it's all the big oil companies, whether it's Chesapeake or Shell or Chevron. And then they rely on service companies to do the hydraulic fracturing itself, and that industry is controlled by three large players: Halliburton is one, BJ Services and Schlumberger, the French giant.

AMY GOODMAN: Can you talk about how the energy industry swayed Congress, and the Safe Drinking [Water] Act, how fracking got exempted?

ABRAHM LUSTGARTEN: Yeah, this is politically the most controversial point. In the early days of the George W. Bush administration, Dick Cheney's energy task force identified hydraulic fracturing as a very important part of the natural gas industry and the ability to develop that industry. And within a year or two after that, there was a proposal put forth to exempt the hydraulic fracturing process from the Safe Drinking Water Act, which is the nation's premier, you know, water protection law.

It's not clear that, before that, the EPA was enforcing hydraulic fracturing or was looking at it under this act. And in some cases they weren't, but they clearly had the authority to do so. And this law took away their opportunity to even decide that this was an issue worthy of EPA investigation.

AMY GOODMAN: I want to play an excerpt again from *Split Estate*. Filmmaker Debra Anderson interviews Weston Wilson, an environmental engineer in the EPA's Denver office. In 2004, Wilson

openly questioned an EPA study that declared fracking "poses little or no threat" to drinking water.

> **WESTON WILSON:** The former chairman, CEO of Halliburton, Dick Cheney, within a few months of coming into office as vice president, he was pressuring the administrator of EPA, Christine Todd Whitman, to exempt hydraulic fracking from the Safe Drinking Water Act regulation. From my own point of view as a technician, I just thought it very alarming that EPA technically had described how toxic these materials are, toxic at the point of injection, and still come out with a summary that says they don't need to be reported or regulated.
> And that led me, in the fall of '04, to object on technical grounds. Then the Inspector General of EPA began an investigation of my complaints. And several months into that, Congress took the report from EPA saying that fracking did not present a risk, along with other information, and exempted hydraulic fracking from regulation under the Safe Drinking Water Act. That leaves you and I, as the American public, in this position: we cannot know what the industry injects in our land. It is exempt from being reported.

AMY GOODMAN: EPA's Weston Wilson. Your response, Abrahm?

ABRAHM LUSTGARTEN: Well, the EPA did undertake that study in 2004, and it's been highly criticized by Wes Wilson and numerous other scientists who work very directly with these issues. In Colorado, the EPA essentially undertook a survey at that time. They went and heard some of the complaints from residents that their water was bad. They went and asked state regulatory agencies whether they'd seen contamination, and those regulatory agencies said, "Yeah, for the most part, no, we haven't." And the EPA, despite its scientific judgment that there was a potential risk to groundwater supplies, which their report clearly says, then went ahead and very surprisingly concluded that there was no risk to groundwater, unless you read deeper into that report.

And part of my reporting found that throughout that process the EPA was closer than seemed comfortable with the industry. I filed FOIA requests for some documents and found conversations between Halliburton employees and the EPA researchers, essentially asking for an agreement from Halliburton in exchange for more lax enforcement. The EPA, in these documents, appeared to offer that and agree to that. And it doesn't appear, by any means, to have been either a thorough or a very objective study. And that's why what's happening in Wyoming now is so significant, because it's really a change of course for the EPA on this issue.

JUAN GONZALEZ: And the head of the EPA then was Christie Todd Whitman, wasn't it?

ABRAHM LUSTGARTEN: It was, yeah.

AMY GOODMAN: Well, we're going to leave it there, but we will continue to follow your reporting, very important for the health of this country. Abrahm Lustgarten, reporter for the investigative news website ProPublica, has been covering the issue very closely around the country, the issue of fracking.

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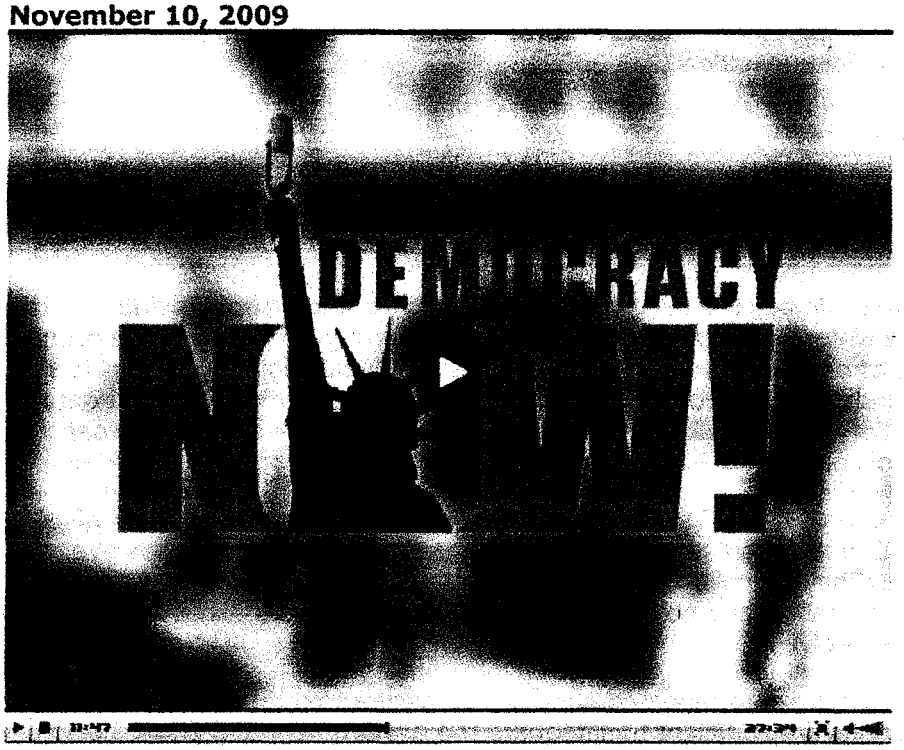
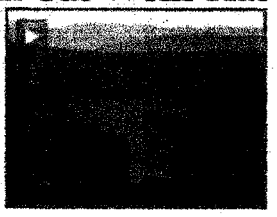
November 10, 2009



Watchdog: New York State Regulation of Natural Gas Wells Has Been "Woefully Insufficient for Decades."



The New York-based Toxics Targeting went through the Department of Environmental Conservation's own database of hazardous substances spills over the past thirty years. They found 270 cases documenting fires, explosions, wastewater spills, well contamination and ecological damage related to gas drilling. Many of the cases remain unresolved. The findings are contrary to repeated government assurances that existing natural gas well regulations are sufficient to safeguard the environment and public health. The state is considering allowing for gas drilling in the Marcellus Shale watershed, the source of drinking water for 15 million people, including nine million New Yorkers. [includes rush transcript]

Guest:

Walter Hang, President of Toxics Targeting, **an environmental database firm in Ithaca, New York.**

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AMY GOODMAN: We begin today with the latest developments on gas drilling in the Marcellus Shale watershed, potentially the largest natural gas reserve in the country and the source of drinking water for 15 million people, including nine million New Yorkers. On Monday, an environmental research group released government data revealing New York state regulation of natural gas wells has been, quote, "woefully insufficient for decades."

The upstate New York-based Toxics Targeting went through the Department of Environmental Conservation's own database of hazardous substances spills over the last thirty years. They found 270 cases documenting fires, explosions, wastewater spills, well contamination and ecological damage related to gas drilling. Many of the cases remain unresolved.

The findings are contrary to repeated government assurances that existing natural gas well regulations are sufficient to safeguard the environment and public health.

Well, the New York Department of Environmental Conservation didn't respond to our requests for comment. They told the *Ithaca Journal*, however, that spills from the oil and gas industry constituted a very small proportion of the total number of spills recorded in the past three decades, adding that such accidents are rare.

For more on this, I'm joined here in our firehouse studio by Walter Hang, the president of Toxics Targeting.

Welcome to *Democracy Now!*

WALTER HANG: Thank you for inviting me.

AMY GOODMAN: Now, for a national audience, I think most people have never heard of what Marcellus Shale is.

WALTER HANG: That's right. It's this giant rock formation, very deep underground. It's about a mile deep, and it stretches from just north of Syracuse, New York, all the way to Tennessee. This is very thick impermeable rock, but it's got gas inside these tiny little pores.

So, up until now, there really hasn't been any effective way to get the gas out of the rock, because it's so deep and because it's so impermeable. But now there's a new technology. It's called "slick water hydrofracking," and it involves horizontal drilling. So they drill down, and then they drill through the rock layer, and then they force

incredibly highly pressurized water that's got a lot of additives, and this fractures the rock. This then lets the gas out, and then they retrieve it.

Unfortunately, it requires tremendous amounts of water, and it's incredibly polluting. So the water that comes out of the ground has toxic chemicals, petroleum compounds, and it's actually radioactive. So up until—

AMY GOODMAN: Wait, wait, wait, wait. "It's actually radioactive." What do you mean?

WALTER HANG: Believe it or not, when the water gets drawn out of this deep rock formation, there's radon, there's uranium, so the water that comes out is radioactive, as well as toxic-contaminated. So, one of the key problems is, what do you do with all this wastewater? And that's the issue that we investigated.

So, New York has had natural gas drilling for almost 200 years, and everyone at the state government and industry level has said, "We've never had a problem. We've been drilling. It's reliable technology. No problems." When we looked at the State of New York's own data, however, we found, again, fires, explosions, huge uncontrolled releases of wastewater that went into people's drinking water, went into wetlands, streams. Many of these problems haven't been cleaned up, even after decades.

Arguably the worst case was in Freedom, New York. Someone named Dale Fox was drilling a vertical well, and he hit a gas pocket. The natural gas was incredibly pressurized. It came blasting out of this 2,000-foot-deep hole. It picked up petroleum on the way up. It shot out of the hole. The wind blew this incredibly flammable explosive mixture onto the drill rig. They had to shut off the drill rig. Then they couldn't kill the well. They couldn't stop the gas from exploding out of the well. It got in a rock fracture, and in a matter of minutes it went 8,000 feet. It contaminated twelve homes, that were evacuated. It polluted drinking water wells. It polluted drainage ditches, ponds. And it came up in this farmer's barn, where his dairy herd was. Believe it or not, more than ten years after that release, the water is still undrinkable.

And in the New York City reservoir system, the only protection would be that you can't drill a well within 300 feet, compared to this problem which went 8,000 feet. So these regulations that have been proposed by the Governor, David Paterson, are totally inadequate. And again, they're based on this false assumption that the existing regulations are adequate. And that's how come I've written to him to say, "Withdraw this proposal, look at the problems that your own Department of Environmental Conservation has documented, and come back when you have something that's actually going to assure that this drilling can be done safely and without harming public health."

AMY GOODMAN: I have seen images that you've posted on your website of water lighting up, being flammable, light—water catching fire.

WALTER HANG: This is just incredible. About a year ago—actually, a little bit more than a year ago, basically, a Vietnam vet living in Candor, New York had discovered that, even though he had lived in the same house since 1962, his water started to release gas, and he discovered that you could light it. And he was immediately east of an area where they had begun drilling. So, last January, he complained to the Department of Environmental Conservation. He said, "Hey, my water is flammable. I can light it."

AMY GOODMAN: Instead of the flame going out, it lights up.

WALTER HANG: It lights up. I mean, you will literally turn on the water, the water will start coming out of the faucet, and then it will like burp gas. And if you hold a match to it, it literally ignites.

So the incredibly shameful thing is that the Department of Environmental Conservation did not even come to look at this situation. They simply told this disabled vet, Mr. Mayer, "Don't drink the water." And that was it. And the key thing is, they said this reported problem was administratively closed out, and it met the applicable cleanup standards. They didn't do anything, but they said it met the cleanup standards. There are hundreds of similar kinds of problems where the Division of Mineral Resources in the state of New York has said, "Yep, that problem is taken care of," even though it appears that they did inadequate cleanup. And some of these problems, again, have been going on for decades.

AMY GOODMAN: When you describe, for example, the herd of cows, when you describe all the houses that had to be evacuated, what happens to these families? What happened to the cows? What happened to the water? You said that it was permanently polluted?

WALTER HANG: The day of the gas release, I asked one of the people whose wells got contaminated—I said, "How did you know that your water got polluted?" He said, "It turned black." In other words, when the gas went through this rock fracture and came up this person's well, it just blasted out the pollution in the water. You could see it was oily. It had all kinds of contamination. And he has never been able to drink it.

So, eventually the gas petered out. They hit the gas pocket. The gas was released. It came up in the ground. It was just jetting out all over this area through this fractured rock. Eventually, the gas was released, but the residual pollution has never been cleaned up.

And that's the problem all over New York. There are these problems where oil has been spilled, gas is released in uncontrolled fashion, and the state Department of Environmental Conservation has simply failed to clean up these problems. And that's how come we should not go forward with Marcellus gas horizontal, high-volume fracking, until we have an adequate regulatory program.

AMY GOODMAN: Who benefits from it?

WALTER HANG: The benefit, if we do it well, is that the natural resources will be protected, communities will be protected, people's drinking water won't be impacted—notably, the people in the City of New York, who drink water from the Catskills. There are these huge reservoirs that are above the Marcellus Shale.

If we don't do it well, then many of the biggest companies in the planet are going to save money—Chesapeake, Fortuna, Talisman, Hess. These are giant corporations. They are chomping at the bit to come to New York and to drill for this giant reserve of gas.

AMY GOODMAN: The largest possibly in the country?

WALTER HANG: That's right. The problem is it is very difficult to get out of this deep rock formation. Usually if you drill into a gas pocket, the gas just comes right back up. But this requires this incredibly polluting hydrofracking, where they pump this liquid under tremendous pressure into the rock, and it just explodes out, maybe as far as 3,000 feet, shattering the rock. And then sand gets injected into the little fractures, and they draw the gas out.

AMY GOODMAN: What happens to the water, for example, in New York, where there are millions of people, obviously, who rely on the reservoirs upstate?

WALTER HANG: Well, right now there are almost no natural gas wells in the Catskills region. Literally, a handful. But that area does have Marcellus Shale. So if they begin to drill in that area, and if they cause the same kinds of uncontrolled

pollution problems that other areas of New York have experienced—notably, western New York—then the drinking water could be impacted. And once these problems develop, they're very difficult to clean up.

AMY GOODMAN: And you have states all over this country, of course, that are in dire economic shape, and so they are going to turn to any way they can make money. Is New York in that situation? And what are you doing right now?

WALTER HANG: New York, unfortunately, in the Southern Tier, in the Finger Lakes region in western New York, is in dire economic straits. These communities are just desperate for jobs. And so, it sounds so good: we're going to get this gas out, we're going to make tons of money, communities are going to benefit, the state of New York is going to benefit. Governor David Paterson has basically made this Marcellus Shale effort the linchpin of his economic development plan.

The problem is he hasn't answered those key questions. What happens when hundreds and hundreds of these hundred thousand ton trucks start pounding these structurally deficient bridges that have been neglected for decades into pieces? Who's going to pay for that? What about the roadways that are going to get destroyed? What are we going to do with all of this toxic wastewater?

Believe it or not, they were actually dumping this natural gas drilling wastewater from a vertical well in little Cayuga Heights, New York, and it was passing through this sanitary wastewater treatment plant that was not designed, constructed or maintained in any way to take out the toxics. And it was passing through into southern Cayuga Lake, which is a nationally recognized impaired water body. It's already been polluted for decades. And this added to the problems. And 30,000 people drink water from that area.

So we're looking at an impending disaster, and that's how come we're going to now try to organize all these communities to say this has to be done properly.

AMY GOODMAN: There's one public hearing today?

WALTER HANG: That's right, in the City of New York. They're going to talk about the threat to the reservoirs. And so, that's how come I'm here in New York. I'm going to talk to the Department of Environmental Conservation about these concerns.

And I've posted at toxicstargeting.com the 270 profiles. People can look at them and see, are there any major problems in my community in the Marcellus Shale region of New York?

But then we're going to have a coalition letter that people can sign onto and basically say, "Governor Paterson, we're just not ready to go forward with Marcellus Shale drilling, until we get these regulations. Don't do it. Withdraw this proposed supplemental generic environmental impact statement."

AMY GOODMAN: We only have thirty seconds, but the significance of the New York watershed, freshwater, how it comes into the city, how unusual it is in this country?

WALTER HANG: It's absolutely unique. You have these upland reservoirs, hundreds of miles away from the city, and the water flows completely under gravity through these giant tunnels. It's so pure it doesn't even need to be filtered. And so, this is a jewel. Any city in the world would give anything to have this water. That's why it has to be safeguarded. It has to be protected. Once it's polluted, then the city would have to treat that water at gargantuan cost. So Mayor Bloomberg and all the other city leaders have to unite with all the other New Yorkers who could be impacted by Marcellus Shale.

Natural Gas Exploration and Leasing | Damascus Citizens

DCS. Damascus Citizens for Self-Government and Friends, LLC.

HYPERLINK http://www.damascuscitizens.org www.damascuscitizens.org

PO Box 147, Milanville, PA 18443

April 7, 2008

Dear Wayne County Landowners:

Gas companies have approached landowners in our area by spreading misinformation. There is extensive proof that gas drilling is not a benign activity. Contrary to the information that only sand and water are used in drilling, the use of over 200 documented toxic chemicals are involved. After gas drilling accidents occurred –termed blowouts -- the government took samples of the drilling muds. Test results found them to contain a long list of toxic substances. These chemicals have been shown to contaminate aquifers, ponds, lakes, land, and the wells, streams, and rivers that provide drinking water.

We are including a list of some of the chemicals used in the fracing process as identified by the Environmental Protection Agency in 2002, before gas and oil companies were exempted from revealing the chemicals used in their drilling. At least nine of the chemicals used exceed the EPA's regulatory standard. The other chemicals on this list reach either the EPA maximum contaminant level or their risk rated concentration level. What this means is that if the Bush/Cheney administration had not exempted gas and oil companies from EPA regulation, the fracturing liquid used by these companies would not have been able to include the chemicals that will be used on your land if you lease. This is because these chemicals are known cancer-causing agents, or because they cause severe health problems such as respiratory and/or neurological illnesses, as well as organ damage. These chemicals have also been proven to be volatile. This means that when exposed to air through the drilling process they do not dissipate, but become a part of the air that we breath, harming those close to the drilling as well as those downwind. These volatile chemicals have been known to create the illnesses described above, as well as developmental problems in children, and potentially birth defects.

But maybe the most frightening thing with regard to extensive gas drilling is not only the factual information. The stuff that can not be proven will also destroy our community - the accidents, secrets, mistakes, lies, shortcuts, explosions, miscalculations, blowouts, greed, incompetence, lack of

accountability, and personal shortcomings (like "let's brake for lunch now instead of connecting that pipe" . . . or "let's get a few beers and dump our load of contaminated production water right here and now.")

We include excerpts of extensive testimonials from people living with gas drilling. Countless people around the country have had to move from their homes and towns due to the contamination of drinking water and air through gas drilling in shale conditions exactly the same as those that exist in our area. They have not been able to get the gas companies or the Department of Environmental Protection to rectify the problems caused by drilling. It is not an exaggeration to say that gas drilling has ruined many, many lives.

We have been told that some landowners are leasing and planning to move out of state, intending to make a profit on their leasing without thinking about the health and environmental consequences for their neighbors and family members who plan to stay in the area. Please be aware that in many towns, in both Pennsylvania and elsewhere, some landowners who have leased are now suing the gas companies and the DEP (see attached article) for not correcting the dire conditions created by gas drilling. There is also the strong probability that non-leasing landowners will end up suing those who lease and are responsible for contaminating the land, water, and air of their neighbors. Any reputable lawyer will tell you that lease signers will not be able to escape liability for the damage to others caused by drilling on their land, regardless of any waiver signed with the gas companies or coverage by insurance company "protections."

Please think long and hard about the consequences of leasing your land to gas companies that are not held to any regulatory accountability. How many stories have we heard of corporations acting out of greed and with disdain for the people they supposedly serve? What it comes down to is this: when you lease your land, you lose control of it. You have one opportunity to make a safe decision. Before you act, please contact us. We can provide answers to questions, as well as scientific data and first-hand accounts, and audio and video recordings of the serious crises related to gas drilling.

Sincerely yours,

The Steering Committee, Damascus Citizens for Self-Government and Friends

http://www.DamascusCitizens.org

Gas drilling's impact on land & water focus of Callicoon meeting

By Ross Brinkerhoff

Judah Catalan addresses the assembled crowd at the Damascus Citizens for Sustainability meeting, held Saturday at the Delaware Valley Youth Center in Callicoon, while Pat Carullo looks on. They were joined by filmmaker Bo Samajopoulos and bioengineering expert Barbara Arrindell.

By Sarah Thomas
Wayne Independent
Mon May 05, 2008, 06:43 PM EDT

Calliccon, N.Y. -

"They made a mistake when they let them in here."

"I'm not happy with what my tax dollars are paying for."

"You can't sit on your porch anymore. The quiet of the valley is gone."

"The land is raped. The land will never be the same."

These are the quotes from farmers and landowners in Washington County, Pa., after natural gas drilling commenced there not too long ago. None of them gave their names; one speaker even refused to be photographed. But what they all had in common was their willingness to share their disappointment and disgust with Bo Samajopoulos, a filmmaker from Brooklyn.

"I have no vested interest in the issue of natural gas drilling one way or another," he said. "I just go out and see what's out there. And what I found appalled me."

Samajopoulos made his film on the recommendation of the Damascus Citizens for Sustainability; it was shown at their Saturday night meeting held in the Delaware Valley Youth Center in Callicoon, NY. Over 400 attended. It was part of a series of presentations given by organizers, geologists, and concerned citizens on the natural gas drilling that could begin soon in our area.

"As a grassroots effort, our role is now significant," said Pat Carullo, a founding member of the Upper Delaware Preservation Coalition and speaker at the event. "There is currently no body existing between the community and the natural gas industry...our role will be to protect private property, public health, and the integrity of the river system."

The risks all three entities face are very real, explains DCS spokesperson Barbara Arrindell. Arrindell is both an artist and the holder of a degree in Bioengineering from Columbia University, two disparate fields which have in common a desire to let the work speak for itself. Arrindell's findings did so, and eloquently.

"In 1986, the Jonah Natural Gas Field in Wyoming was a world-renowned wildlife corridor. Now, just over twenty years later, it has about 40% of the animals it used to," said Arrindell, showing a slide of a landscape so dotted with drilling platforms it resembled gopher holes. "This is not a benign activity. There is real impact; streams are drained, water is polluted, and property values are greatly diminished."

A great deal of this pollution comes from NORMs (Normally Occurring Radioactive Materials, or volatile compounds which occur whenever the earth's crust is breached), said Arrindell, but much more of it results from the unsafe practices engaged in by drillers.

"The EPA has published a list of fluids used in fracking (or fracturing the shale in which natural gas is suspended)," said Arrindell, "and it's much more than water and sand. Chemicals used include benzene,

ammonium chloride, and a powerful endocrine disruptor called 2-butoxyethanol. These can lead to mutations in reproductive systems, and the hydrogen sulfide released by bleeding raw gas impurities effects memory, the central nervous system, and even death."

These claims were echoed in the findings of the National Resource Defense Council, which presented findings to Congress in October 2007 confirming the release of hydrogen sulfide, mercury, benzene, and radium around Rocky Mountain drilling sites. For more information, visit nrdc.org.

Much of Arrindell's science found its real-life analogue in Samajopoulos' interviews. One woman spoke of being made sick from her well water, and only regaining her health after switching to bottled water. A man who owned a trout pond described waking up one morning with all his trout dead and the weeds around his pond turning brown. A farmer pressed on muddy soil near a runoff stream, so the camera could capture the slick of oil and pollutants being released from his earth. All the interview subjects mentioned how much their property values had fallen.

"You can lose your homeowner's insurance," said Carullo. "In Hickory, sellers are walking away with 15% of their property value. Municipalities might have to raise taxes to carry public official liability insurance."

"We can't be a penny wise and a pound foolish," said Judah Catalan, a speaker at the event. "The main issue here is health. Whatever an individual may feel about drilling, it must be conducted in a way so we're healthy."

To that end, the Damascus Citizens for Sustainability are raising funds to retain the services of public health advocate Richard Lippes of Buffalo, N.Y. Lippes, who represented the homeowners in the famous Love Canal case, will use his expertise to ensure that permitting on the already-signed leases will only happen after residents' safety is assured.

"We aren't inventing the wheel; much of this has been argued successfully before," said Lippes. "There's no doubt that drilling harms the environment. We're going to look at the permits on a case-by-case basis, and try first to come to an agreement with the permit-granting bodies to only go forward if all environmental regulations are met, and if they're not, to not grant the drilling permit at all. I believe the government agencies have the public's best interest in mind. If we can't come to an agreement, then we might consider legal action, but at this point it's still too early to tell."

So far, the DCS has raised over $20,000, which they have used for public awareness projects. For more information, to make a donation, or to receive a CD of testimonials from citizens in Washington County, please visit the group's website at www.damascuscitizens.org.

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DCS — Damascus Citizens for Sustainability

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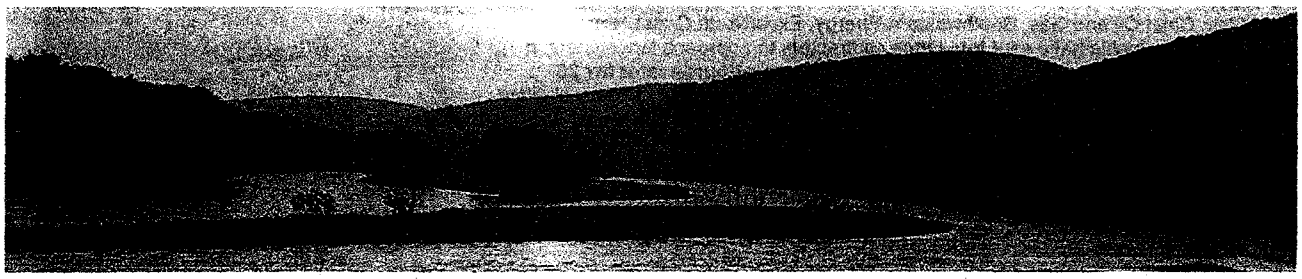


WORKING TO PROTECT OUR COMMUNITY AND HOME
And ... The Upper Delaware Watershed

The New York City Council is demanding a "BAN" on gas drilling in its Watershed - and we are working very hard to prevent the same dire effects of gas drilling - in our township and in the Upper Delaware Watershed [Wayne & Pike County, PA & Sullivan County, NY] because Chesapeake has begun deployment within the **Watershed Region** ... *see maps.*
Overwhelming evidence and much science now exists that the type of gas drilling proposed for this region - made possible by **total federal deregulation** - is a danger to the public health, causes contaminated drinking water, carcinogens in the farmland and food chain, torn-up roads, air pollution, plummeting home values, and noise polution.

DIMOCK, PA • WATER CONTAMINATION
Scranton Times, "DEP probes blast in gas-drilling region."
Binghamton Press & Sun-Bulletin, "DEP zeros in on gas tainting water."
Scranton Times, "Gas taints wells."
The River Reporter, "Dimock's dilemma - Methane found in water wells."

RECENT PRESS... more important press reports
Newsweek, "Officials Worry About the Impact of Fracking."
ABC News, "Sex for Oil & Gas, Reports Blast Interior Department."
NY Daily News, "Natural Gas Rush Will Come at Expense of NYC's Water."
NBC Nightly News, "Will Gas Drilling Spoil Our Water."
New York Times, "Where Water Trumps Energy."
The Citizen Telegram, "No to Gas Well Drilling in Watershed."
BusinessWeek, "Does Natural-Gas Drilling Endanger Water Supplies?"
Scientific American, "Drill for Natural Gas, Pollute Water."
Washington Post, "Hunt for gas leads drillers to NYC watershed."
New York Times, "Proposed Gas Drilling Upstate Raises Concerns About Water Supply."
New York Times, "11th-Hour Ruling Blocks Utah Oil and Gas Leases."
Christian Science Monitor, "Boom in gas drilling fuels contamination concerns in Colorado."

YouTube ... Gas Drilling Truth ... *The Real Impact*

No Permits | Always Noisy | Regulation | Polluted Stream | Never Again

Each deep gas well uses millions of gallons of water, sand, 171 products, and 245 chemicals (some secret & toxic). **Halliburton's gas well drilling process**, "hydraulic-fracturing" - is now exempt from the "Safe Drinking Water Act," "The Clean Water Act," "The Clean Air Act," "The Right-to-Know-Act", and other importnt protections.
The NRDC has released a comprehansive report about this issue ... *read more*

MORATORIUM PETITION **Sign Petition to Protect Watershed**
Sign an online Petition for a Moratorium on gas drilling in the Watershed Basin

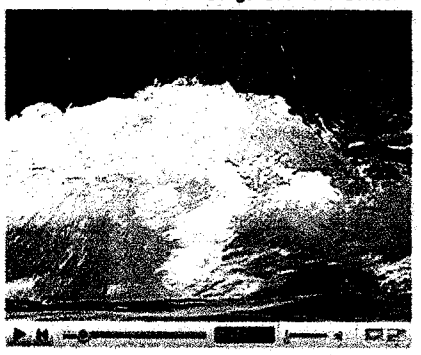
PDF Download Printable Petitions & Documents

GAS DRILLING IS NOT A BENIGN ACTIVITY. Besides temporary disruptions there are many possible irreversible damages to water, land, wildlife, quality of life, human health, and property values. It took only five years for Fort Worth, Texas - sitting on the

PITTSBURGH / WHITE-PAPER
Read-Download *Read-Download*

PRESIDENT'S GREEN TEAM
Energy Department, EPA, White House
President Obama's 20-minute Press Conference.

OUR BELOVED RIVER
Celebration of Beauty & Pure Source
A River Like No Other - in Danger Like Never Before.



BEFORE & AFTER DRILLING
Upper Delaware River Watershed
Digital Landscape - Impact of Gas Development.

same geologic strata as here and dealing with the same gas companies - to be transformed from one of the most livable cities in the country into a beleaguered industrial zone. Residents have suffered from gas fumes, piercing noise pollution and tainted water wells. The gas companies have left behind unsightly and dangerous sites that the municipality can ill-afford to correct. Such problems can result in tax increases.

For the last two years, companies such as Equitable Productions, Noble Energy, Cabot Oil and Gas, Chief Oil and Gas, Southwestern Energy, Exco/North Coast, and Chesapeake Appalachia have sent free-lance contractors to approach landowners in the **Upper Delaware River Watershed Basin - the source of pure-water for 25 million people.** These contractors have asked landowners to sign leases that will allow for gas well drilling on their land.

Gas Rush Poses Environmental Threat
Watershed that supplies drinking water to New York City & Philadelphia is now threatened.

After meetings with the PA Department of Environmental Protection (PA-DEP) and NY Department of Environmental Conservation (NY-DEC) - experts have calculated that over **10,000 wells** will be drilled in the **Upper Delaware River Watershed Basin**. ONE well requires 3 to 5 million gallons of water in the initial drilling, and up to that much each time the well undergoes the hydraulic-fracturing process used to access the gas. This water is allowed to be taken from our streams, lakes, rivers, and aquifers. It is left polluted by the chemicals used in the drilling and fracturing. Some of this water leaches into the drinking water aquifers and surface waters. Some of this water is brought up and discarded, resulting in huge trucks damaging our roads or, as allowed by the PA-DEP & NY-DEC, put into the topsoil with the waste from the drilling. The PA-DEP & NY-DEC do not have sufficient staff to provide oversight on such drilling activity, and communities will be left to their own devices and budgets to deal with the problems that will inevitably arise.

THE RIVER REPORTER
"New hazard of gas drilling: flow-back water."
"Water Expert: Public Health is top drilling issue."
"DRBC to find out: What's in frack fluid?."
"Gas drilling opponents hold mass meeting."
"Congress investigates possible water contamination caused by gas well drilling."
"Western PA landowners regret deep gas wells deals."
"Local agencies allow gas drilling exemption."
"Their money or your life."
"...Nor any drop to drink."

Compensation for this from the private companies is at most minimal. We know that farmers in our areas are hurting financially. But we also know that they love their land. There has been a great deal of misinformation distributed about gas well drilling. Please help us to protect your drinking water and land and properties. Read the facts; talk to your neighbors; donate.

PLEASE USE THIS E-MAIL TO CONTACT US:
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WATER UNDER ATTACK
A Film by Josh Fox
Previews of his 8000-mile Journy about Gas Drilling.

WTAE-TV• INVESTIGATION
Water Contamination, Toxic Wastewater
6-minute News Report.

THE REAL IMPACT OF GAS DRILLING

Depletion of Water Tables
Water Pollution
Decreased **Property Values**
Neighborhood **Depreciation**
Noise Polution
Air Pollution
Soil Contamination
Light Pollution
Health and Safety at **Risk**
Increased **Crime**
Loss of Green Space
Loss of **Recreation**
Aesthetic Impacts

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DEMOCRACY NOW!
THE WAR AND PEACE REPORT

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April 14, 2010

World-Renowned Scientist Dr. Theo Colborn on the Health Effects of Water Contamination from Fracking

The Environmental Protection Agency has begun a review of how the drilling process known as hydraulic fracturing, or "fracking," can affect drinking water quality. We speak to Dr. Theo Colborn, the president of the Endocrine Disruption Exchange and one of the foremost experts on the health and environmental effects of the toxic chemicals used in fracking. [includes rush transcript]

Filed under natural gas drilling

Guest:

Dr. Theo Colborn, zoologist and president of the the Endocrine Disruption Exchange

Related stories

- Congress to Investigate Safety of Natural Gas Drilling Practice Known as Hydraulic Fracturing
- Watchdog: New York State Regulation of Natural Gas Wells Has Been "Woefully Insufficient for Decades."
- Environmental Battle Brews in New York over Natural Gas Drilling

- Fracking and the Environment: Natural Gas Drilling, Hydraulic Fracturing and Water Contamination
- Will Our Reliance on Fossil Fuels & Nuclear Energy Cause Even Bigger Blackouts? A Discussion on Alternative Energy

AMY GOODMAN: Right now, we're turning to a health issue here in this country. Sharif?

SHARIF ABDEL KOUDDOUS: That's right. We're going to look at the health impacts of natural gas drilling. As the Environmental Protection Agency begins its review of how the drilling process known as hydraulic fracturing, or "fracking," can affect drinking water quality, the gas industry is raising new objections. The Independent Petroleum Association of America told the EPA its intended research, quote, "goes well beyond relationships between hydraulic fracturing and drinking water." The findings could lead Congress to repeal an exemption that shields the fracturing process from federal regulation under the Safe Drinking Water Act.

AMY GOODMAN: Well, as the debate over shale gas drilling heats up, we're joined here in New York by Dr. Theo Colborn, zoologist and president of the Endocrine Disruption Exchange. She's one of the foremost experts on health and environmental effects of the toxic chemicals used in fracking fluid.

Welcome to *Democracy Now!*, Dr. Colborn.

DR. THEO COLBORN: Amy, it's great to be here with you.

AMY GOODMAN: Well, it's great to have you in our studio. Start off by explaining what fracking is. What is hydraulic fracturing?

DR. THEO COLBORN: Well, you know, you first have to drill a hole. And fracking goes one step beyond drilling the hole. In other words, the gas comes up out of the hole, but eventually you want to get more gas. And to facilitate that, there's a now technology called fracking. Actually, industry calls it "stimulating." And that's to make it more, you know, citizen-, public-wise acceptable.

But basically, it causes many earthquakes underneath the ground. They put chemicals in large amounts of fluids. Basically, if you're going to be drilling in the New York City watershed, say, you're going to be using between three and eight million gallons of water, which may be carrying tons of toxic chemicals that eventually—no one really knows where they're going to go.

Now, when they fracture, as they go down in the hole, the chemicals are added over a sequence of time, because they're put in there for various purposes. But when the little mini-explosion takes place underground, that may extend as far as 2,000 feet out from the borehole. And consequently, that extends then this ability of this fracturing process to work. Now, that's from a direct drilled pipe, and we've been using that process for years. More recently, they've gone into what they call horizontal fracturing, where as they drill the pipe down in, they bend the pipe, so that the pipe then goes off horizontally below the ground. And that can extend another 2,000 feet.

So the beauty of fracturing, of course, is that you don't have to make as many perforations on the ground, above, where the people are living, but you also have this access to maybe a radius of a mile or more around where each borehole goes into the ground.

SHARIF ABDEL KOUDDOUS: Well, let's turn to a clip from this documentary *Split Estate* that investigates fracking. This clip features Weston Wilson, an environmental engineer in the EPA's Denver office. In 2004, Wilson openly questioned an EPA study that declared fracking poses little or no threat to drinking water.

> **WESTON WILSON:** The former chairman, CEO of Halliburton, Dick Cheney, within a few months of coming into office, and as vice president, he was pressuring the administrator of EPA, Christie Todd Whitman, to exempt hydraulic fracking from the Safe Drinking Water Act regulation.
>
> From my own view as a technician, I just thought it very alarming that EPA technically had described how toxic these materials are—toxic at the point of injection—and still come out with a summary that says they don't need to be reported or regulated. And that led me, in the fall of '04, to object on technical grounds. Then the inspector general of EPA began an investigation of my complaints.
>
> And several months into that, Congress took the report from EPA saying that fracking did not present a risk, along with other information, and exempted hydraulic fracking from regulation under the Safe Drinking Water Act. That leaves you and I, as the American public, in this position: we cannot know what the industry injects in our land. It is exempt from being reported.

SHARIF ABDEL KOUDDOUS: That was Weston Wilson, an environmental engineer in the EPA's Denver office, speaking in 2004. Dr. Theo Colborn, your thoughts on what he was saying on this issue of disclosure?

DR. THEO COLBORN: Well, exactly. It's very interesting. We've been trying to get information on the chemicals that are used to fracture—well, actually, drilling and fracturing. Drilling has its problems, as well. We must not overlook that. And over the years, with the help of government datas and then also information that we've basically collected because of accidents and spills, we've been able to put together a database in which we have 944 products listed now that are being used in the states where natural gas activity is taking place.

Now, out of those 944 chemicals, we know between 95 and 100 percent of about 14 percent of the chemicals that are being used. We know what they are in those products. But we also have 43 percent of the products that are being used, we know absolutely nothing. We have no idea what's in those forty-two-gallon drums or the 350- or 360-gallon totes. So we're dealing with—the information that we're working with is only based on a very small percentage of the products that are being used. And then—

AMY GOODMAN: So, let's talk about the health—go ahead.

DR. THEO COLBORN: But the problem here is, what Wes is talking about is, 70 percent—30 to 70 percent of that water that's injected underground can possibly come back up to the surface. No one knows exactly how much stays underground and how much is going to be coming back up to the surface. So you worry about the long-term effects of that material that's staying underground, that could appear later coming up in rivers and streams, at people's well sites, that sort of thing, because we don't understand the geology underground. But then all that—the rest of that has to come back up. And what people don't realize is that gas doesn't come up out of the ground dry, either; it comes up wet. So we have the water we're taking off of

the gas that is not clean, and we have the water that's coming back up from fracturing.

AMY GOODMAN: We don't have much time, but we want to talk about the health effects. You are the president of the Endocrine Disruption Exchange.

DR. THEO COLBORN: That's right.

AMY GOODMAN: Explain what endocrine disruption is and how that relates to these chemicals that you are beginning to identify.

DR. THEO COLBORN: Well, it's amazing, Amy. We were really stunned when we began breaking out the chemicals by their major health effects, and we found that 43 percent of the chemicals in Colorado, in those that are used there, are endocrine disruptors. Now, and in our national survey, it's 37 percent.

But what endocrine disruption does, basically, these are the chemicals that we now understand better—by the way, that are made from natural gas, believe it or not—the plastics that—and pesticides and other industrial chemicals. 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. And this is our big concern today, because we're facing major pandemics of endocrine-driven disorders—simple things like ADHD, autism, diabetes, obesity, early testicular cancer, endometriosis. These are all endocrine-driven disorders that we're very concerned about.

And these products are being injected underground, for centuries, maybe, to stay before they surface, and also coming back up. So the big problem is—with natural gas, is dealing with the water when it comes back up.

SHARIF ABDEL KOUDDOUS: And the EPA now is conducting a national study looking at natural gas drilling. What do you think is the significance of the study, and is it funded well enough?

DR. THEO COLBORN: Well, I'm concerned about the funding, actually, and the time limit on it, too. It's been given to the Office of Research and Development. Dr. Paul Anastas is now running that division of EPA, which was a great appointment by Obama recently, and I have a lot of faith in him. But there is—you know, it's easy to go into a laboratory and set up some test tubes and run an experiment. But you're working with undefined geology that shifts. Every single place you go, the geology is different, the hydrology is different. And for them to be able to get out there, and in two years, with only $2 million, try to resolve this problem, I don't think they can do it.

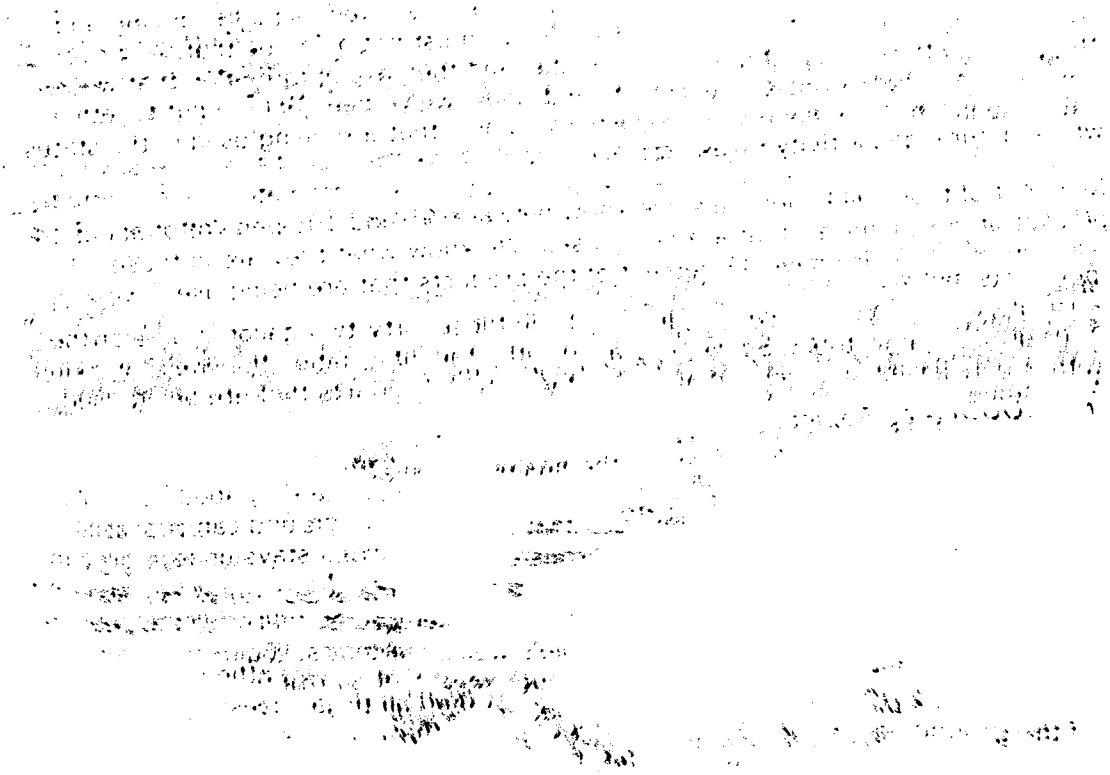
And I did sit in on their day-and-a-half meeting that they had in Washington about the plans they're thinking about and how they're going to move forward to do this study. And I'm afraid they're going to get into what is called the stakeholder process. They're going to bring in people who know nothing about it, representing all the stakeholders, just like they did with the endocrine disruption panel that they put together in 1996.

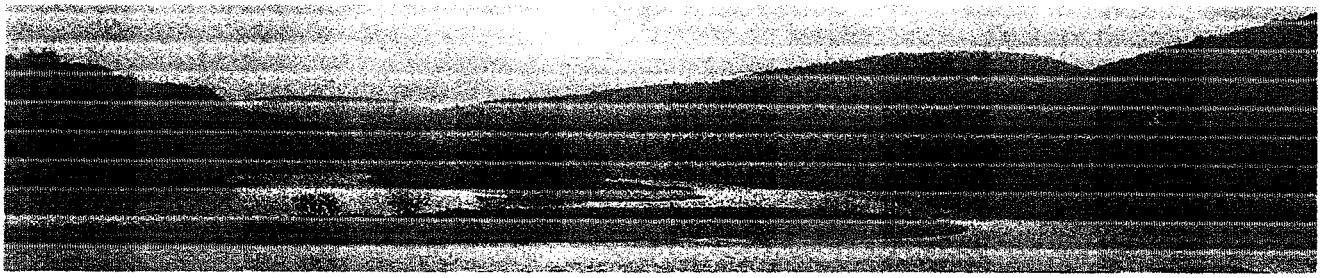
AMY GOODMAN: We have five seconds.

DR. THEO COLBORN: Five seconds, OK.

But when you give it to the stakeholders, and you don't give it to the scientists, you're—we've got to separate the research that we're doing behind all of this work that's going on from those—the corporate-controlled decision makers.

AMY GOODMAN: And, of course, we're going to continue to follow this, because, well, under the guise of energy independence, this whole issue of natural gas drilling is really coming to the fore in this country. Dr. Theo Colborn, thank you so much for being with us.





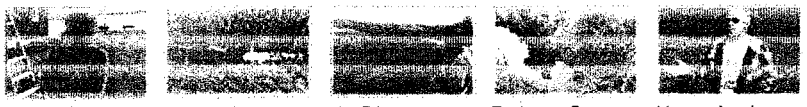
WORKING TO PROTECT OUR COMMUNITY AND HOME
And ... The Upper Delaware River Basin

We are working very hard to prevent the dire effects of gas well drilling in our township and in the **Upper Delaware River Basin**, including **Wayne County, PA** and **Sullivan County, NY**. **Overwhelming evidence now exists that the type of gas drilling proposed for our area causes contaminated drinking water, carcinogens in the farmland and food chain, torn-up roads, risk of explosions, toxic air pollution, plummeting real estate values, and screeching noise polution.**

Water-Testing Services, List of Service Providers in Upper Delaware River Region

Each deep gas well uses millions of gallons of water, sand, 171 products, and 245 chemicals (some secret & toxic). Halliburton's gas well drilling process, "hydraulic-fracturing" - is now exempt from the "Safe Drinking Water Act," "The Clean Water Act," "The Clean Air Act," "The Right-to-Know-Act", and other importnt protections. The NRDC has released a comprehansive report about this issue *. . . read more*

YouTube ...Living with Gas Wells ...*Real Life*



Water Smells | Always Noisy | No Permits | Polluted Stream | Never Again

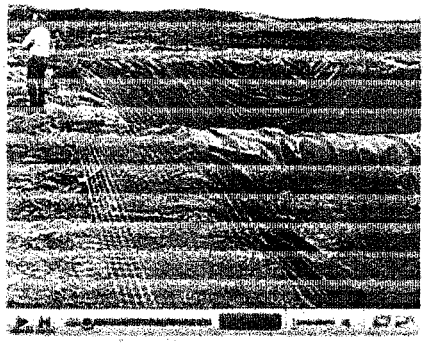
For the last two years, companies such as Equitable Productions, Noble Energy, Cabot Oil and Gas, Chief Oil and Gas, Southwestern Energy, Exco/North Coast, and Chesapeake Appalachia have sent free-lance contractors to approach landowners in the **Upper Delaware River Basin - the source of pure-water for 17 million people.** These contractors have asked landowners to sign leases that will allow for gas well drilling on their land.

GAS DRILLING IS NOT A BENIGN ACTIVITY. Besides temporary disruptions there are many possible irreversible damages to water, land, wildlife, quality of life, human health, and property values. It took only five years for Fort Worth, Texas - sitting on the same geologic strata as here and dealing with the same gas companies - to be transformed from one of the most livable cities in the country into a beleaguered industrial zone. Residents have suffered from gas fumes, piercing noise pollution and tainted water wells. The gas companies have left behind unsightly and dangerous sites that the municipality can ill-afford to correct. Such problems can result in tax increases.

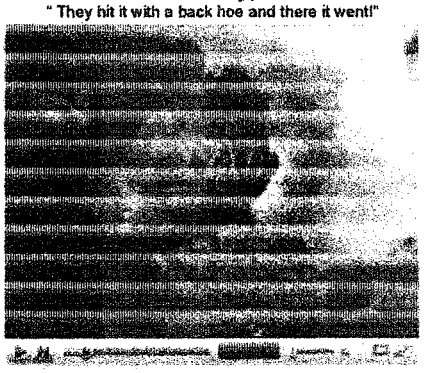
"Three New York State towns eye moratoriums."

"Gas drilling opponents hold mass meeting."

"POND & FARM RUINED"
Washington County P.A.
"Hickory Township Farmer's Personal Experience."



"HUGE GAS WELL FIRE!"
Parker County, Texas
" They hit it with a back hoe and there it went!"



THE REAL IMPACT OF GAS DRILLING

Depletion of Water Tables
Water Pollution
Decreased **Property Values**
Neighborhood **Depreciation**
Noise Polution
Air Pollution
Soil Contamination
Light Pollution
Health and Safety at **Risk**
Increased **Crime**

"Congress investigates possible water contamination caused by gas well drilling."

"Western PA landowners regret deep gas wells deals."

"Local agencies allow gas drilling exemption."

"Their money or your life."

"...Nor any drop to drink."

THE RIVER REPORTER online

In a recent meeting with the PA Department of Environmental Protection we learned that approximately 5000 to 7000 wells are projected by these companies for the **Upper Delaware River Basin. ONE well requires 3 to 5 million gallons of water in the initial drilling, and up to that much each time the well undergoes the hydraulic fracturing process used to access the gas. This water is allowed to be taken from our streams, lakes, rivers, and aquifers. It is left polluted by the chemicals used in the drilling and fracturing. Some of this water leaches into the drinking water aquifers and surface waters. Some of this water is brought up and discarded, resulting in huge trucks damaging our roads or, as allowed by the DEP, put into the topsoil with the waste from the drilling. Currently, the DEP does not have sufficient staff to provide oversight on such drilling experiments, and communities will be left to their own devices and budgets to deal with the problems that will inevitably arise.**

Compensation for this from the private companies is at most minimal. We know that farmers in our areas are hurting financially. But we also know that they love their land. There has been a great deal of misinformation distributed about gas well drilling. Please help us to protect your drinking water and land and properties. Read the facts; talk to your neighbors; donate.

PLEASE USE THIS E-MAIL TO CONTACT US:
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Please mail check to: DCS, *P.O. Box 147 • Milanville, PA 18443*

Loss of Green Space
Loss of **Recreation**
Aesthetic Impacts
Catastrophic **Accidents**
Lack of **Evacuation** Plans
Habitat **Fragmentation**
Negitive Impact on **Hunting**
Increased **Traffic**
Possible **Wildfires**
Spills of Hazardous Materials

Holding **Ponds** Containing Hazardous Liquids.

Drilling Muds used for Natural Gas Drilling are Known to **Contaminate** the Soil and Food Chain.

Damascus Image as a Pristine Setting will be Lost **Forever!**

Please allow several minutes for download.

This is a 1-hour MP3 recording of a radio presentation about the dangers for our area of gas well drilling. The program includes a 28-minute presentation by Dr. Theo Colborn, a renowned and respected expert on the subject of gas well drilling.

DCS — Damascus Citizens for Sustainability

IMPORTANT FACTS FOR THE GENERAL PUBLIC

Regarding gas drilling and the Regional Impact...

The grid on this map the areas target the gas companies

The effects of drilling goes beyond this area to downwind pollution, water pollution of the Delaware River which the water supply to 17 million people.

Did you know The Delaware River Watershed provides **drinking water to over 17 million people** and supports a world-class **trout fishery** and **bald eagles**?

Gas Drilling is not a benign activity. Besides temporary disruptions there are many possible irreversible damages to the water, quality and quantity, the land, wildlife, quality of life, property values. We must take the responsibility to decide what we want our community and our environment to be like in five years. That is the length of time it took Fort Worth, Texas, -sitting on the same geologic strata as here and dealing with the same gas companies as are here - to be transformed from one of the most livable cities in the country into a beleaguered industrial zone.

The reason the companies want to lease land is that the lease gives them the right to pollute and they then leave. They leave the pollution behind. There is much documentation of water and surface pollution and other harms done by the drilling and exploration activities.

We can and must assert our rights of self governance to take the power of decision for ourselves. **The State of Pennsylvania in Article 1, Section 27 of the State Constitution says that The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment.** Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.

We must insist that the State of Pennsylvania live up to its obligations.

Below, please see links to important facts:

23-MINUTE RADIO INTERVIEW:
What are the health hazards of gas drilling? **Dr. Theo Colborn,** author of *Our Stolen Future* discusses the health impacts to humans, wildlife and domestic

animals in areas of gas drilling:
http://www.prx.org/pieces/20015

The **2005 Energy Act** provided the oil and gas industry with numerous exemptions from provisions of federal laws intended to protect human health and the environment. Below is a comprehensive **NRDC** Report:
➡ http://www.nrdc.org/land/use/down/contents.asp

NY TIMES, OP-ED:
"Recovering From Wyoming's Energy Bender"

This is a website put up by a community group in Fort Worth, Texas who are speaking the truth about the gas drilling going on there:
http://www.fwcando.org

A VIDEO - about the True Cost of Gas Drilling:
http://www.fwcando.org/video

Oil & Gas Accountability Project:
http://www.ogapold.org/

Facts and data about gas drilling:
http://www.ourpubliclands.org/public-lands-faq/oilandgas101

A River Reporter Editorial:
http://www.riverreporter.com/issues/08-01-31/editorial.shtml

Free book about gas drilling, "OIL & GAS AT YOUR DOOR":
http://www.earthworksaction.org/LOguidechapters.cfm

Mining, Drilling Issues:
http://www.earthworksaction.org/mining_issues.cfm

About the Allegheny national forest and what has been happening there:
http://www.alleghenydefense.org/hchronicles/?p=32

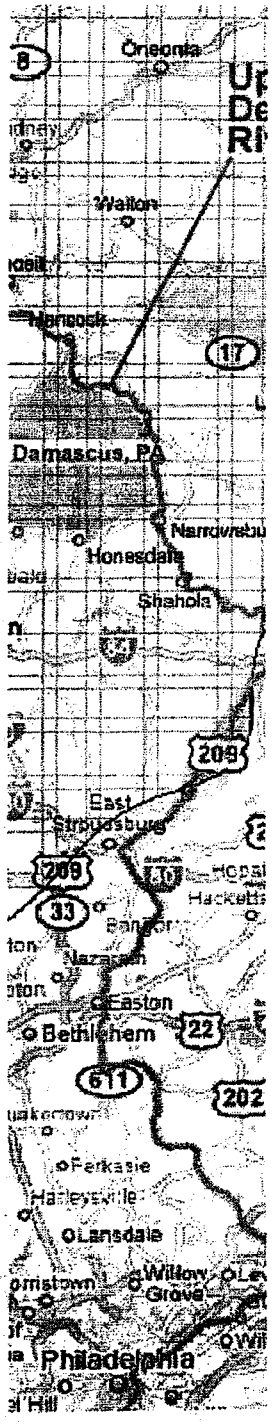
PICTURING LANDSCAPE CHANGE:
To see what it would look like around here, look at the link below and see the picture of the Jonah gas field - each well pad - the dots - are 4 to 5 acres.
The Truth from Above.

.....
One-Page FLYER (PDF) for your distribution.
.....

The threat from gas and oil field waste injection wells.
Published in The Texas Observer May 2006:

"What Lies Beneath"

Gas drilling issues in Nockamixon, PA:
http://nockamixon.us/Issues/gas/gasandoil.htm



Endocrine Disruption Exchange what happens to the human body when exposed to toxins from gas drilling and other mining:
http://EndocrineDisruption.com

For More Information - Fact Sheets:
Contaminants associated with the various stages of gas development:
• Oil and Gas Pollution

Air pollution from gas facilities:
• Think Again

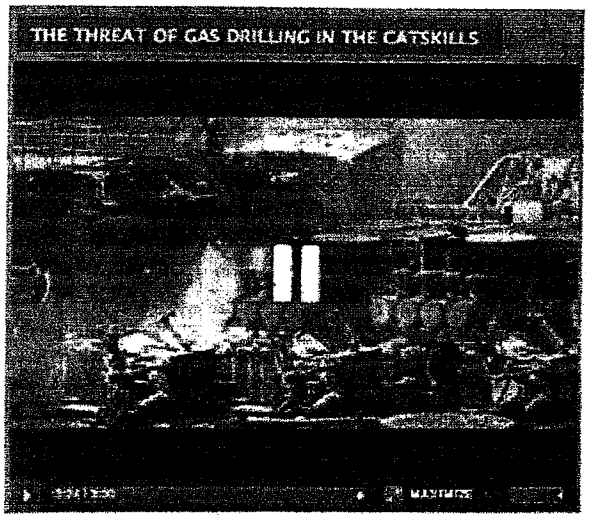
Contamination and regulation issues:
• Pits

A brief look at the major issues:
• Fracking

---

http://www.catskillmountainkeeper.org/node/290

The effects of drilling on the Catskill environment have the potential to be devastating. Carcinogens that accompany deep drilling also have the ability to penetrate our water supply— a water supply that provides drinking water to NYC through aqueducts connected to the Catskill Watersheds. Perhaps the most devastating effects of drilling will be the endangerment of the natural beauty of this region, and the carbon emissions that come with the further use of fossil fuels:



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CURRENT RESEARCH

What Damascus Citizens and Friends have discovered...

The oil and gas industry now enjoys numerous exemptions from provisions of federal laws intended to protect human health and the environment:
http://www.nrdc.org/land/use/down/contents.asp

August 10, 2008

Basin Commission presses gas driller.

By Peter Becker, *Wayne Independent*

Stone Energy Corporation, the company that has been drilling for natural gas in Clinton Township, Wayne County, is being pressed by the Delaware River Basin Commission (DRBC) to comply with their regulations.

Carol Collier, Executive Director of the DRBC, told the Upper Delaware Council (UDC), Thursday night, that it has informed Stone Energy that it will need to apply for and receive approval from the commission before it can extract natural gas in Wayne County.

The company began drilling this Spring on the lands of Louis Matoushek near Creamton. As of the end of July, this is the only natural gas drilling that has begun in Wayne County despite many hundreds of applications to the Pa. Department of Environmental Protection (DEP), according to the DEP.
Collier said that a letter was sent by the DRBC to the company over a month ago and so far there has been no reply. A compliance letter was sent Wednesday. "There are fines running," said Collier.

The June 6th letter from Collier to Stone Energy stated in part, "We understand the project to include among other things water withdrawals, the addition of chemicals to the water, the injection of the water into the ground and the recovery, storage, reuse and/or disposal of the water." The letter goes on to say that in accordance with the Delaware River Basin Compact and the DRBC's Rules of Practice and Procedure, "a project sponsor may not commence any withdrawal of ground or surface water from the basin, drill any well, construct any impoundment or other associated appurtenances, discharge to the ground waters or surface waters of the basin or otherwise undertake the project until the sponsor has applied for and received approval from the commission."

The company also plans to drill in neighboring Mount Pleasant Township.
DEP has advised the DRBC that it will be requiring all natural gas drillers to obtain DRBC or Susquehanna River Basin Commission (SRBC) approval as a condition of Pa. DEP-issued permits for projects in those two basins. In addition, drillers will be required to obtain DRBC or SRBC approvals prior to the initiation of any activities. She said that the DRBC requires review if as much as 100,000 gallons per day is withdrawn in a 30 day period. She added that the DRBC is not aiming to stop natural

What in your heart of hearts do you want to happen to the land, the trees, the animals, the water etc. in Damascus Township?

●

What do you want to leave your children and your grandchildren?

●

There is no need to rush into something that has the possibility of damaging our environment for many years to come.

●

Also real estate values will go to a fraction of the current ones; jobs in tourism, hotels, restaurants, the construction sector etc. will disappear - who will want to have a second home or visit an industrial zone?

●

gas drilling, but rather "to do it as smart as we can so we don't dry up our trout streams."

Collier suggested that perhaps certain areas should be restricted from drilling, due to sensitivity of environmental issues. UDC's delegate from the Town of Hancock, Fred Peckham, replied that if access were restricted, perhaps the property owner should be compensated, whose right to extract minerals from the ground would be infringed. Collier stated she did not feel restricting access was in the purview of the DRBC, but was suggesting it should be considered.

The Millennium Pipeline, which will carry natural gas, is currently being constructed through New York State's Southern Tier and Upper Delaware region. Charles Wielamd, UDC's Town of Tusten representative, asked if the DRBC could regulate any feeder pipeline from Wayne County drill sites, that might go underneath the Delaware River to access the Millennium Pipeline.

Collier stated they wouldn't have control over that unless it affected the flood plain. She said she understood the gas well in Wayne County had been drilled and is capped, without means at present to pipe the gas elsewhere, which might be extracted.

Editorial:

During a 5-year period in Colorado, the oil & gas industry reported **1,435 spills** in excess of 5 barrels. The spilled products included crude oil, produced water, diesel fuel, glycol, lubricating oil, hydraulic fracturing fluids, drilling muds and natural gas leaks. 23% of these spills contaminated water sources. The New Mexico Oil Conservation Division has detected and documented **743 incidents of groundwater contamination** from oil and gas facilities across the state.

The nonprofit group Endocrine Disruption Exchange analyzed 171 products and 245 chemicals used in the gas drilling process in Colorado. They found 92% of the products had health effects covering a vast range of symptoms and disorders. Hydrogen sulfide, a deadly gas, is found at many gas sites throughout New Mexico. In the San Juan Basin alone, there are approximately 375 wells that contain hydrogen sulfide.

Naturally occurring radioactive material can travel up a well hole with gas and its byproducts. Decontamination specialists have disposed of more than **378,696 barrels of this radioactive waste** in Texas since 1996.

On June 7, 2006, employees at Halliburton Energy Services in Farmington, New Mexico spilled 30 to 60 gallons from a 600 gallon tank of acid. This chemical was used for the hydraulic fracturing of gas wells. The spill sent a toxic cloud into the neighboring community resulting in a mass evacuation of 200 residents.

There are a number of cases in the U.S. where hydraulic fracturing is the prime suspect in incidences of impaired or polluted drinking water. These cases have been reported in Alabama, Colorado, New Mexico, Virginia, West Virginia, Texas, Arkansas, Pennsylvania and other states. Residents have reported changes in water quality or quantity following fracturing operations of gas wells near their homes.

Laura Amos and her family lived in Garfield County, Colorado. In May 2001 while fracturing four wells on their neighbors' property, the gas well operator "blew up" their water well. Fracturing opened an hydrogeological connection between their water well and the gas well. "Immediately our water turned gray, had a horrible smell, and bubbled like 7-Up," she writes. "Tests of our water showed 14 milligrams per liter of methane. . . In the spring of 2003 I became very ill. I spent months in doctors' offices and hospitals. I was eventually diagnosed with . . . a very rare condition of a tumor in my adrenal gland." Although the gas company repeatedly denied it, evidence later surfaced that a fracking fluid, 2-BE had been used for the gas drilling. 2-BE can cause a long list of health problems including tumors of the adrenal gland.

"After tons of problems, mistakes, spills and damages, they finally finished the well and pipeline yesterday," an Arkansas landowner, James Weaver, wrote. "My land is a mess. My artesian water well is contaminated. My ponds are still full of their

chemicals. My creek is flowing with their chemicals from the west side to the east and down into the City Lake."

Dr. Theo Colborn, the author of *Our Stolen Future*, describes the gas-drilling process as follows: Fracturing of wells is the practice in which millions of gallons of fluids are injected underground, creating a mini-earthquake that facilitates the release of natural gas. The gas industry claims that 70% of the material it injects underground is retrieved. While the fate of the remaining 30% is unknown, the recovered product is placed in holding pits on the surface and allowed to evaporate. This results in many highly toxic chemicals being released into the air, as well as being dispersed into local surface waters. The condensed residues remaining in the pits are taken off-site and dealt with in two ways: (1) They can be re-injected in the ground posing concerns for aquifers, or (2) they can be "land farmed" by which they are incorporated into the soil through tilling. Land farming can release toxic chemicals to the air via volatile substances and dusts, or result in accumulation of mixtures of toxic metals in the soil.

If allowed here in Wayne County, this fracturing process would extend a mile or more below the earth's surface into the Marcellus Shale bed. This ancient rock formation extends across the entire length of PA to Wayne County and into Sullivan County as well. Similar beds of shale exist in Arkansas and in Texas where the same deep-bed fracturing process has been underway for many years. Many of these tales of environmental devastation, of few of which are related here, emanate from these communities where the same gas drilling procedures proposed for Wayne County has been taking place.

If we think our government is going to protect us, it is unlikely to happen given the current state of government regulations which have been either gutted or rewritten to benefit the gas industry. We owe it to ourselves and to future generations who will live on this beautiful land and depend on its air and water, to protect against this harm that people have suffered elsewhere due to irresponsible, under-regulated gas drilling.

Ron Hine
Damascus, PA

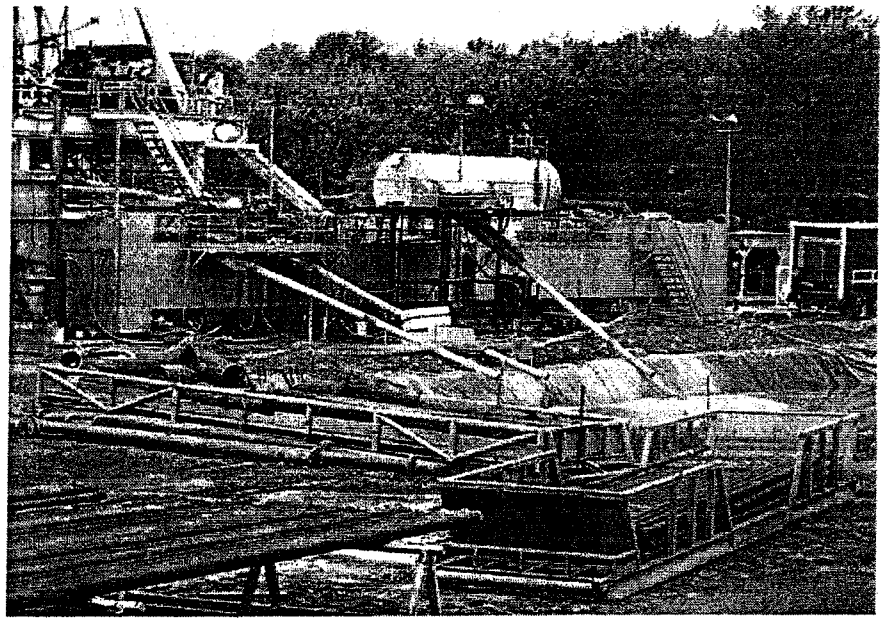
23-MINUTE RADIO INTERVIEW:

http://www.prx.org/pieces/20015

What are the health hazards of gas drilling? **Dr. Theo Colborn**, author of *Our Stolen Future* discusses the health impacts to humans, wildlife and domestic animals in areas of gas drilling. She shares with your listeners the truth behind the industry claim that they only use sand, water and soap in the drilling process. She exposes the chemicals they actually use and the extreme heath dangers of these chemicals. Research has documented that 91% of these chemicals are hazardous to health as result of being skin and sensory organ toxicants, respiratory toxicants, gastrointestinal and liver toxicants, neurotoxicants, kidney toxicants, cardiovascular and blood toxicants, immunotoxicants, carcinogens, reproductive toxicants, wildlife toxicants, developmental toxicants and endocrine disruptors. Historically, these chemicals have not been properly handled, causing air and ground water pollution. As air and water are mobile - this affects us all!

DCS • Damascus Citizens for Sustainability, Inc. • P.O. Box 147 • Milanville, PA 18443

Drilling 101



What is different about the Marcellus?

There has been gas drilling in NYS for over 100 years in conventional gas plays. But a new drilling process, called "high-volume hydraulic fracturing," has made the huge natural gas reserve in the Marcellus Shale recoverable. Drilling will most often be done horizontally in the Marcellus Shale.

Extent of Formation

Unlike other gas formations, the Marcellus is vast and continuous. Although it varies in depth and thickness, the Marcellus underlies the entire southern half of the state (and extends under PA, WV, and eastern OH) **(1)** Marcellus development in NY is expected to begin in the Southern Tier, along the Millennium Pipeline (which runs from Corning to Rockland County), and to radiate North from there.

Hydraulic Fracturing (also known as hydrofracking)

Unlike in conventional gas reserves, the gas in the Marcellus is trapped and dispersed throughout the shale in tiny pores, and must be released in a process called hydraulic fracturing, or fracking. In each fracking, 2-9 million gallons of water mixed with sand and chemicals are forced through the well into the formation at high pressure to fracture, or crack, the shale. Roughly half the fracking fluid remains in the ground. The rest of it (1,000,000 to 4,000,000 gallons) comes up out of the well and is considered industrial waste and must be disposed of. Each well may be fracked up to ten times during its productive life. **(2)**

Watch a video from the natural gas drilling industry showing horizontal hydrofracturing >

Water Usage

Fracking requires large quantities of fresh water. Fracking the Marcellus will require many billions of gallons of water over the next 15 years. This water can be withdrawn from lakes, rivers, streams, wetlands, ponds, and wells. Because the water becomes contaminated, it may never be returned to the watershed. **(3)**

Fracking Fluids

Most of the recent advances in fluid technology for shale gas recovery are owned by Halliburton. The gas industry describes fracking fluids as being "like soap and oil." However, because Halliburton classifies the fracking fluids as proprietary, nobody knows for sure what is in them. Samples from well blowouts and fluids pits in Colorado, Wyoming and New Mexico found fluids to contain diesel fuel and more than 200 different kinds of chemicals, over 95% of which have adverse side effects including brain damage, birth defects and cancer. **(4)**

Fluids Disposal

The produced water from the Marcellus Shale is toxic waste. In addition to the added chemicals, the water picks up hydrocarbons, heavy metals like arsenic, and radioactivity from the shale. **(5)** Billions of gallons of waste water will be produced in our area alone and will need to be trucked to a final disposal site. The most common method of disposal will be Deep Well Injection Disposal, where the waste is forced underground at high pressure into dry gas wells. **(6)**

Well Life

Marcellus wells are long lived. They will remain active for decades, up to 40 years. **(7)**

Well Spacing

Marcellus wells can be spaced in 40-acre units or 16 wells per square mile. An average town could contain up to 1,500 wells. **(8)** The photograph above is of the Jonah field in the Rockies; this is what 40 acre spacing gas development looks like.

Well Pad Size

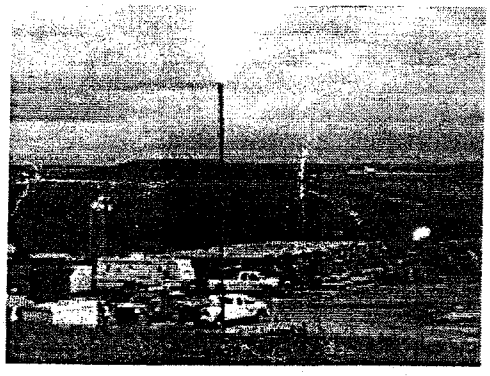
When hydrofracked and drilled horizontally, Marcellus wells require large, industrial pad sites. Depending on how many well heads it contains, a pad will range from 5-15 acres.

Noise

Like all natural gas production, Marcellus wells have temporary noise pollution from drilling and fracking that will last about a month per well. In addition, compressor stations will be needed for every 100 or so wells, to bring the gas pressure in gathering lines up to that of larger pipelines. Compressor stations are permanent, extremely noisy, and run day and night.

Traffic

All gas development creates traffic in rural areas. The large scale of development planned for the Marcellus, and the fact that it must be fracked, translates to dramatic increases in traffic compared to that generated by drilling conventional wells. One well service company, Gas Field Specialists, uses tanker trucks that can carry 5,460 gallons of fluid. If one well requires 2 million gallons of water for one fracking, that's 366 tanker trucks hauling fresh water and 183 tanker trucks hauling waste water, for a total of 549 tanker truck trips per well, per fracking. For the average fracking, which may take 3.5 million gallons, that is 960 tanker truck trips. In Pensylvania, the DEP estimates that one horizontal Marcellus well requires 1,000 truck trips during drilling and fracking.



Air Pollution

Each well site emits air pollution. In addition to pollution from diesel generators, drill rigs, trucks and other equipment, condensate tanks and the flaring of wells are significant sources of VOC's and nitrogen oxide, which react with sunlight to form ozone. Proposed Marcellus Shale drilling in New York will be high density. In high-density drilling areas in Colorado and Wyoming, rural communities that were once pristine now have ozone levels higher than Los Angeles. Ozone can cause a range of respiratory health problems and lung disease.**(9)**

Sources

(1) Pennsylvania Geology, The Marcellus Shale-An Old "New" Gas Reservoir in Pennsylvania, Vol. 38, NO.1, 2008

(2)**http://www.propublica.org/special/hydraulic-fracturing**

(3) Calculations based on water withdrawal rates by companies operating in Pennsylvania. Susquehanna River Basin Commission, Bucknell University, September 11, 2008 **http://www.srbc.net/programs/projreviewmarcellus.htm**

(4)Analysis of Chemicals Used in Natural Gas Production: Colorado, Theo Colborn, PhD, February 6, 2008

(5)**http://www.earthworksaction.org/FracingDetails.cfm**

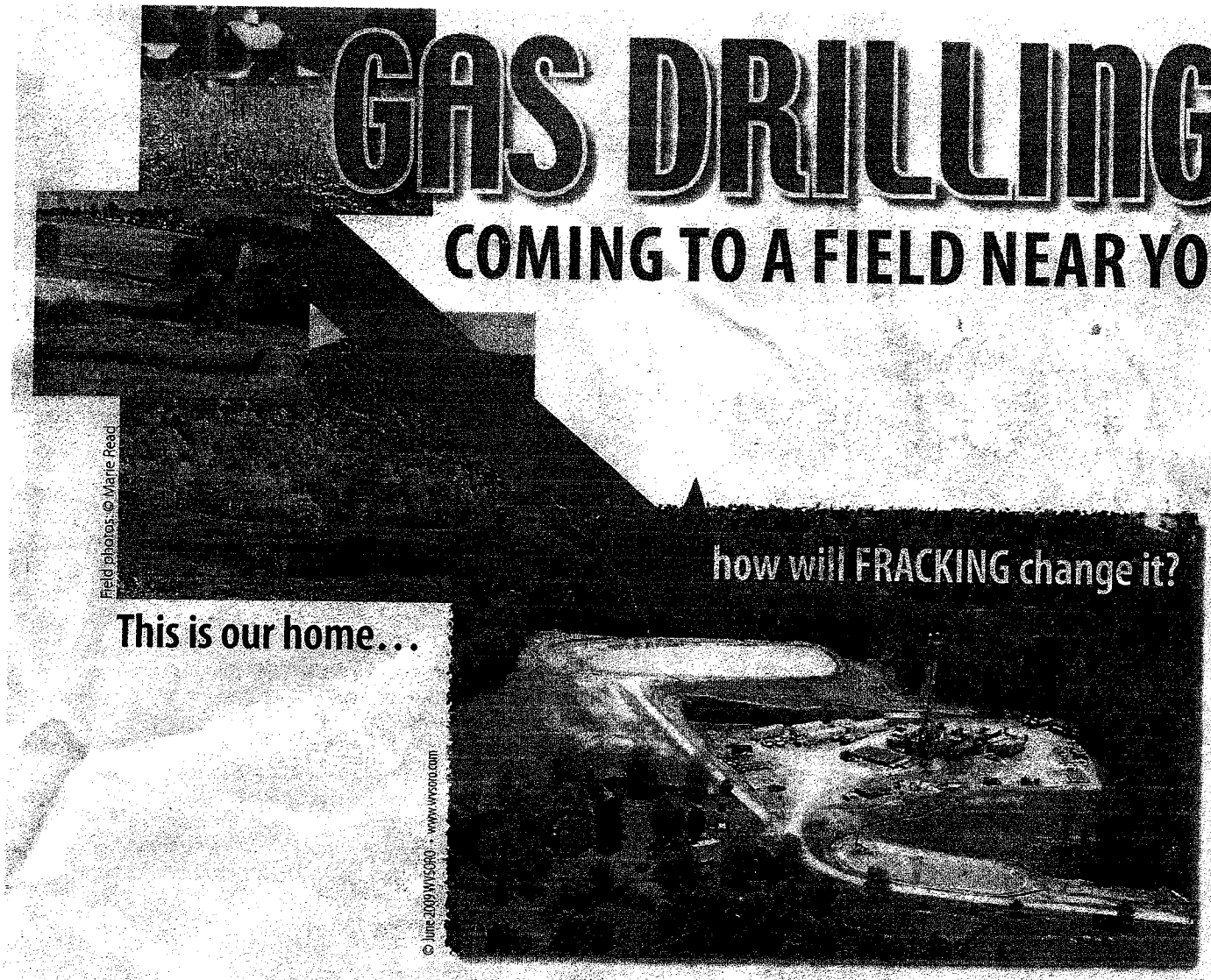
(6)Draft Scoping Document for Horizontal Drilling and High Volume Hydraulic Fracturing to Develop Shale and Other Low Permeability Gas Reservoirs, New York Sate Department of Environmental Conservation, 2008

(7) Industry Sources

(8)Draft Scoping Document for Horizontal Drilling and High Volume Hydraulic Fracturing to Develop Shale and Other Low Permeability Gas Reservoirs, New York Sate Department of Environmental Conservation, 2008

(9)Draft Oil and Gas Ozone Reduction Strategy, Regional Air Quality Counsel of Colorado, presented at April 10, 2008 meeting

GAS DRILLING:
COMING TO A FIELD NEAR YOU?



This drilling is *different* – it's *industrial.*

Hydrofracturing ("fracking") is the high-pressure pumping of a chemical slurry into the ground, shattering shale to release gas. But the chemicals are not all recovered. ***Where will they end up?*** Well sites are industrial areas of 4–6 acres with roads, drill rigs, pipelines, storage tanks, compressors, dozens of tanker trucks, holding lagoons for toxic fluids, lights, and buildings for workers. And ***thousands of wells may be fracked in the region within a few years.***

Environmental Impacts

- **Fresh Water Used:** 2–9 million gallons used per well fracking, taken from our ponds, streams, lakes, and aquifers for free.
- **Chemicals:** 140,000 lbs. of chemicals per fracking: benzene, formaldehyde, toluene, and more. 65 are classified as hazardous waste. Many cause cancer or birth defects.
- **Water Pollution:** Many private water wells have been contaminated in areas near gas drilling operations.
- **Air Pollution:** Toxic gases—benzene, radon, acetone, hydrogen sulfide, and more are released at well sites.
- **Noise Pollution:** fracking, drilling and trucking are ***loud.*** Drilling operations run 24/7. Compressor stations will run 24/7 for years.

Economic Impacts

- **Decreased Property Values:** After drilling, nearby home and property values plummet.
- **Road Damage:** Each fracking requires 550–2,500 tanker truck trips. ***Who will pay for road and bridge damage: our local taxes?***
- **Jobs Not Local:** Many gas industry jobs are specialized and use out-of-state companies & workers.
- **Emergency Response Costs:** Accidents happen, and chemical fires, spills, and increased traffic accidents will increase emergency response needs. ***Who pays?***
- **Business Impacts:** Heavy industrial development can harm our local businesses, tourism & agriculture.

Gas Industry Exemptions

The oil & gas industry, ***unlike all others,*** is not required to comply with any of these federal or local laws:

- Clean Air Act
- Clean Water Act
- Safe Drinking Water Act
- Superfund Law
- Federal Right to Know Law
- Resource Conservation & Recovery Act
- Local land use & noise ordinances

They don't have to tell us what chemicals they inject into the ground beneath us, even in life-threatening emergencies!

Concerned? The time to get involved is ***now!***

Go to **www.gdacoalition.org** to learn more or get involved.

DAMASCUS CITIZENS FOR SUSTAINABILITY

Civilization exists by geological consent, subject to change without notice.
Will Durant

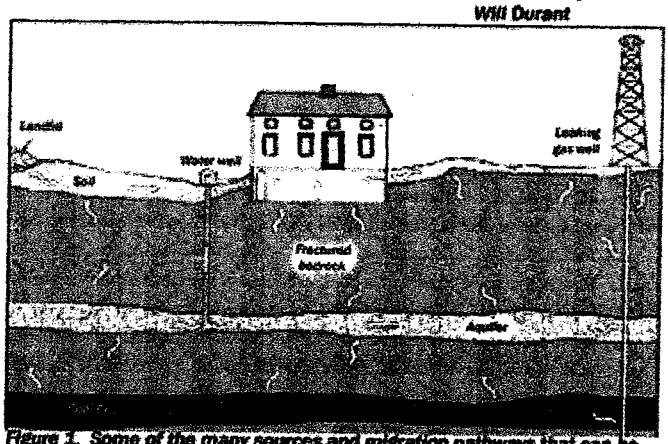


Figure 1. Some of the many sources and migration pathways that can be responsible for natural gas leaking into a building.

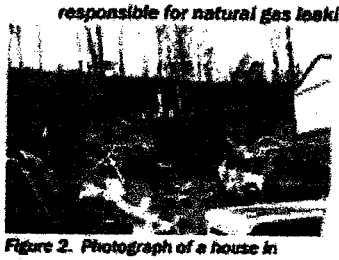


Figure 2. Photograph of a house in western Pennsylvania that exploded and burned as a result of natural gas leaking into a basement from a nearby gas well. Photo taken by Fred Baldassare

Section "A" is taken from "Natural Gas Migration Problems in Western Pennsylvania / The Pittsburgh Geological Society.

SECTION "A"

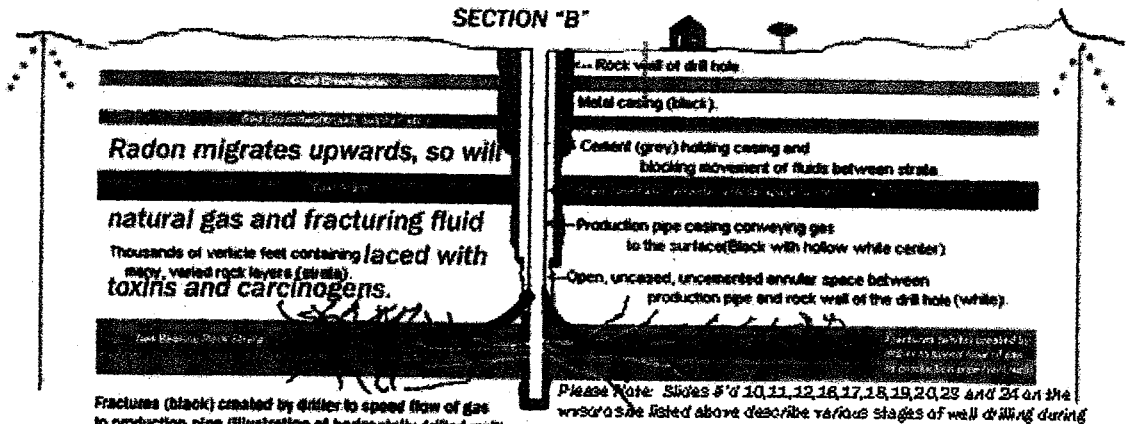
Gas Migration Problems...

Natural gas, which occurs in significant quantities in the subsurface rocks in... Pennsylvania...can...be a major geologic hazard in some circumstances. Under certain conditions it can escape from reservoir rock,coal seam, pipeline, gas well or landfill. If the gas migrates through the bedrock and soil, it can result in an explosion capable of damaging property and causing loss of life. ...Gas migration typically occurs along fractures in bedrock and through permeable soils and aquifers. The gas can then enter a building through cracks in foundations and basement walls, along pipes, through water wells, or other openings (Figure 1). If the air circulation in the building is poor, ...a spark from a furnace or a faulty wire, a cigarette, a lit match might cause the gas to explode with devastating results (Figure 2).

Section "B" is a composite drawing based on slide #'s 3 and 4, see: http://www.wvsoro.org/resources/how_a_well_is_drilled/index.html. Those slides show a drilled vertical well with fracturing occurring in the gas bearing shale (white lines), and extending beyond the shale above and below (black extended lines). From this illustration, I have drawn a general representation of a horizontally drilled well with fractures extending up and down from the drilled areas (black).

key

SECTION "B"



Fractures (black) created by driller to speed flow of gas to production pipe (illustration of horizontally drilled well).

Please Note: Slides #'s 10,11,12,16,17,18,19,20,23 and 24 on the website listed above describe various stages of well drilling during which pollution to drinking water may occur. James Barth, 9/22/08

Various stages of well drilling during which pollution To drinking water may occur

Once you "lease" your land to a gas company, your land is destroyed forever,

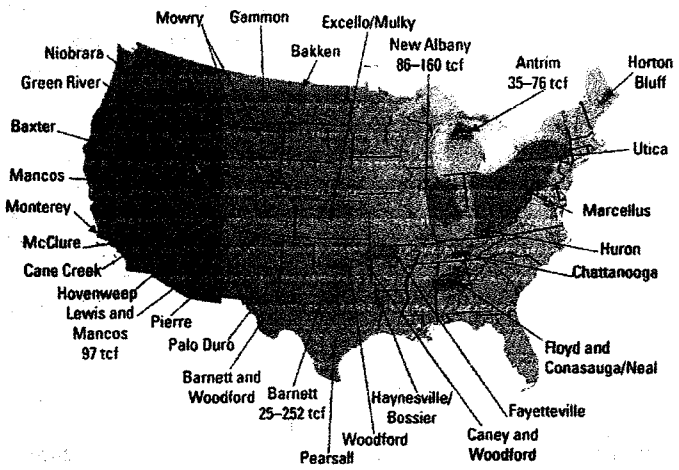
FACT SHEET: Natural Gas

Natural Gas Basics

Natural gas is a gaseous fossil fuel consisting primarily of methane, but includes significant quantities of ethane, propane, butane, and pentane – heavier hydrocarbons removed prior to use as a consumer fuel – as well as carbon dioxide, nitrogen, helium and hydrogen sulfide. Natural gas is not the "clean" fuel it's purported to be. Toxic metals like lead and mercury can be found organically-bound in natural gas, as can radioactive radon and other toxic contaminants. Natural gas is found "associated" with oil in oil fields, or can be found "non-associated" (dissolved or isolated in fields of natural gas), and in coal beds (as coalbed methane). Since the 1990s, with the development of slickwater hydraulic fracturing, massive shale formations across the U.S. have begun to yield large amounts of natural gas.

In the late 1990s, there was a mad rush to build around 1,000 new power plants, nearly all of them natural gas fired. Grassroots community opposition stopped most of them, but about 400 were built. As gas prices started rising dramatically after in 2000, many of these power plants sat idle or operated only when necessary. Another mad rush of development followed, starting around 2003, as proposals for over 60 new liquefied natural gas (LNG) import terminals were proposed in North America (40 in the U.S.), so that gas could be imported from across oceans, requiring that we go to war for gas as well as oil. Only a few new terminals were built due to a combination of community opposition and falling gas prices – the result of the economic depression plus increased supply from new domestic reserves opened up by hydraulic fracturing.

98.5% of natural gas consumed in the U.S. comes to us via pipeline from the U.S. and Canada. However, natural gas production is nearing its peak in North America. Over the past decade, we're drilling more and more, but production is leveling off and will drop sharply in the not-too-distant future. The recent shale developments are providing a slight recent surge in domestic production, but the hype will likely be short-lived since the typical shale gas well declines 81% in the first two years of production. World-wide, natural gas production will peak in a plateau between 2027 and 2045, before dropping dramatically.



Natural Gas Worse for the Climate than Coal

Since methane, the principle component of natural gas, is as much as 25 times as potent as CO_2, if only 2% of the gas moving through pipelines leaks, the effect on climate change is thought to be equal to that of burning coal. Experts say that in fact, 3-5% loss in transmission is normal, and up to 20% is known to happen.

Hydraulic Fracturing

Hydraulic fracturing is a natural gas extraction process by which water, usually mixed with highly toxic chemicals, is forced down a drilled well at extremely high pressure to create or expand fractures, releasing gas trapped in rock formations. Proppants (small particles such as sand or synthetic beads) hold open the newly-created fractures so that released gas can flow toward the well. The process is also known as fracking or hydrofracking.

When drilling for gas in geologic formations where the gas is tightly bound in rock ("low-permeability gas reservoirs"), hydraulic fracturing is used in combination with horizontal drilling, in which the drill bit is gradually turned sideways to penetrate long distances away from the vertical well bore (hole). Because of the very large quantities of water and pressure needed for this process, it is called horizontal drilling / high-volume hydraulic fracturing, or HD/HVHF.

HD/HVHF is an industrial activity and the areas where it is used become polluted industrial zones. Rural areas are often exploited, but suburban and urban areas are increasingly subjected to an invasion of heavy equipment and dangerous activities.

Water

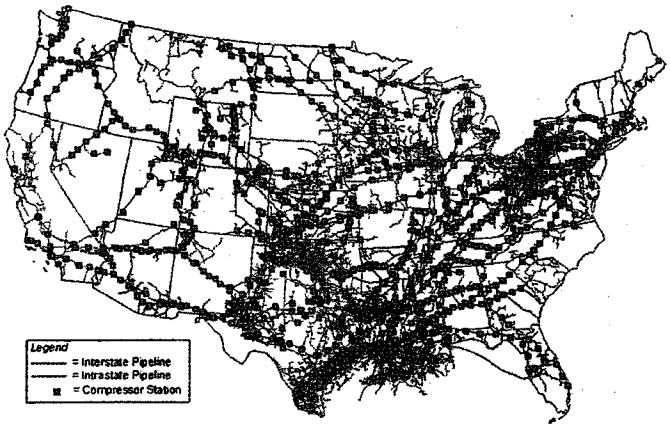
HD/HVHF gas wells can require anywhere from 1 to 9 million gallons of water per "frack." Wells have to be re-fracked approximately every 5 years to restimulate production. Such high water use creates issues such as where to obtain it, traffic and pollution from getting hundreds of heavy truckloads of water to the drill site, deliberate contamination of the water, and trucking all of the wastewater away to be disposed of somewhere. Wastewater must be stored onsite at least temporarily, leading to repeated problems with leaks and overflow during heavy rains. Additionally, ancient "formation water" may be released in the well completion process. This 'brine' is typically far saltier than seawater and presents serious disposal issues. Spills and other unintended releases are inevitable industrial accidents. Clandestine dumping is widely suspected and has been reported.

Chemicals & Sand

The chemicals used in hydraulic fracturing are known to cause a wide variety of health problems. Increasingly, reports from affected areas indicate a prevalence of serious and incurable disorders in people and animals living near natural gas extraction or transmission facilities (pipelines and compressor stations). Even the special sand used as a proppant has a destructive effect on the communities where it is mined. See www.ccc-wis.com

Pipelines & Compressor Stations

Natural gas is transported with networks of pipelines, with smaller gathering lines joining into larger interstate pipelines and branching out again to reach various markets. Pipeline routes are dotted with compressor stations, where energy is consumed to pressurize the gas to keep it moving – sometimes thousands of miles until it reaches its destination. Compressor stations run continuously and are very noisy. Pipelines cut through forests, farms and residential neighborhoods and even run under rivers and lakes, disturbing a variety of environments, sometimes in very damaging ways, like where toxic sediments on lake bottoms are stirred up by "jet trenching" used to bury pipelines in a lake bed. Pipeline routes are frequently established through the process of eminent domain (government taking of private land). The aging pipeline infrastructure leads to fequent leaks, which regularly produce explosions that are costly in property damage and lives lost.



Power Plants

68.5% of natural gas is used for heating industrial processes, homes and businesses. 2.8% is used in transportation. The remaining 28.6% is burned in power plants to make electricity. After approximately 400 new gas-burning power plants were built since the late 1990s, there is now 37% more natural gas electric generating capacity than coal. However, more than half of that capacity is not used (which is why coal provides three times more electricity than gas does).

Natural gas burning power plants are major air polluters, releasing carbon dioxide (CO_2), nitrogen oxides (NOx), sulfur oxides, fine particulate matter, ammonia, volatile organic compounds and a long list of toxic and hazardous air pollutants, such as lead, mercury, benzo(a)pyrene and polycyclic aromatic hydrocarbons. A single 1,000 MW gas plant can legally release over 3 million pounds of regulated air pollutants a year, including 40 pounds of lead, 28 pounds of mercury and over 33,000 pounds of hazardous air pollutants, many of which cause cancer. This doesn't count CO_2, since CO_2 isn't yet regulated. As little as 0.002 pounds of mercury deposited annually into a 20-acre lake can contaminate fish to a level where they're unsafe to eat.

Noise

Heavy truck traffic, drilling, and fracking are all extremely loud and invasive for people living nearby. Extraction-related activities go on around the clock, 7 days a week. The development and completion of gas wells continues without letup, with one day of cessation per year: Christmas. In addition to this being intensely stressful, people living near compressor stations can develop a life-threatening condition called vibro-acoustic disease. Compressor stations and power plants (especially the air-cooled kind) are also significant noise polluters.

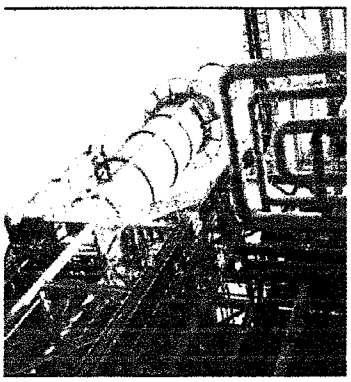
Air pollution

Invisible gas leakage (made visible) from gas storage tanks at a drilling site in Texas.

In addition to the air pollution from power plants, communities near drilling operations, compressor stations and natural gas storage tanks also suffer from polluted air. At drilling sites, this results from diesel exhaust from heavy truck traffic and from the extraction activities. Volatile organic compounds evaporate easily from the chemicals used in drilling and fracking, as well as from the extracted gas. In Fort Worth, Texas, in the Barnett Shale, natural gas storage tanks and compressors are thought to have as great a negative impact on air quality and be as great a cause of the increasing smog as all automotive traffic in the Metroplex. Recent video footage taken by the Texas Commission on Environmental Quality using an infrared camera clearly shows fugitive hydrocarbon emissions billowing from storage tanks. Storage tanks are designed for a certain legally-permitted amount of leakage. In the small town of DISH, Texas, where numerous pipelines and compressor stations have been built in recent years, there has been a corresponding die-off of trees, livestock have died of mysterious causes, and humans are developing a range of unusual medical problems.

Regulation

Over decades, the oil and gas industry has lobbied for and gotten exemptions from a wide array of federal laws, including laws requiring environmental impact statements, laws regulating hazardous waste and toxic site cleanup, laws requiring reporting of toxic emissions and laws to protect the air and drinking water. The industry lobbies to keep nearly all regulation at the state rather than federal level, saying that the states do a good job of regulating. The evidence strongly suggests otherwise.



Co-Authored by:
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Energy Justice Network 215-743-4884 fossilfuels@energyjustice.net **www.energyjustice.net/naturalgas/**

Oct 2009

DCS Damascus Citizens for Sustainability

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WORKING TO PROTECT OUR COMMUNITY AND HOME
And ... in the Upper Delaware Watershed

The New York City Council is demanding a "BAN" on gas drilling in its Watershed - and we are working very hard to prevent the same dire effects of gas drilling - in our township and in the Upper Delaware Watershed [Wayne & Pike County, PA & Sullivan County, NY] because Chesapeake has begun deployment within the Watershed Region *... see map.*

Overwhelming evidence and much science now exists that the type of gas drilling proposed for this region - made possible by total federal deregulation - is a danger to the public health, causes contaminated drinking water, carcinogens in the farmland and food chain, torn-up roads, air pollution, plummeting home values, and noise polution.

RECENT PRESS

WNYC Radio, "Natural Gas Drilling: Is New York Ready."
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NBC Nightly News, "Will Gas Drilling Spoil Our Water."
New York Times, "Where Water Trumps Energy."
The Citizen Telegram, "No to Gas Well Drilling in Watershed."
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WTAE-TV Pittsburg, "Streams Drained Dry by Drillers."
Scientific American, "Drill for Natural Gas, Pollute Water."
CNN-Money, "Election May Bring Hard Look at Oil-Gas Exemption."
Washington Post, "Hunt for gas leads drillers to NYC watershed."
New York Times, "Proposed Gas Drilling Upstate Raises Concerns About Water Supply."

MORATORIUM PETITION **Sign Petition to Protect Watershed**
Sign an online Petition for a Moratorium on gas drilling in the Watershed Basin

PDF Download Printable Petitions & Documents

Each deep gas well uses millions of gallons of water, sand, 171 products, and 245 chemicals (some secret & toxic). Halliburton's gas well drilling process, "hydraulic-fracturing" - is now exempt from the "Safe Drinking Water Act," "The Clean Water Act," "The Clean Air Act," "The Right-to-Know-Act", and other importnt protections.
The NRDC has released a comprehansive report about this issue *... read more*

YouTube ...Living with Gas Wells ...*Real Life*


Water Smells


Always Noisy


No Permits


Polluted Stream

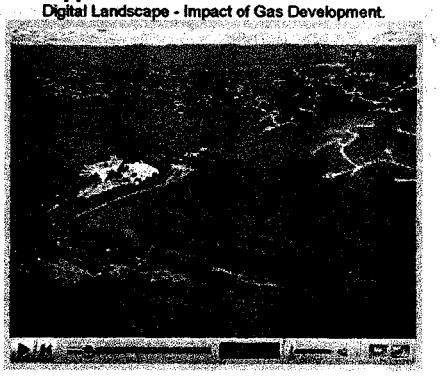

Never Again

GAS DRILLING IS NOT A BENIGN ACTIVITY. Besides temporary disruptions there are many possible irreversible damages to water, land, wildlife, quality of life, human

RESEARCH • WHITE-PAPER
Read *Download* ***White Paper***

"WTAE-TV• REPORT"
Water Contamination, Toxic Wastewater
An Excellent 6-minute, Investigative News Report.

"BEFORE & AFTER"
Upper Delaware River Watershed
Digital Landscape - Impact of Gas Development.



"OUR BELOVED RIVER"
Celebration of Beauty & Pure Source
A River Like No Other - in Danger Like Never Before.

health, and property values. It took only five years for Fort Worth, Texas - sitting on the same geologic strata as here and dealing with the same gas companies - to be transformed from one of the most livable cities in the country into a beleaguered industrial zone. Residents have suffered from gas fumes, piercing noise pollution and tainted water wells. The gas companies have left behind unsightly and dangerous sites that the municipality can ill-afford to correct. Such problems can result in tax increases.

For the last two years, companies such as Equitable Productions, Noble Energy, Cabot Oil and Gas, Chief Oil and Gas, Southwestern Energy, Exco/North Coast, and Chesapeake Appalachia have sent free-lance contractors to approach landowners in the **Upper Delaware River Watershed Basin - the source of pure-water for 25 million people**. These contractors have asked landowners to sign leases that will allow for gas well drilling on their land.

Gas Rush Poses Environmental Threat
Watershed that supplies drinking water to New York City & Philadelphia is now threatened.

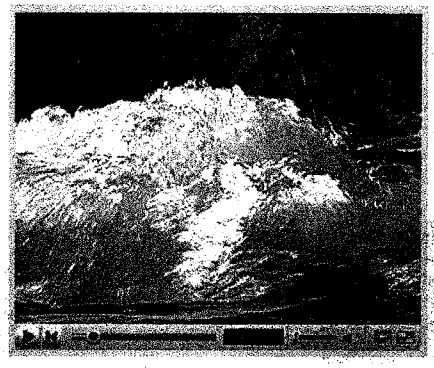
After meetings with the PA Department of Environmental Protection (PA-DEP) and NY Department of Environmental Conservation (NY-DEC) - experts have calculated that over **10,000 wells** will be drilled in the **Upper Delaware River Watershed Basin**. ONE well requires 3 to 5 million gallons of water in the initial drilling, and up to that much each time the well undergoes the hydraulic-fracturing process used to access the gas. This water is allowed to be taken from our streams, lakes, rivers, and aquifers. It is left polluted by the chemicals used in the drilling and fracturing. Some of this water leaches into the drinking water aquifers and surface waters. Some of this water is brought up and discarded, resulting in huge trucks damaging our roads or, as allowed by the PA-DEP & NY-DEC, put into the topsoil with the waste from the drilling. The PA-DEP & NY-DEC do not have sufficient staff to provide oversight on such drilling activity; and communities will be left to their own devices and budgets to deal with the problems that will inevitably arise.

THE RIVER REPORTER
"Water expert: public health is top drilling issue."
"DRBC to find out: What's in frack fluid?."
"Gas drilling opponents hold mass meeting."
"Congress investigates possible water contamination caused by gas well drilling."
"Western PA landowners regret deep gas wells deals."
"Local agencies allow gas drilling exemption."
"Their money or your life."
"...Nor any drop to drink."

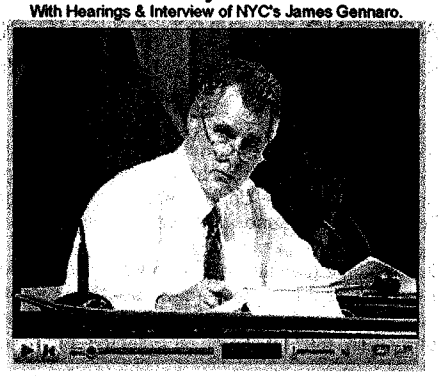
Compensation for this from the private companies is at most minimal. We know that farmers in our areas are hurting financially. But we also know that they love their land. There has been a great deal of misinformation distributed about gas well drilling. Please help us to protect your drinking water and land and properties. Read the facts; talk to your neighbors; donate.

PLEASE USE THIS E-MAIL TO CONTACT US:
DCS@mailhosts.net

Please mail check to: DCS, *P.O. Box 147 • Milanville, PA 18443*



"WATER UNDER ATTACK"
A Movie by JOSH FOX
With Hearings & Interview of NYC's James Gennaro.



THE REAL IMPACT OF GAS DRILLING

Depletion of Water Tables
Water Pollution
Decreased **Property Values**
Neighborhood **Depreciation**
Noise Polution
Air Pollution
Soil Contamination
Light Pollution
Health and Safety at **Risk**
Increased **Crime**
Loss of Green Space
Loss of **Recreation**
Aesthetic Impacts
Catastrophic **Accidents**
Lack of **Evacuation** Plans
Habitat **Fragmentation**
Negitive Impact on **Hunting**
Increased **Traffic**
Possible **Wildfires**
Spills of Hazardous Materials

Contaminant Confirmed at **Robson Well** Site.

AUGUST 30
SHOWS CONTAMINATED RUNOFF ALONG DRAINAGE RUT - AND DEAD & DYING TREES - SEE WASTE PIT UPPER RIGHT. AND THE WORK OF PAD REMOVAL HAS BEGUN.

LightHawk
Photo Copyright 2009

SEPT. 24
SHOWS THE WORK OF PAD REMOVAL IS WELL UNDER WAY - ENTIRE PAD SURFACE IS PUT IN SINGLE MOUND - WITH PIT LINER. MORE DEAD AND DYING TREES ARE EASILY SEEN.

These photos depict an aerial view of the Robson Well site in Oregon Township, Wayne County, PA. They were supplied to The River Reporter last fall by a citizen concerned about the appearance of the trees in the lower portion of the photos. An ongoing investigation has confirmed the presence of a contaminant at the site

An investigation of the Robson Well has confirmed contaminated soils at the site. This is the only active well within the watershed region. It was drilled with no oversight by watershed basin regulators - under great opposition by Damascus Citizens.

Thus we took two sets of aerial photographs, circled the site with a coordinated set of water tests, and our legal team filed an official complaint on October 5. **We have had no response:**

[Seven-page] ... Robson-COMPLAINT.pdf

WAYNE INDEPENDENT

October 21, 2009
THE WAYNE INDEPENDENT
By Steve McConnell
"Environmental Complaint Filed by Damascus Citizens."

THE RIVER REPORTER online
December 24, 2009

THE RIVER REPORTER
By Sandy Long

http://www.riverreporter.com/issues/09-12-24/head1-robson.html

HONESDALE, PA — The presence of dead or dying trees on a Wayne County natural gas well pad site has led to an ongoing investigation of the Robson Well site on Fox Hill Road in Wayne County, PA. Initial sampling performed by the Pennsylvania Department of Environmental Protection (DEP) and Chesapeake Appalachia, LLC, which drilled the exploratory well, has revealed contaminated soils at the site.

On October 15, the DEP collected soil samples there, confirming the presence of a "weathered petroleum product, possibly transmission oil or pump oil," as specified in a DEP Notice of Violation (NOV) letter submitted to James E. Grey of Chesapeake Appalachia, LLC, on November 9.

"Our investigation revealed that an uncontained release of a petroleum product had occurred at the site," notes the NOV. Based on lab results issued October 22, as well as visibly impacted soil, the DEP cites violation of several Pennsylvania laws in its NOV to Chesapeake.

The letter specifies violation of the Solid Waste Management Act for "an uncontained release of a petroleum product." For discharge of fluids to a forested area, creating the potential for "pollutional substances" to enter waters of the Commonwealth, a violation of the Clean Streams Law was cited. The investigation also found that "pollutional substances generated from activities associated with drilling were not contained in a pit or tank," constituting a violation of the Oil and Gas Act.

According to the NOV, the DEP could institute administrative, civil and/or criminal proceedings for violation of the Solid Waste Management Act or the Oil and Gas Act, each of which provide for a range of fines related to civil and criminal penalties.

Chesapeake is working with the DEP to address the situation and has submitted sample results to the DEP's Oil and Gas Program. Once delineation and remediation of a spill is called for, the DEP's Northeast Regional Office's (NERO) environmental cleanup program becomes involved.

NERO staff met on-site with Chesapeake to discuss further sampling requirements and will provide ongoing guidance. According to DEP community relations coordinator Daniel Spadoni, the DEP has approved the soil sampling plan submitted by Chesapeake. Additional sampling will continue in approximately 12 locations.

In early December, Chesapeake's consultant conducted an electromagnetic conductivity test to determine where the best areas for continued sampling are.

"The goal is to clearly define the boundaries of the spill as well as what the contaminants of concern will be," said Spadoni. The samples will be analyzed for volatile organic compounds, semi-volatile organic compounds and for total metals, such as aluminum, cobalt, nickel, chloride and more.

According to Spadoni, when the results come back, the DEP will meet with Chesapeake again to discuss the data and determine what additional remediation may be necessary.

"While we have not been able to identify any operational deficiencies that would negatively impact the environment at the Robson site, we are working with DEP to conduct follow-up tests, as well as consulting with appropriate experts to review the data and provide an independent analysis," said director of corporate development Brian Grove. "Chesapeake is committed to being a good neighbor and environmental steward wherever we operate. We are working proactively to fully and accurately account the facts of this matter and take appropriate action, if needed."

Damascus Citizens Conducted Coordinated Water & Soil Tests around the Robson Well Site.

DELAWARE RIVERKEEPER
An American Littoral Society Affiliate

Delaware Riverkeeper Network
300 Pond Street, Second Floor
Bristol, PA 19007
tel: (215) 369-1188
fax: (215) 369-1181
drkn@delawareriverkeeper.org
www.delawareriverkeeper.org

NATURAL GAS WELL DRILLING AND PRODUCTION
In the Upper Delaware River Watershed
Fact Sheet

Where: Pennsylvania and New York communities in the Upper Delaware River Watershed. The Marcellus shale formation defines the region that is involved in the exploration for natural gas in the region. The Upper Delaware River is a Scenic and Recreational River as designated by Congress under the Wild and Scenic Rivers Act based on its outstanding natural values and resources. Its watershed, habitats and tributaries share and contribute to those qualities. The Delaware River also supplies water to more than 15 million people, including New York City, Philadelphia, and one third of New Jersey's population. The impacts of natural gas production must be considered in this context.

What: Drilling of natural gas wells in the shale basin known as Marcellus Shale. Presently leases for gas rights are being signed in Wayne and Pike Counties, PA and in Sullivan and Delaware Counties, NY within the Delaware River Watershed and throughout the southern tier of New York and throughout Pennsylvania's portion of the Marcellus fairway outside of the Delaware River Watershed. Within the Delaware River watershed, one well has been drilled but not completed as a shale gas well in Wayne County (illegally); one well has been drilled into the Oriskany sandstone formation in Wayne County as well. For reference in terms of scale, the Susquehanna River Basin Commission (SRBC) has received many applications for water withdrawals, which will result in thousands of new gas wells. Throughout Pennsylvania in 2008, 4,320 new natural gas wells were permitted[1] and as of September 2009, 4,456 permits have been issued; PADEP reports that 1,592 were Marcellus shale permits.[2] No applications have been processed by the Delaware River Basin Commission and no permits have been issued yet by New York or Pennsylvania in the Delaware River Watershed.

Why Now: Primary reasons:

1. Economy: Price of crude oil has made other fuels more competitive; value of natural gas is steadily climbing and its market is expanding; attractive for investment by big energy firms looking to diversify from oil (such as Hess, Exxon, and French Total's recent buys into the market).
2. Markets: The volume of natural gas that geologists expect to tap in the Marcellus Shale formation is larger than any other shale gas formation being developed today and there is an increasing push for new fuels that can supplement current energy sources, particularly domestic sources of energy.

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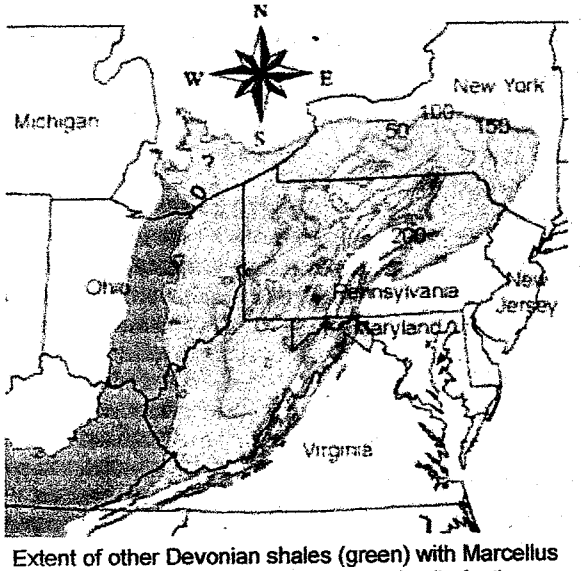
[1] http://www.dep.state.pa.us/dep/deputate/minres/OILGAS/Permits%20by%20County%202008%20Tot~'

[2] Ford Turner, "Twelve Marcellus shale gas drilling wastewater plants proposed in northern Pennsyl
Patriot News, 11.18.09.

3. Advancements in technology that have made the gas more accessible: The two main development practices used are Hydraulic fracturing and Horizontal drilling
   a. Hydraulic fracturing: "Fracking" (or "fracing") is the practice of injecting fluid and proppants into the rock formation to open fractures to release gas. Fracking markedly boosts production.
   b. Horizontal drilling: The well bore is directed down and then extended horizontally to access the shale bed. This markedly lengthens the well bore and expands the amount of gas that can be recovered from each well.

Marcellus Formation shale	
Region:	Allegheny Plateau
Country:	United States
Offshore/Onshore:	Onshore
Operators:	Chesapeake Energy, Chief Oil and Gas, Range Resources



Extent of other Devonian shales (green) with Marcellus shale (gray) and thickness isopachs (in feet)

Field History	
Start of production:	2000's
Production	
Estimated GIIP (Bcf):	168×10^{12} cu ft (4,800 km³) – 516×10^{12} cu ft (14,600 km³)[1]
Producing Formations:	Marcellus Formation

Marcellus Shale

http://en.wikipedia.org/wiki/Marcellus_Formation

Regulation: Drilling Permits are required for all gas wells in both Pennsylvania (PA) and New York (NY). Both states have an Oil and Gas/Minerals Division within their environmental departments which issue these permits. The degree of scrutiny that is given to these permits varies between the two states but generally the regulatory controls are thin, particularly because of several federal exemptions, including exemptions granted by the federal Energy Policy Act (2005), which exempts the industry from certain environmental protection laws, including some provisions of the Clean Water Act, Safe Drinking Water Act, Clean Air Act, National Environmental Policy Act (NEPA), Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). For more information go to http://www.nrdc.org/land/use/down/contents.asp and to http://www.earthworksaction.org/oil_and_gas.cfm

Both the House of Representatives (H.R. 2766) and the Senate (S. 1215) have introduced legislation - the FRAC Act - to overturn the exemption of hydraulic fracturing from the Safe Drinking Water Act and to require the public disclosure of what is in the fracking fluids being injected. These bills are sponsored by Senators Casey (PA) and Schumer (NY) and Representatives Hinchey (NY), DeGette (CO) and Polis (CO) -- 3 of the sponsors represent the Delaware River Watershed. Co-sponsors in the Delaware River Watershed include Congressmen Patrick Murphy (PA) Joe Sestak (PA), Rush Holt (NJ), Frank Palone (NJ), Michael Acuri (NY), John Hall (NY), and Paul Tonko (NY). The bills are gaining strength with more co-sponsors from across the nation; there is strong opposition to the Bills from the gas and oil industry and strong support from the public.

Note: Two recent court decisions may change the Clean Water Act exemption: a legal challenge by the Natural Resources Defense Council resulted in a federal court ruling that struck down the Environmental Protection Agency (EPA) exemption of the gas and oil industry in California; and the Pennsylvania Supreme Court recently ruled in part supporting some rights of municipalities in their attempts to restrict gas drilling.[3] and[4] (See Amici Curiae brief filed by DRN and Nockamixon Twp with PA Supreme Court, 7.8.08).[5] Additionally, Nockamixon Township, who was sued by Arbor Resources of Michigan to overturn the township's efforts to protect resources within their borders, received a favorable ruling from Judge Clyde W. Waite, Bucks County Court of Common Pleas. September 29 the Judge issued an Order supporting the Township's ability to use the PA Municipalities Planning Code and the Floodplain Management Act to regulated gas drilling.[6] Arbor Resources appealed to overturn the ruling and the case is being litigated.

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[3] Docket No. 30 WAP 2008 and 31 WAP 2008, Appeal from the Order of the Commonwealth Court of Pennsylvania entered July 27, 2007, No. 2406, reversing the December 8, 2006 Order of the Court of Common Pleas of Allegheny County, Pennsylvania, Docket No. S.A. 06-484 and Appeal from the Order of the Commonwealth Court of Pennsylvania entered August 9, 2007, affirming the Decision of the Court of Common Pleas of Westmoreland County of September 8, 2006.

[4] Supreme Court of Pennsylvania, No. 29 WAP 2008, decided 2.19.09, Pa. Lexis 264; No. 30 and 31 WAP 2008, decided 2.19.09, Pa. Lexis 265.

[5] Brief of Amici Curiae, Nockamixon Township, the Delaware Riverkeeper, Delaware Riverkeeper Network, American Littoral Society, and Damascus Citizens for Sustainability in Support of Appellants, In the Supreme Court of Pennsylvania, Western District, July 8, 2008.

[6] Memorandum Opinion and Order, In the Court of Common Pleas, Pennsylvania, Civil Division, Arbor Resources, Pasadena Oil and Gas and Hook 'Em Energy Partners v. Nockamixon Twp., No. 2008-4801-31-1.

New York State Department of Environmental Conservation (NYSDEC) is updating its Environmental Impact Statement (EIS) for gas drilling permits in Marcellus Shale.[7] The draft Supplemental Generic EIS (SGEIS) draft scoping document was released in October 2008 & public hearings and a comment period ran through December 15, 2008.[8] The Final Scope was issued by NYSDEC in February 2009. The final Draft SGEIS was issued September 30 2009[9] with 4 public hearings and an extended public comment period that concluded December 31, 2009.

More than 12,000 comments were submitted to NYSDEC on the Draft; a coordinated call for the withdrawal of the Draft and an extension of the existing permitting ban was lodged by environmental/conservation groups, elected officials, towns, and general public due to the inadequacy of the Draft to address the far reaching adverse impacts of shale gas drilling, the lack of a cumulative analysis, and the lack of any proposed regulations. New York City (NYC) filed extensive comments on the Draft, calling for the ban of all gas drilling within the NYC reservoir watershed due to water quality concerns.[10] EPA also filed comments expressing concern about human health impacts and the possible pollution of NYC's water supply reservoirs.[11] 14 New Jersey organizations filed a letter calling for the withdrawal of the Draft due to lack of consideration of the adverse impacts on downstream water supplies, such as New Jersey's 2.8 million people who rely on the Delaware River. Some commenters supported the Draft and urged DEC to finalize it and remove the moratorium. The New York Times published an editorial position in support of a NYC Watershed ban.[12] See DRN comment to NYSDEC at www.delawareriverkeeper.org

A moratorium on the processing of Marcellus Shale gas well permits for wells using the existing Generic Environmental Impact Statement (GEIS) that other types of gas wells use in New York State is in place. NYSDEC states that they may process individual supplemental EIS's for Marcellus shale well drilling permits in the meantime but none have been yet processed. At least eight applications have been received by NYSDEC for gas well permits in the Marcellus Shale near Hancock, NY.

New York State presently lacks meaningful water use regulation, leaving unanswered the question of how much water can be safely withdrawn without depleting water resources, streams and wetlands and allowing the massive water needs of the gas industry to run ahead of needed protection.[13] State officials themselves have called current water resources regulation fragmented and incomplete, recommending a comprehensive water resource program that addresses both quantity and quality including legislation, for starters, to require permits for all water withdrawals of 100,000 gpd or more.[14]

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[7] "Governor Paterson signs bill updating oil and gas drilling law; pledges environmental and public health safeguards", New York State Press Announcement, July 28, 2008. http://www.dec.ny.gov/press/45423.html

[8] NYSDEC Division of Mineral Resources, Bureau of Oil and Gas Regulation, Draft Scope for Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program, Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and other Low-Permeability Gas Reservoirs, 10.06.08.

[9] www.dec.ny.gov/energy/58440.html

[10] http://www.nyc.gov/html/dep/pdf/natural_gas_drilling/nycdep_comments_final_12-22-09.pdf

[11] http://www.epa.gov/region2/spmm/r2nepa.htm#r2letters

[12] NYT Editorial, "Where Water Trumps Energy", 10.15.08, http://www.nytimes.com/2008/10/15/opinion/15wed3.html?_r=2&oref=slogin&oref=slogin

[13] Trout Unlimited, "Tapped Out, New York's Water Woes", 2008.

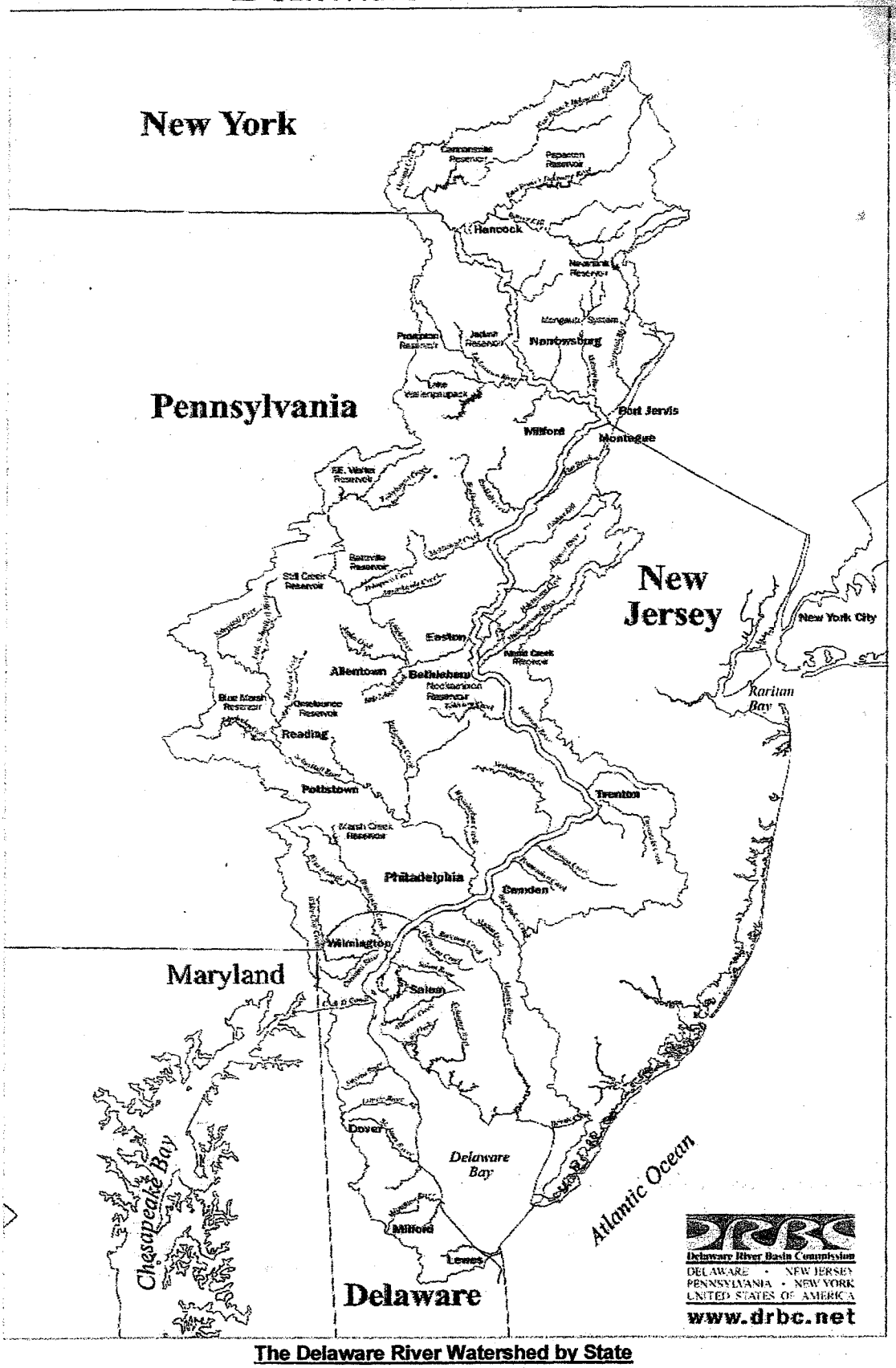
[14] Jim Dezolt, Director Division of Water, NYSDEC, Testimony before the New York Legislature, Assembly Standing Committee on Environmental Conservation, 8.6.08.

Pennsylvania: Pennsylvania Department of Environmental Protection (PADEP) Bureau of Oil and Gas Management and Bureau of Watershed Management adopted changes to the application for Marcellus Shale gas wells in 2008[15]. Information required by the "Marcellus Addendums" included water use and safe yield analysis, wastewater disposal, wetland and thermal impacts, disclosure of fracking fluid chemicals, and a natural resource inventory based on state records (PA Natural Diversity Inventory "PNDI"). But requirements have changed, with recent changes reducing oversight and environmental protections; the gas well drilling permitting process is considered to be "streamlined" for quicker results.[16] Industry representatives are participating on committees with PADEP to develop policies and regulations.[17] PADEP has begun a rulemaking process to develop Total Dissolved Solids (TDS), sulfate, and chloride effluent standards for high-TDS wastewaters, driven by gas drilling wastewater. PADEP has noticed proposed standards[18], held 3 hearings in the State, and is accepting written comment up to February 12, 2010. TDS and wastewater issues are discussed later in this fact sheet.

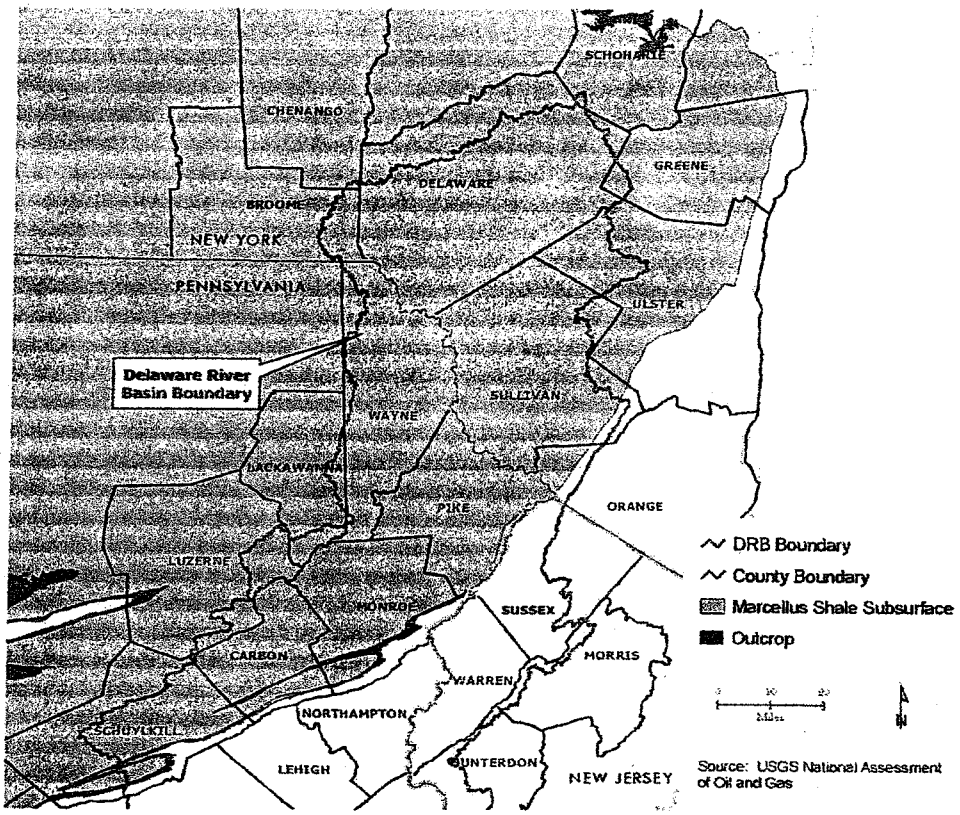
There are no spacing requirements between wells and no limits on how many wells can be placed in a "field". Water use regulation is notably lacking in Pennsylvania except where the Susquehanna and Delaware River Basin Commissions operate. Overall, regulation is weak and lays the Commonwealth's water resources and waterways open to depletion and degradation resulting from gas development practices to meet their huge water supply and disposal needs.

[15] 5500-pm-og0083 rev. 8/2008 Commonwealth of Pennsylvania Instructions Department of Environmental Protection Bureau of Oil and Gas Management Bureau of Watershed Management - 1 - application addendum and instructions for Marcellus shale gas well development.
http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/ESCGP-1/E-S_Permit.htm
[16] http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/marcellus/marcellus.htm
[17] http://www.depweb.state.pa.us/watersupply/cwp/view.asp?a=1260&Q=545730&watersupplyNav=|30160|
[18] http://www.pabulletin.com/secure/data/vol39/39-45/2065.html

Delaware River Basin



The Delaware River Watershed by State



Marcellus Shale in the Delaware River Watershed

http://www.state.nj.us/drbc/naturalgas.htm

Delaware River Basin Commission (DRBC): DRBC is an agency comprised of the four states in the Delaware River Basin (NY, PA, NJ, DE) and the federal government (Army Corps of Engineers).[19] DRBC is responsible for the River's water resources and regulates water withdrawals and discharges within the Watershed, including all gas well permits. No applications have been approved yet by the DRBC for gas wells or gas drilling water supply. Chesapeake Appalachia Energy Co. filed the first application for water supply withdrawal for 1 million gallons of water per day from the West Branch of the Delaware River, near Hancock, NY.

A Hearing held on the Chesapeake application on July 15, 2009 drew hundreds of objectors to the water withdrawal (and a few supporters) and 1,200 letters were filed with the DRBC regarding this application. NYCDEP filed a letter 7.13.09 raising concerns with DRBC in regards to Chesapeake Gas Co.'s application to withdraw water from the West Branch of the Delaware, located above the gauge that measures how much water the City must release from its reservoirs into the River for conservation.[20] PA Fish and Boat Commission (with concurrence from PADEP), the National Park Service and other agencies objected to the inadequate minimum stream flow protection in the proposed permit.[21] DRBC tabled action at the July meeting and announced they would be making changes to the draft permit based on comments received. A new draft permit was issued and

[19] http://www.state.nj.us/drbc/
[20] Letter from NYCDEP to DRBC, July 13, 2009.
[21] NPS_Comments_West_Branch_Withdrawal 7-14-09NER

another Hearing set for September 2009, which was postponed at the applicant's request. On October 20, 2009, Chesapeake withdrew its application, stating ". . . we have decided to withdraw the application and reassess our approach to the situation. We believe this is preferable to continuing with hearings and further public debate about the project at this time."[22] No new applications have yet been submitted for any shale gas projects by Chesapeake to the DRBC.

Chesapeake Appalachia also drilled a new gas well into the Oriskany formation, a sandstone that is not being reviewed by the DRBC because the "target formation" is not shale. Presumably, DRBC considers the amount of water that will be used to develop a well in the Oriskany to be much less (they claim up to 100,000 gallons as opposed to millions for shale wells) but DRN and others have objected to the DRBC's lack of oversight and PADEP's minimal permitting requirements for this well, called the Robson well, located in Wayne County. See March 6, 2009 DRN Comment to DRBC at www.delawareriverkeeper.org

Applications for 6 natural gas wells were filed by Chesapeake with New York State in the Hancock region and with PADEP for one well in Wayne County, PA. Stone Energy, who drilled a vertical well in the Marcellus Shale in Wayne County, PA without DRBC approval and was notified that they were in violation of DRBC requirements, has submitted applications for a shale gas well and a water supply withdrawal of .70 mgd from the West Branch of the Lackawaxen River, a tributary to the Delaware River. The Stone Energy applications (one well and one water withdrawal) may be noticed for a Hearing in January 2010 with possible action by the DRBC in March 2010.

After being notified by DRBC of their requirements, Arbor Resources submitted applications for wells in a different shale formation in Nockamixon Township, Bucks County, PA where the company has signed leases and is expected to begin exploration.[23] They also have applied for a one-time withdrawal of groundwater to develop its exploratory well in the Rapp Creek Watershed in the Township. Other well applications by other companies are in the works in Wayne County. It is approximated that at least 200,000 acres of land have been leased out for gas wells in the Upper Delaware River Watershed to many different companies, including Hess in Northern Wayne County and large holdings to Chesapeake in New York State.

In an Executive Director Determination issued in May 2009, Executive Director Carol Collier stated that they will regulate all aspects of gas extraction including water supply, wastewater processing and discharge, wells and well pads, pit management and nonpoint source pollution for each well project. The DRBC has eliminated their usual review thresholds and is requiring all shale well projects, regardless of size or amounts of water to be used or discharged, to obtain approval from the DRBC due to the potential for substantial impact to the water quality of the Delaware's Special Protection Waters, individually or cumulatively.[24] They also say they will require the disclosure of all chemicals to be used in well development.[25]

DRBC has announced that they will be developing shale gas-specific regulations for all shale gas projects that will be permitted by the DRBC. DRN and many other organizations have taken the position that no gas projects should be permitted by the DRBC until these regulations are implemented. See DRN comment to DRBC at www.delawareriverkeeper.org

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[22] Letter d. 10.20.09 from James Grey, Chesapeake Appalachia LLC to Mark Klotz, DRBC Chairman.
[23] Letter dated Sept. 5, 2008 from Carol Collier, Executive Director, DRBC to Arbor Resources, re. Natural Gas Mining, PA, Well permit number 37-017-20002-00 and 37-017-20003-00.
[24] http://www.state.nj.us/drbc/newsrel_naturalgas.htm
[25] http://www.state.nj.us/drbc/naturalgas.htm

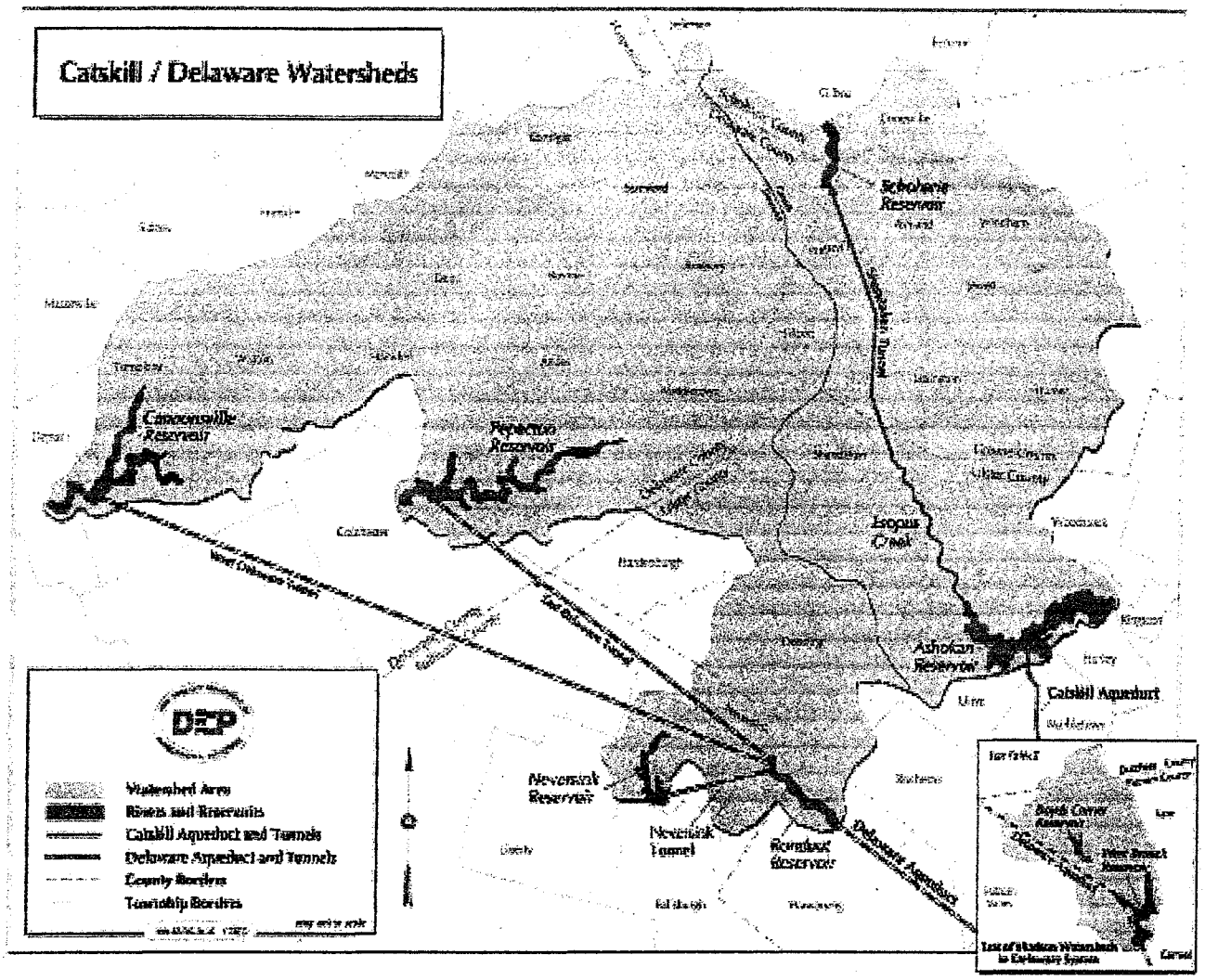
New York City Department of Environmental Protection (NYDEP) Watershed Rules: The Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and Its Sources (Chapter 13, New York City) govern the watershed lands that drain to New York City's three water supply reservoirs located in the Delaware River's headwaters (Pepacton, Cannonsville and Neversink Reservoirs). These rules provide the City with broad power to regulate land use activities and discharges within the reservoirs' watersheds. The City has the power to restrict and ban certain activities and has done so through limiting new sewage treatment plants, activities that lead to nonpoint source pollution, and has established programs to reduce or eliminate certain priority pollutants.

New York City Council, Committee on Environmental Protection, held hearings to consider establishing a ban on all gas well drilling and development in the NYC drinking water watershed.[26] Many of the Borough Committees in New York City passed resolutions calling for a total ban on gas drilling in the NYC Watershed drainage area. The public has become more aware about the threat of pollution that shale gas drilling poses to the up to 9 million people in New York City who drink water from the Delaware River through the City's reservoir system.

NYCDEP issued a draft report in September 2009 on the potential impacts of gas drilling in the NYC drainage area for the City's reservoirs underlain by Marcellus shale, pointing out how groundwater and the reservoirs could become polluted by hydraulic fracturing and horizontal drilling and watershed land changes.[27] NYCDEP's Final Report, issued when they filed their DSGEIS comments, examines the technical details of water quality and water resource risks inherent in shale gas drilling.[28]

How the regulatory structure of these government entities will work together and whether these attempts will be successful in preventing environmental harm is a raging question throughout the Marcellus shale fairway. The wave of gas well development has not yet broken upon the Delaware River Watershed.

[26] See Delaware Riverkeeper Network statement to NYC Council, September 10, 2008
[27] New York City Department of Environmental Protection, "Rapid Impact Assessment Report, Impacts Assessment of Natural gas Production in the New York City Watershed", September 2009
[28] Final Impact Assessment Report (PDF)



NY City Reservoir System- Delaware/Catskill

http://nyc.gov/html/dep/html/dep_projects/catdel_wide.shtml

What's the Risk?

Issues: Numerous environmental and health issues arise from natural gas well drilling, development, production and infrastructure.

- ✓ Water Quantity: It takes between 2 and 9 million gallons of water to frack a well in the Marcellus Shale.[29] Amounts vary, depending on equipment, site specific conditions and the depth of the well (Marcellus shale wells are expected to be 5,000 to 8,000+ feet deep).[30] The water is either drawn from a water well or from surface water (e.g. a nearby stream). The use is classified as consumptive and depletive because the water is not returned. Considering the number of gas wells that can be installed, in the tens of thousands in the Upper delaware River watershed, the volume of water that will be needed to hydrofrack and develop these wells will reach into the billions, a significant depletive loss. Potential impacts include aquifer depletion, stream flow depletion and disruption of natural flow regime, interference with hydroperiod flow to wetlands and other water dependent ecosystems. In turn, aquatic life, fish, wildlife and plant life can be affected. Drinking water supply can be depleted.

  In addition to the volume of water used in fracking, in some instances water is "produced" by the gas well when fluids and gas rise to the surface, carrying water from deep geologic layers. This produced water is considered an additional depletive loss; the black Devonian shale that holds the Marcellus formation is known to produce higher quantities of water than some other natural gas geologies.[31]

- ✓ Water Quality: The use of chemicals and the contaminants that are produced by well development processes expose water resources and features, including drinking water supplies, to significant risk of pollution.[32] The pathways for this pollution are multiple.

  The drilling and fracking processes introduce chemicals into the well and also disturb, distribute, and bring to the surface flowback or "produced water" that contains chemicals/minerals from various rock formations such as salts, sulfate, heavy metals, arsenic, aromatic hydrocarbons such as benzene, and "normally occurring radioactive materials" or NORMS, which occur in the region[33]. NORMS have required decontamination elsewhere such as at 140 sites since January 2005 in Texas in Barnett Shale.[34] New York State Department of Environmental Conservation identified NORMs as a substantial issue in flowback from Marcellus shale drilling since several radiological parameters were identified in samples of produced water or flowback from shale gas wells in PA and WVA, including Gross Alpha, Gross Beta, Total Alpha Radium, radium 226, and radium 228 and is expected to be found in New York Marcellus shale. Radium 226, the radionuclide of greatest concern in terms of human health, was found in the PA and WVA samples well beyond safe drinking water levels.[35]

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[29] "Gas Well Drilling and Development, Marcellus Shale, June 12, 2008 Commission Meeting", www.srbc.net
[30] "Gas Well Drilling and Development, Marcellus Shale, June 12, 2008 Commission Meeting", www.srbc.net
[31] U.S. Dept. of Energy, Argonne National Laboratory, "A White Paper Describing Produced Water from Production of Crude Oil, Natural Gas, and Coal Bed Methane", January 2004, page 17.
[32] http://www.earthworksaction.org/pubs/DrinkingWaterAtRisk.pdf
[33] NYSDEC Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program (DSGEIS), 2009, Chapters 4, 5, and 6.
[34] "Radioactive Waste Surfaces at Texas Gas Sites", Peggy Heinkel-Wolfe, Denton Record-Chronicle, 11.11.07.
[35] NYSDEC Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program (DSGEIS), 2009, Table 5-10

Chemicals are also used in the fracking fluids and drilling muds. It is estimated that 10%-75% of the fracking fluids and the chemicals they contain can remain underground and can spread into deep aquifers (how much stays in the well bore varies considerably site by site). The storage of the fracking fluids in open pits and the action of the well development process can expose the chemical mix to the land surface, which provides another pathway to groundwater through infiltration and to surface water through overland flow and deposition on water from the air volatilization of chemicals. Compromised pit liners and the residue left in/on cuttings that settle out in the open pit over time and are sometimes buried after a pit is removed, also can provide a pathway for contaminants to leach into groundwater aquifers.

Wastewater

How and where used fracking water (also called "brine water" due to the saltiness) will be disposed is far from settled. So much wastewater is being produced in Pennsylvania due to the frenzy of shale gas drilling, for instance, that the volume is overwhelming. According to PADEP, "Estimates from the industry indicate that demand for brine water treatment in Pennsylvania will reach approximately nine Million Gallons per Day (MGD) in 2009, 16 MGD in 2010, and 19 MGD in 2011. Estimates from the Susquehanna River Basin Commission are 20 MGD for that same timeframe".[36]

Due to the large amount of water used for fracking, the resulting volume of wastewater to be treated and discharged is beyond the capacity of existing treatment plants in the region.[37] Also, existing sewage treatment plants are not equipped to process or safely manage the contaminants in the wastewater – particularly since the wastewater is high in total dissolved solids (TDS) and salts -- but some municipal facilities in the Delaware River Watershed and New York State are considering importing it nonetheless, including the Central Wayne Regional Authority in Honesdale, PA[38] and the Delaware County Regional Water Quality Control Authority (DELCORA) in Chester, PA, which has applied to the DRBC for approval to accept gas drilling wastewater and will be re-applying to PADEP if the DRBC application is approved.[39]

Several draft permits have been issued by PADEP to allow existing sewage plants to take gas drilling wastewater; one of the final permits is being challenged by objectors based on adverse environmental impacts.[40] NYDEC's general discussion in their Draft SGEIS of treatment options available in the State to process the expected wastewater and their positive statement that wastewater can be exported to Pennsylvania[41], also questions whether New York has the capacity to process the wastewater produced from shale gas development in the State.[42] A NYSDEC official testified in July 2008 that sewage treatment

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[36] PADEP "Permitting Strategy for High Total Dissolved Solids (TDS) Wastewater Discharges", April 11, 2009, http://www.depweb.state.pa.us/watersupply/cwp/view.asp?a=1260&Q=545730&watersupplyNav=|30160|

[37] "Gas Well Drilling and Development, Marcellus Shale, June 12, 2008 Commission Meeting", www.srbc.net

[38] Weekly Almanac, "Sewer Plant Could Treat Drilling Waste", Mary Baldwin, August 27, 2008, (http://weeklyalmanac.com/articles/2008/08/27/news/doc48b594eab5658405325327.prt):

[39] DRBC DELCORA Docket D-1992-18 CP-2

[40] Clean Water Action appeal WW Shallen Amended Notice FINAL, EHB Docket No. 2009-134-R, 11.02.09.

[41] NYSDEC Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program (DSGEIS), 2009, p. 5-121.

[42] NYSDEC Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program (DSGEIS), 2009, Chapters 6 and 7.

infrastructure in the state was inadequate for municipal needs[43] much less the needs of the natural gas industry for wastewater disposal.

It's not even clear exactly what is in the wastewater because no sampling is required of the waste that leaves the well site, says Dr. Conrad Dan Volz of the University of Pittsburgh and Tom Rathbun, a PADEP spokesperson.[44] Additionally, companies that subcontract hydrofracking guard their formulas and do not disclose all the ingredients of proprietary mixtures. Both states have stated that they intend to regulate disposal of all wastewater fluids as required under the Clean Water Act.

Wastewater treatment facilities further west in Pennsylvania and West Virginia are already accepting the waste – and are experiencing serious consequences. The discharge of wastewater from gas development in the Marcellus shale in Pennsylvania contributed to a serious contamination emergency for the Monongahela River, according to a PADEP news release October 22, 2008. PADEP discussed the 2008 total dissolved solids (TDS) overload in the Monongahela River in its Chapter 95 revision public rulemaking (discussed further below), using it as an example as to why a TDS effluent standard is needed.[45]

PADEP investigated the unusually high levels of TDS in the Monongahela River that affected at least 11 public water supplies that serve 325,000 customers and industrial facilities such as an electric generating station and a steel mill. TDS represents the dissolved elements in water and can include carbonates, chlorides, sulfates, nitrates, sodium, potassium, calcium and magnesium and causes water to be discolored and of poor taste.[46] PADEP issued a water quality advisory for consumers to use bottled water until the problem was addressed and has limited the acceptance of wastewater from gas well hydrofracking by local sewage treatment plants there (requiring reduction of gas drilling wastewater to 1% of the daily sewage flow—some plants were taking in as much as 20%).[47] Water treatment facilities are not equipped to remove the TDS that has fouled the Monongahela River. The overload of TDS was repeated twice since 2008 in varying degrees. Apparently the 1% limit and other measures imposed by PADEP have not been adequate. In August 2009, PADEP issued a consent order and agreement with Shallenberger allowing a wastewater plant on the Monongahela to accept gas drilling wastewater but the discharge that would result is considered by challengers to the permit to be polluting and in violation of existing regulations and clean water laws in an appeal filed by Pennsylvania Clean Water Action in November 2009.[48]

Recently PADEP stated that applications for at least 12 new industrial treatment plants have been received for northern Pennsylvania[49], which, in itself, is a significant environmental issue, considering the limited assimilative capacity of the region's surface waters. Pennsylvania has 6 industrial discharge plants (2 of them are "brine" plants

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[43] Testimony of Jim Dezolt, Director, Division of Water, NYSDEC, before NYS Legislature, Assembly Standing Committee on Environmental Conservation, August 6, 2008.
[44] Don Hopey, "State concerned about waste water from new gas wells", Pittsburgh Post Gazette, 12.21.08
[45] PADEP "Permitting Strategy for High Total Dissolved Solids (TDS) Wastewater Discharges", April 11, 2009, http://www.depweb.state.pa.us/watersupply/cwp/view.asp?a=1260&Q=545730&watersupplyNav=|30160|
[46] PADEP News Release 10.22.08, "DEP investigates source of elevated total dissolved solids in Monongahela River", http://www.ahs.dep.state.pa.us/newsreleases/default.asp?ID=5337&varQueryType=Detail
[47] PADEP News Release 10.22.08, "DEP investigates source of elevated total dissolved solids in Monongahela River", http://www.ahs.dep.state.pa.us/newsreleases/default.asp?ID=5337&varQueryType=Detail
[48] CWA appeal WW ShallenAmended Notice FINAL
[49] Ford Turner, "Twelve Marcellus shale gas drilling wastewater plants proposed in northern Pennsylvania", the Patriot News, 11.18.09.

specifically for high-chloride wastes) but these are at their limit; tank trucks wait in line for hours at a time to deposit natural gas wastewater. The issue of how to safely treat and dispose of gas drilling wastewater is unresolved in both NY and PA.

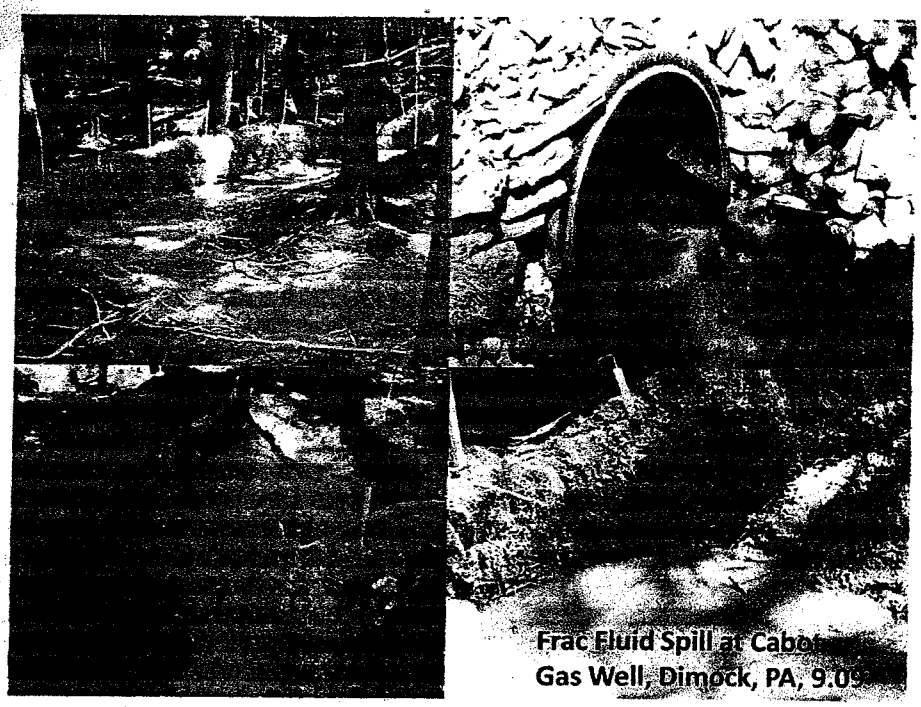
November 7, 2009 PADEP released for public comment proposed changes to Chapter 95 wastewater regulations that will govern discharges of high TDS, chloride and sulfate.[50] The rulemaking will establish effluent limits for these gas drilling wastewater constituents by 2011 but will permit continued discharge of this wastewater in the interim. The proposed standard of 500 mg/L TDS and 250 mg/L for chloride and sulfate are open for public comment until February 12; DRN and others want stricter limits adopted by PADEP and the regulations expanded to cover other contaminants in gas drilling wastewater. (See DRN Action Alert at www.delawareriverkeeper.org)

Contamination Incidents

Incidences of water contamination and environmental pollution have been reported around the country near natural gas wells either from spills, accidents or through customary practice[51]. In Dimock Township, Susquehanna County, PA a residential drinking water well exploded without warning near a new gas well in January, 2009. PADEP shows that natural gas (methane) mixed with several private water wells, fouling water and forcing homes on water tanks. PADEP issued a violation notice to Cabot for the pollution in March, 2009.[52] PADEP settled with Cabot in November with a fine of $150,000 for polluting 13 water wells and several square miles of aquifer with methane. Also, in November 2009 a group of Dimock residents announced that they filed a class action law suit against Cabot for pollution of their water and the environment.

Also in Susquehanna County, in Springville and Dimock Townships, diesel spills related to gas drilling by Cabot have dumped 100 gallons, 800 gallons and 100 gallons of fuel on the ground in three recent separate incidents.[53] In September 2009, there were also three spills of fracturing fluid by subcontractor Halliburton at Cabot wells in Dimock that were undergoing hydraulic fracturing stimulation. Two spills entered Stevens Creek and wetlands, causing a fish kill. After these three fracturing fluid spills in one week, PADEP then ordered that Cabot stop fracking operations at all their wells, although they were allowed to continue drilling. The ban was lifted in November once Cabot filed spill prevention plans, which had been missing or inadequate while these pollution incidents occurred.

[50] http://www.pabulletin.com/secure/data/vol39/39-45/2065.html
[51] http://www.earthworksaction.org/pubs/Spills.pdf, http://www.earthworksaction.org/oilgaspollution.cfm
[52] Steve McConnell, "Gas driller found in violation for 'polluting' groundwater", Wayne Independent, 3.10.09
[53] http://www.riverreporter.com/issues/09-03-12/news-gasglance.html



Dimock Township hydraulic fracturing fluid spill, September 2009

In Bradford Township, McKean County, PADEP found Schreiner Oil and Gas responsible for contaminating at least 7 water supplies with methane and/or high levels of iron and manganese, ruining local wells. They also found Schreiner committing pit and other gas well violations, endangering the community and environment; bottled water is being supplied on an emergency basis to the homes while more are tested.[54]

In McNett Township, Lycoming County, Pennsylvania, an East Resources natural gas well leaked methane in late July 2009. The leak was noticed first in a creek. Emergency crews evacuated one home; the company provided water to four homes and is monitoring 18 wells. 20 firefighters worked for a few days while the well leak was being plugged.[55] In Greene, Fayette, and Washington Counties, PA, PADEP found Atlas Resources guilty of discharging "residual and industrial waste, including diesel fuel and production fluids, onto the ground at 7 of 13 natural gas well sites" and in violation of erosion and sediment control measures and site restoration requirements at 8 well sites for incidences that occurred between Dec. 8 2008 and July 31, 2009, resulting in a fine of $85,000 in January 2010.[56]

In Hickory, PA, farmer Ron Gulla's fish pond has been polluted and polluted runoff continues to ruin his farm[57]; PADEP says the lack of pre-drilling condition data lets Range Resources off the hook. PA's shale region is experiencing pollution from natural gas storage facilities, pipelines and gas wells.[58] In a report January 2010 in Tioga County, PA, Fortuna Energy Co. is being blamed for polluting a water well and a stream with methane by a resident near their gas wells.[59] In October, 2009, Mt. Pleasant, PA raw natural gas escaped from a pipeline near a MarkWest Co. Station with such force that nearby houses shook, causing residents to report toxic clouds of gas

[54] http://www.ahs2.dep.state.pa.us/newsreleases/default.asp?ID=5494&varQueryType=Detail
[55] The Daily Review, Towanda, Pa, "Natural Gas Well Down After Leak", 7.30.09, http://www.thedailyreview.com.
[56] http://www.portal.state.pa.us/portal/server.pt/community/news_releases/14288
[57] http://uk.reuters.com/article/environmentNews/idUKTRE5422TG20090503?sp=true
[58] http://uk.reuters.com/article/environmentNews/idUKTRE5422TG20090503?sp=true
[59] http://www.syracuse.com/news/index.ssf/2010/01/tioga_county_man_blames_natura.html

that caused nausea and coughing; PADEP is investigating with air tests.[60] Also reported was the emission of large amounts of natural gas and an oily substance at a Spectra compressor station in Clearville, PA in August 2009.[61]

In Arkansas, two major wastewater companies were shut down in 2009 after high salt levels were found in a reservoir and fish kills occurred in a local creek.[62] In another example, an incident reported in Newsweek recounted a fracturing fluid spill that sent a worker to the hospital and is being investigated as the cause of his nurse's near death illness[63]. An incident of methane from a gas well leaking into 43 water wells has been reported in Ohio, ruining private wells and requiring water to be imported for the neighborhood.[64]

Other incidents of pollution near natural gas wells include water wells in the Pinedale Anticline, a natural gas rich area in Wyoming where six wells are emitting potentially flammable gas in such high levels that they can't be safely tested[65] and also in Wyoming where hydrocarbons have been found in a water well for livestock[66]. In Spring Ridge, Louisiana, 20 cattle dropped dead after drinking fluid next to a Chesapeake Oil and Gas Co. natural gas well.[67] An increased risk of stillbirths linked to the flaring of natural gas with high levels of hydrogen sulfide has been reported in cattle in Canada.[68] In Colorado benzene and other pollutants from natural gas drilling is exposed as the cause of many human health and environmental problems in a documentary "Split Estate".[69] Incidents in Texas are increasingly reported, especially in the Fort Worth region.[70]

There is a need for thorough study of the environmental and health impacts of well drilling and development; there is very little on record. For instance, in Colorado a Health Impact Assessment has been called for as part of an Environmental Impact Statement due to documented pollution problems from natural gas development in Garfield County that require scientific analysis.[71] To date, research has been impeded because fracking fluid formulas are protected from disclosure by federal exemptions granted to the oil and gas industry despite health and environmental impacts.

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[60] http://pittsburgh.indymedia.org/news/2009/10/31424.php
[61] Ibid.
[62] Lauren Trager, "Department of Environmental Quality Tells Two Wastewater Companies to Shut Down", KARK News, 12.15.08
[63] Jim Moscou, "A Toxic Spew?" Newsweek, 8.20.08.
[64] Joan Demirjian, "Home near gas well on brink of explosion" Chagrin Valley Times, 10.22.08. http://www.chagrinvalleytimes.com/NC/0/274.html
[65] Joy Ufford, "Untested Water Wells Trigger 'Explosive' Alarm" Sublette Examiner, 9.17.08.
[66] Gazette News Service, "Impurities Seen in Well Near Drilling" Billings Gazette, 9.10.08.
[67] http://content.usatoday.net/dist/custom/gci/InsidePage.aspx?cId=thetowntalk&sParam=30643841.story
[68] Waldner, C. L. et al., Associations between oil- and gas-well sites, processing facilities, flaring, and beef cattle reproduction and calf mortality in western Canada," Preventive Veterinary Medicine 50 (2001) 1-17.
[69] http://www.documentary.org/content/meet-filmmakers-debra-anderson-split-estate
[70] Fwweekly.com
[71] Witter, et al, "Potential Exposure-Related Human Health Effects of Oil and Gas Development: A White Paper", Colorado State University, University of Colorado, page1 and 21.

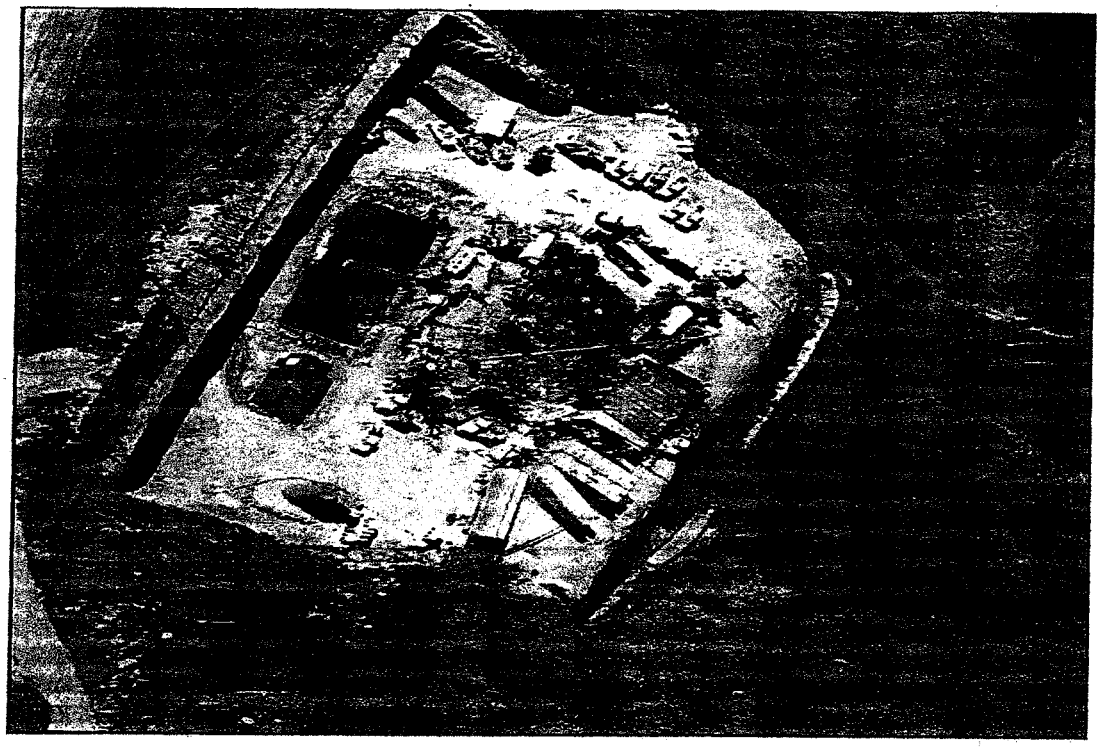

Image retrieved from: Independent Oil and Gas Association of Pennsylvania's, Drilling & Developing the Marcellus Shale[72]

Several issues compound the water quality impacts of natural gas development:

- Because of the industry's Energy Policy Act exemptions and protections from Right to Know laws based on "trade secrets", they have not had to reveal specific fracking chemicals that are being used. EPA's list of common fracking fluids and additives include liquid carbon dioxide, liquid nitrogen, crude oil, kerosene, and various lubricants, friction reducers, gels, surfactants, defoamers, biocides, polymers and proppants.[73]

- NYSDEC lists up to 260 "unique chemicals" and another 40 compounds (with ingredients that are not disclosed by the industry) that are being used for hydrofracking in Marcellus shale in PA and WVA and that are expected to be used in New York.[74]

- A report submitted to Congress by an EPA whistleblower employee in 2004 revealed that acids, BTEX, formaldehyde, plyacrylamides, chromates, and other toxic substances may be introduced underground and to deep aquifers during fracking.[75] The concerns reported were ignored by EPA in their decision that fracking fluids do not pose significant environmental threats to drinking water.

- Water contamination incidents across the nation are increasingly reported; most recently hydrogeologists discovered benzene 1,500 times the level safe for people in a

[72] http://www.srbc.net/whatsnew/docs/Marcellusshale61208ppt.PDF
[73] U.S. Environmental Protection Agency, Office of Solid Waste, "Associated Waste Report: Completion and Workover Wastes", January 2000.
[74] New York State Department of Environmental Conservation, Division of Mineral Resources, "Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program", September 2009, 5-35 and 5-45.
[75] Weston Wilson, "EPA Allows Hazardous Fluids to be Injected into Groundwater", October 8, 2004.

water well near hydrofracked natural gas well fields in Wyoming. Over 100 other reports have been documented in Colorado, Alabama, Ohio, and Pennsylvania.[76]

- During well development, hydrofrack water and produced water or "flowback" is stored on site in an open pit, usually mixed with fresh water that is imported and stored for use in fracking. Testing of pit water contents in New Mexico had a 30% detection rate for the chemicals tested including polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), semi volatile organics (SVOs), including arsenic, lead, mercury, 2,4-Dinitrotoluene, 2-Methylnaphthalene, phenol, benzene, m,p-Xylene, sulfate, barium, cadmium, chromium. Most of the 154 constituents found in the pits can be classified as hazardous.[77] Impacts to water quality from the pits occur when liners fail or the pit is breached and pollutants escape into the environment, contaminating soil and surface water.

- Formaldehyde, a human carcinogen, acids, pesticides that are toxic to fish and aquatic life, and at least 85 other hazardous materials are added to the frack water being used in Pennsylvania, according to public records.[78]

- The fracking chemicals and drilling muds have health impacts for humans and animals that range from mild to severe skin and eye irritation to brain and nervous system effects. Some cause acute problems, others lead to slowly developed disorders.[79] Some chemicals are known carcinogens. The environmental and health impacts are not tracked or closely studied since well and stream monitoring, pit testing and disclosure of constituents used in well development and that are contained in the wastewater have not been routinely required for natural gas well drilling and none of this analysis is required in Pennsylvania or New York.

- "Produced water" or "flowback" is fluid that is brought to the surface when gas is released from a well bore during natural gas development procedures. The constituents of produced water vary depending on the geologic conditions, the composition of the gas, and the chemical properties of any injected fluids, such as fracking fluids; produced water requires treatment before discharge under Clean Water Act requirements.[80] During natural gas production, produced water is separated from the gas. The Department of Energy has found that this wastewater product has "higher contents of low molecular-weight aromatic hydrocarbons such as benzene, toluene, ethylbenzene and xylene (BTEX) than those from oil operations; hence they are relatively more toxic than produced waters from oil production."[81] The fluid also may contain salts (chlorides can be so high that the liquid, called "brine", is 5-10 times saltier than sea water), high iron and barium levels, and may be acidic (typical range is 3.5-5.5).[82] It is estimated

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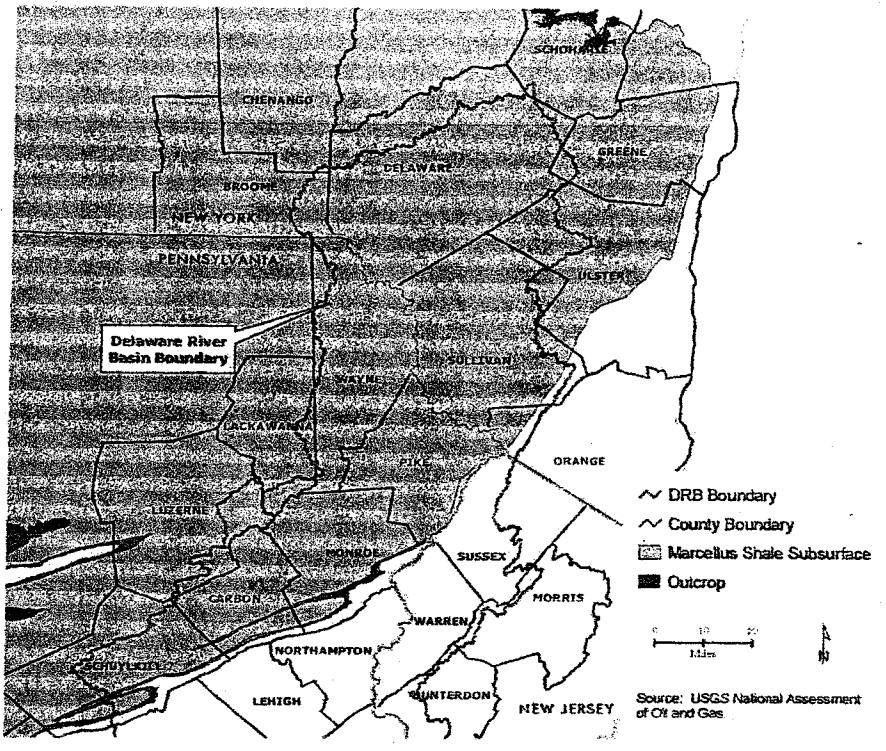
[76] Abrahm Lustgarten and ProPublica, "Drill for Natural Gas, Pollute Water", Scientific American, 11.17.08.
[77] www.emnrd.state.nm.us/OCD
[78] Don Hopey, "State concerned about waste water from new gas wells", Pittsburgh Post Gazette, 12.21.08 and http://www.riverreporter.com/issues/08-12-18/frac.pdf
[79] Theo Coburn, PhD, "An Analysis of Possible Increases in Exposure to Toxic Chemicals in Delta County, Colorado Water Resources as the Result of Gunnison Energy's Proposed Coal Bed Methane Extraction Activity", October 22, 2002.
[80] U.S. Dept. of Energy, Argonne National Laboratory, "A White Paper Describing Produced Water from Production of Crude Oil, Natural Gas, and Coal Bed Methane", January 2004, page 25.
[81] U.S. Dept. of Energy, Argonne National Laboratory, "A White Paper Describing Produced Water from Production of Crude Oil, Natural Gas, and Coal Bed Methane", January 2004, page 4.
[82] U.S. Dept. of Energy, Argonne National Laboratory, "A White Paper Describing Produced Water from Production of Crude Oil, Natural Gas, and Coal Bed Methane", January 2004, page 5.

that the produced waters discharged by natural gas operations are about 10 times more toxic than those from offshore oil wells.[83] USGS also reports that natural gas condensates may also contain the chemicals known as "BTEX".[84]

- NYSDEC discovered significant amounts of benzene in samples of flowback from PA and WVA, reported in its Draft SGEIS, in addition to many other dangerous contaminants.[85] Benzene is regulated by EPA because it is carcinogenic and has other well-documented adverse human health impacts and exposure to benzene is considered a global human health hazard; the maximum contaminant level set by EPA for drinking water for benzene is 0.005 mg/L, which makes even tiny amounts harmful.[86]



Marcellus Shale in the Delaware River Watershed

http://www.state.nj.us/drbc/naturalgas.htm

- ✓ Stormwater runoff: Erosion and sediment control permits are needed according to federal regulations for land disturbances of 5 acres or more. Drilling pads can be between 3 and 5 acres but it is expected that most disturbances will attempt not to break the 5 acre threshold to avoid the possibility of strict stormwater regulation. If there is a point discharge

[83] U.S. Dept. of Energy, Argonne National Laboratory, "A White Paper Describing Produced Water from Production of Crude Oil, Natural Gas, and Coal Bed Methane", January 2004, page 4.
[84] Williams, Ladd and Farmer, "Fate and transport of Petroleum Hydrocarbons in Soil and Ground Water at Big South Fork National River and Recreation Area, Tennessee and Kentucky, 2002-2003", U.S. Geologic Survey, 2006 p. 10, http://pubs.usgs.gov/sir/2005/5104/PDF/SIR20055104.pdf
[85] NYSDEC Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program (DSGEIS), 2009, Tables 5-8 and 5-9, p. 5-109.
[86] Department of Health and Human Services, Agency for Toxic Substances and Disease registry, "ToxFAQs for Benzene, August 2007, updated 10/05/07, www.atsdr.cdc.gov/tfacts3.html

on site, a General NPDES permit is usually required with one acre or more of land disturbance. However, because gas drilling is exempted from the NPDES provisions of the federal Clean Water Act, most states do not require NPDES for these wells.

- Under NY and PA rules, both states require stormwater management and erosion and sediment control plans in order to protect stream quality but the level of management differs in each state.

  Pennsylvania Department of Environmental Protection (PADEP) adopted a stormwater rule (General Permit)[87] for oil and gas well construction in May 2008 that applies when 5 acres or more are disturbed. Recent changes by PADEP have weakened this General Permit and allowed an "expedited" process that eliminates technical review of stormwater plans by any agency prior to construction, relying simply on the applicant's engineer for certification.

  The stormwater "permit by rule" adopted by PADEP was protested by DRN and members of the PA Clean Water Campaign when it was adopted in 2009 and when the local Conservation Districts were stripped of their review of soil and erosion plans for natural gas and oil drilling sites.[88] According to PADEP, erosion and sediment control plans are required under PA Chapter 102 for a drilling permit but now the DEP has assigned this to the Oil and Gas division of PADEP, even though their budgeting has been cut by the legislature by almost 30%. Chesapeake Bay Foundation filed appeals of 2 natural gas projects that were permitted under the new "permit by rule" standards; PADEP subsequently rescinded those permits as being issued in error. PA Fish and Boat Commission announced in late 2009 that they were starting a stream monitoring program to attempt to track stream quality in gas drilling areas.

  NYSDEC says that they expect to review erosion and sediment control plans when the environmental assessment form (environmental impact statement or EIS) is submitted by the applicant under SEQRA (New York State Environmental Quality Review Act). NYSDEC admits in their Draft SGEIS that the land conversion required by gas well development from natural vegetation to impervious surfaces may cause pollution and increased flooding but they express confidence in their stormwater regulations by overstating the controls that these regulations have over stormwater runoff.[89] Due to understaffing and budget cuts, the employee's union that represents NYSDEC workers filed a comment with NYSDEC during the public review of the Draft SGEIS that they do not feel they have the work force needed to properly oversee the development of natural gas wells in the State.

- DRBC is planning to require nonpoint source pollution control plans for the Upper Delaware River that is governed by Special Protection Waters. This designation does not apply to the Schuylkill River, the Delaware River's main tributary, which is also underlain by Marcellus Shale. SPW also does not apply above New York City reservoir dams; NYCDEP, however, has broad watershed rules governing nonpoint source pollution and stormwater runoff management but how these would be applied is unclear.

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[87] PADEP ESCGP-1

[88] Letter to PADEP Secretary John Hanger from PA Campaign for Clean Water dated March 31, 2009.

[89] New York State Department of Environmental Conservation, Division of Mineral Resources, "Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program" (NY SGEIS), September 2009, Section 6.1.2.

Since stormwater management is not consistently or comprehensively managed throughout the Watershed, wells have not historically had and may continue to lack a high and consistent level of stormwater management. Further, municipalities are responsible under the NPDES 2 Stormwater Rule to control runoff and nonpoint source pollution under municipal General Permits[90] yet those efforts are being challenged by gas companies in court. Impacts of poor stormwater controls include nonpoint source pollution from drilling operations, land disturbance, machinery and pits; increased stormwater volume and erosion due to removal of natural vegetation and compaction and leveling of land surface; increased flood flows to and disruption of natural flow regime of streams; reduction of stream base flow due to less groundwater recharge on land; destabilization of stream banks and channels; sedimentation of streams and stream bottoms; and degraded stream quality and ecology. In turn, fish and aquatic life are harmed, as is drinking water quality.

Further, if stormwater is not prevented from inundating the open pit(s) on a well site, heavy rain can cause an overflow, spilling polluted pit water onto the land surface and into the nearest stream. Some of the constituents in the water stored in pits on site are toxic, some are carcinogenic and some can cause fish kills, harm wildlife and pollute water supplies (such as pesticides and biocides used to retard algae growth in the ponds).[91]

✓ Floodplain Impacts: In both PA and NY, natural gas wells can be placed in floodplains. Flooding is a major issue in the Delaware River Watershed. Catastrophic flooding in 2004, 2005 and 2006 in the Watershed has spurred new flood studies by the DRBC, the Army Corps of Engineers, and other agencies, all of which are ongoing. The Federal Emergency Management Agency and the Hazard Mitigation Program have spent millions upon millions of dollars addressing flood damages in recent years here.

New York confirms that flooding and stream pollution may be worsened by natural gas development due to:
1. Hydraulic fracturing fluid chemicals that may enter a waterway from fracturing procedures, open pits, spills or accidents;[92]
2. Out of date flood maps;[93]
3. Land use changes (land clearing, larger well pads, etc.) that increase stormwater runoff volume from natural gas well sites;[94]
4. Other pollutants and debris at well sites.[95]

Yet, they do not protect the floodplain from drilling and infrastructure; even New York State's designated Special Flood Hazard Area is not kept off limits to new natural gas wells.

It is irresponsible and contrary to sound public policy and safety goals to allow gas wells and their related infrastructure, including open pits containing polluted water and equipment, in the floodplain. There is a requirement in each state for a minimal setback from a waterway but in both states the setback does not extend far enough, allowing the floodplain to be drilled in and used for gas projects.

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[90] http://www.epa.gov/npdes/pubs/fact1-0.pdf
[91] Don Hopey, "State concerned about waste water from new gas wells", Pittsburgh Post Gazette, 12.21.08
[92] NY GEIS, 8-44
[93] NY DSGEIS, 2-34-35
[94] NY DSGEIS, 6-15-16
[95] NY GEIS, 8-44

- ✓ Habitat loss and Agricultural loss: Individual wells require pads of 3 to 5 acres each for the rigs, equipment, pits, storage tanks, and other machinery. The sites also require roads for access and transport and transmission lines for delivering the gas off site. Usually wells are developed as fields of many wells, sometimes laid in a grid pattern on the land surface, covering large areas. There are no current regulations to limit the size of the fields; estimates range from a square mile to many square miles. The typical life of a well is about 20 years. Habitat impacts include removal of natural vegetation and loss of habitat; fragmentation of forest and vegetative communities; open water degradation; destruction of wildlife and of rare, threatened and endangered species and communities of plants and animals and their habitats.

  Agricultural lands that are leased for natural gas development lose some present use and, as recounted under Water Quality Impacts, some farms have suffered total loss of ponds and other surface waters, effecting fish and farm animal grazing areas. Contamination of some individual wells have also led to farm animal illnesses and other health impacts, as reported by farm owners in Dimock Township, PA. A report from Alberta, Canada, indicates that farmland that has natural gas wells developed on it loses its productivity afterwards, as compared to land where no gas or oil exploration has taken place.[96]

  Some well pads include gas processing and gathering stations, compressors, and frack fluid processors. These facilities have their own environmental impacts related to nonpoint and point source pollution, erosion and runoff, air quality and related environmental disturbances.

- ✓ Air pollution: Air quality impacts are emerging as a major impact in areas of large scale well development. In Wyoming, for instance, the State Dept. of Environmental Quality commented to the Bureau of Land Management during the NEPA review for the Pinedale Anticline Project Area that significant mitigation measures, controls and monitoring were necessary to reduce NOx emissions, visibility impacts, and ozone elevation, including ambient air monitoring stations and regular inspections and reporting.[97] These problems are surfacing in urban drilling areas as well, such as Ft. Worth, Texas, where natural gas and oil emissions have been found to be a major contributor to the severe smog conditions there.[98] But in any region – not only urban -- where gas well development is underway, air quality impacts occur due to volatilization into the air of chemicals in fracking fluid and produced water pits and emissions from well development processes, storage tanks that contain condensates from the "wet methane" in gas, machinery, generators, compressors, drilling operations, causing pollution and health impacts.

  A Houston study calculated the Volatile Organic Compounds (VOCs) in vapors released from permanent natural gas condensate storage tanks located at finished well sites. The storage tanks hold liquids that are bled off natural gas which contains moisture as it comes out of the ground; the moisture is made up of water and gas products, termed "condensates". These condensates easily evaporate and escape through pressure valves on the tanks. The study shows that these condensate tanks are emitting significant VOCs that are poorly tracked and regulated. The North Texas region is classified by EPA as a severe nonattainment area for ozone and emissions from the natural gas industry is a measurable contributor to the polluted conditions.[99] Compressors used to pump gas through pipelines were also tracked and found to be a significant contributor to pollution that contributes to the classification of regions in Texas and Wyoming as severe non-attainment areas for ozone.[100] New ozone reduction plans

[96] Anthony Kovats, "Farmland scarred by wells", Sun Media, Fort Saskatchewan Record, 3.17.09.
[97] Wyoming Dept. of Environmental Quality, letter to BLM from John Corra, Director, d. 4.2.07.
[98] http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf
[99] Mike Lee, "Gas Well Emissions Drawing Scrutiny", Star-Telegram, 10.14.08.
[100] http://www.harc.edu/Search/Results.aspx?q=Storage+Tank+VOCs

there are attempting to address these pollution sources but the air quality problems result from routine natural gas extraction and production practices, making solutions difficult and pollution insidious.

Nationally EPA reports that many states are increasing the number of counties where ozone air quality standards are being violated, many of them in gas drilling areas.[101] The practices that are causing air pollution problems in gas drilling areas that have been under development for a period of time are in use throughout the natural gas industry and can be expected to be the *modus operandi* here.

A recent health study in Dish Texas calculates that sixty-one percent of the health problems reported by residents in a survey are associated with the toxic air emissions detected there.[102] NYSDEC's DSGEIS projects that gas development may violate existing air standards.[103]

- ✓ Noise: The drilling process is very loud and equipment used for well development is noisy. Compressors are especially noisy, estimated to produce about 95 decibels of noise in a consistent, low frequency pattern.[104] For comparison, a jackhammer is 100 decibels, truck traffic or a train whistle at 500 feet is 90 decibels.[105] Prolonged exposure to sounds over 90 to 95 decibels can cause hearing loss.[106] While the use of compressors may be limited to the period of well development – which takes several weeks to several months – the permanent infrastructure that is required for gas pipelines require permanent compressor stations. Noise has documented human health impacts and has negative impacts on wildlife.

- ✓ Light and Scenic Impacts: Lights are required for safety on the rig and at the operation during construction and, to some extent, at the finished well, disturbing natural light and causing glare into the night sky ("sky glow"). Light pollution can confuse wildlife, including migrating birds, and has human health impacts by disturbing sleep.[107] There are scenic vista impacts from elements such as machinery, cleared and disturbed areas, and installation of overhead electric wires which is especially important where scenic and cultural resources are located, such as in the Upper Delaware Wild and Scenic River, parks, and historic locations. The completed well site requires some permanent vegetation removal and control, power source, impervious surface, equipment, storage containers, and access.

- ✓ Health and Safety: Apart from environmental pollution and human health impacts related to pollution, safety issues include risk of explosion, blowouts, fire, and accidents, hazardous material releases, explosive methane leaks, and other emergencies. For example, in Greene County, PA a worker was killed and another badly injured when a coalbed methane gas well exploded.[108] In Ohio, one home exploded, another home narrowly averted an explosion, and 46 wells in the area are contaminated by methane gas that leaked from a Ohio Valley Gas Company well into the aquifer. The problem is still unresolved and homes are on bottled water and some are vacated

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[101] http://www.epa.gov/groundlevelozone/pdfs/CountyPrimaryOzoneLevels0608.pdf
[102] http://earthworksaction.org/pubs/DishTXHealthSurvey_FINAL_hi.pdf
[103] New York State Department of Environmental Conservation, Division of Mineral Resources, "Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program" (NY SGEIS), September 2009.
[104] Tom Wilbur, "Noise Levels Can Pose Problems", Press and Sun Bulletin, 8.24.08.
[105] http://www.gcaudio.com/resources/howtos/loudness.html
[106] http://www.gcaudio.com/resources/howtos/loudness.html
[107] NJ Light Pollution Study Commission, reported in "Outdoor Light Pollution Disrupts Sleep and Wastes Energy", Todd B. Bates, Asbury Park Press, 10.06.08
[108] Don Hopey, "Gas Well Incident Claims 1 in Greene County", Pittsburgh Post-Gazette, 12.3.07.

while water lines are built to the neighborhood.[109] Trained crews are needed to help control and clean up pollution accidents as well, such as the cleanup of an 800 gallon diesel oil spill and another 100 gallon diesel oil spill in January 2009 in Dimock Township, Susquehanna County, PA, at Cabot Oil's natural gas well sites.[110] Another 100 gallon diesel spill there in February required emergency clean up when a fuel tank contracted by Cabot crashed after sliding on ice.[111]

Also in Dimock Township, a homeowner's water well exploded without warning near an area where Cabot is developing new gas well fields in Susquehanna County, PA[112] and in Lycoming County, methane escaped from an East Resources well into a stream and possibly into water wells[113] (see page 11 of fact sheet). In Leidy Township, Clinton County, PA, a gas well exploded into flames Sept. 14, 2008; special firefighters from Texas were brought in to contain the fire, which was expected to burn for weeks.[114] In Appomattox County, also on September 14, a Williams Gas Co. pipeline that runs from the Gulf Coast to New York exploded without warning, destroying 2 homes and damaging 6 others, hurting 5 people, causing the evacuation of a neighborhood of hundreds, and leaving a 50 foot crater behind.[115] Emergencies like these require emergency personnel and the expense attached to providing adequate response, rescue and interim care. Additional human impacts include trauma[116], worker health and safety risks, reduction of quality of life, loss of recreational use and scenic vistas and the economic impact of harm to established ecotourism and nature-based economies, such as fishing and hunting.

Natural gas well fire, Leidy Twp. PA

http://www.lockhaven.com/page/content.detail/id/505600.html?showlayout=0

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[109] Joan Demirjian, "Home near gas well on brink of explosion" Chagrin Valley Times, 10.22.08. http://www.chagrinvalleytimes.com/NC/0/274.html

[110] Josh Mrozinski, "Gas well lessors weigh environmental cost", Scranton Times-Tribune, 2.16.09.

[111] http://www.riverreporter.com/issues/09-03-12/news-gasglance.html

[112] Laura Legere, "DEP Probes Blast in Gas-drilling Region", Scranton Times-Tribune, 1.3.09.

[113] The Daily Review, Towanda, Pa, "Natural Gas Well Down After Leak", 7.30.09, http://www.thedailyreview.com.

[114] Jim Runkle, "Gas Well Fire Could Burn for Weeks", Loch Haven Express, 9.16.08

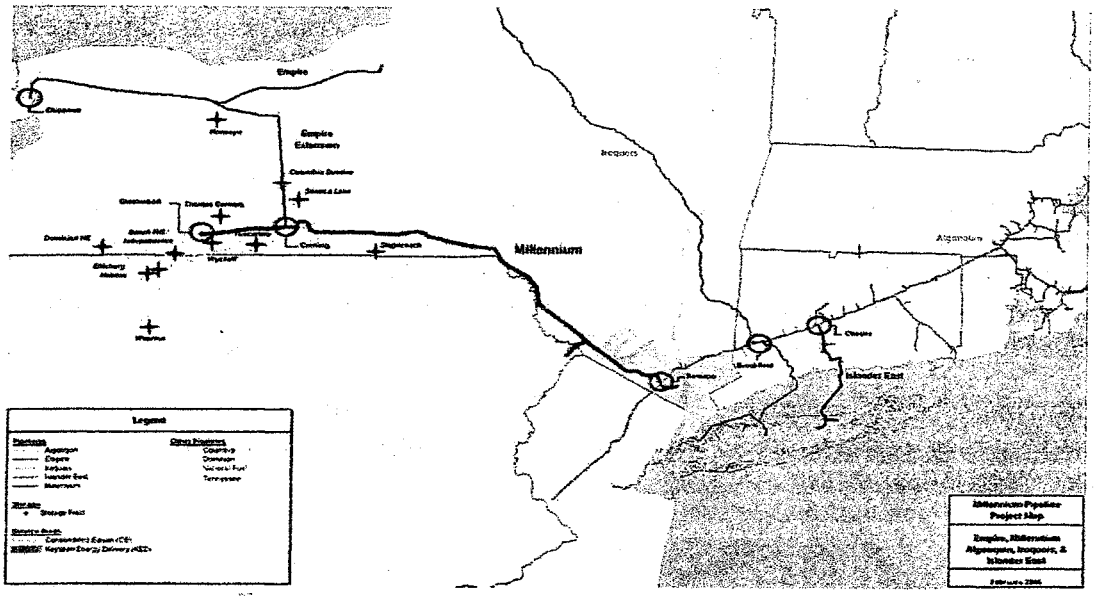
[115] Candice Nelson, Carrie Sidener, "Gas Company Talks to Families about Explosion", WSLS and Lynchburg News and Advance Reporter, 9.16.08, and Candice Nelson, "Community Moves Forward after Appomattox Explosion", 9.16.08.

[116] For example, one mother evacuated due to the pipeline rupture and fire said her children are afraid to return home and her 6 year old daughter can't sleep, "Mommy, I don't want to be here" said her daughter; Carrie Sidener, "Nearby Pipelines Still Working after Appomattox Explosion", The News and Advance, 9.16.08.

- ✓ Permanent Natural Gas Infrastructure: In addition to the well itself, pipelines, processing stations, compressor stations which are required along a pipeline (typically the size of a city block[117]), ventilation, power sources, and other permanent infrastructure and the land management they require (such as vegetation control) impose a set of separate and additional environmental impacts. In Pike and Wayne Counties, PA, Tennessee Gas Pipeline Co. is planning to expand an existing pipeline and add compressor stations to carry out newly produced Marcellus Shale gas[118]; other pipelines are in the works across the region.

Eminent domain is a tool being employed by the industry for the siting of pipelines and compressor stations and other natural gas utility infrastructure. In both Pennsylvania and Texas eminent domain is being used by gas companies to condemn properties for the right of way passage of new pipelines and/or gas storage facilities.[119]

Specific to the region, the Millennium Pipeline, 182 miles of 30 inch diameter steel pipeline, was completed in December 2008 across New York from the lower Hudson Valley and Southern Tier, traversing the Upper Delaware River Watershed near Hancock, NY.[120] This pipeline will collect gas from wells and will also deliver gas as an energy source, which is presently being marketed to towns and industries in the New York region. Pennsylvania can hook into the line through a trunk line. The Millennium Pipeline is one of several new pipelines being constructed and is considered to be the centerpiece of a $1 Billion investment by the industry in permanent natural gas infrastructure in the region.[121]



Millennium Pipeline

http://www.millenniumpipeline.com/maps.htm

[117] Tom Wilbur, "Noise Levels Can Pose Problems", Press and Sun Bulletin, 8.24.08.
[118] Sandy Long, "Powerlines and Pipelines: Here We Grow Again", The River Reporter, 8.28-9.23.08
[119] Bedford County, PA: Tribune-Democrat, "Gas Storage Facility Allowed to Continue", 9.23.08 http://www.tribune-democrat.com/archivesearch/local_story_267214931.html; Ft. Worth, Texas: Press and Sun-Bulletin, "Gas Lines Pit People vs. Profit in Texas", 8.24.08.
[120] http://www.millenniumpipeline.com/overview.htm
[121] http://www.millenniumpipeline.com/news_12_22_08.htm

- ✓ Land Conservation and Preservation: Natural gas, like other minerals, is a controversial matter when it comes to mineral rights under preserved land. First, land conservation efforts are being undermined by gas leasing activities; some conservation organizations are being rebuffed by landowners who are choosing to lease natural gas rights rather than encumber their property with conservation easements. Some conservancies are reporting a loss of new easement and fee simple acquisitions in the Upper Delaware River Watershed since the beginning of the lease-signing craze.

  Second, public lands and privately conserved lands often do not hold mineral rights. Both New York and Pennsylvania are leasing public lands for natural gas development, threatening the public purposes that these lands were to serve, having been purchased with taxpayer money (or user fees). At risk are the use of the land for public recreation, agriculture, natural resource preservation, hunting, fishing, historic and community resource conservation and scenic value protection. Further, private non-profit land conservation organizations are struggling themselves with the question of whether they should lease out natural gas rights on their land to provide funding for more land conservation. The large amounts of money involved and the long term prospect of income has created a tension between natural lands protection and collecting substantial revenue from existing land holdings.

- ✓ Global Climate Change: When weighing the environmental costs and benefits of new energy sources, such as natural gas, it is essential that the analysis assess the impacts of the whole process of energy development. So, when broad statements are made that natural gas is clean and will reduce greenhouse gas emissions, the critical question must be asked and answered: how was this conclusion arrived at? Was the contribution of emissions from "cradle to grave" considered?

  To answer this question, one must examine the environmental impacts, particularly air quality impacts, of natural gas from exploration to development to extraction to production to marketing to delivery to utilization. The evaluation of the cleanliness of natural gas is not simply, "what does a flame release when burned?" but "what is the contribution of natural gas throughout its life cycle to greenhouse gases and global climate change?"

  The EPA lists methane emissions from natural gas extraction, production and delivery as the primary source of methane emissions.[122] Methane is a greenhouse gas that is a major contributor to global warming.

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[122] http://epa.gov/climatechange/emissions/downloads/08_Energy.pdf

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THE TRUTH ABOUT NATURAL SHALE GAS EXTRACTION IN THE UPPER DELAWARE RIVER WATERSHED

What You Need to Know

Drilling for natural gas in Marcellus and other shales requires polluting development methods, including:

- **Hydraulic fracturing**: "Fracking" (or "fracing") is the practice of injecting fluid and sand into the rock formation to open fractures to release gas. Fracking markedly boosts production. Fracking fluids contain chemicals, many of them hazardous and carcinogenic - up to 154 hazardous contaminants (State of New Mexico).[1] In PA, public records show that formaldehyde, a human carcinogen, acids, pesticides that are toxic to fish and aquatic life, and at least 85 other hazardous materials are added to the fracking water being used (PADEP).[2] The drilling and fracking processes introduce chemicals into the well and also disturb, distribute, and bring to the surface chemicals/minerals from beneath called "flowback" (such as salts, sulfides, and "normally occurring radioactive materials" or NORMS, which occur in the region; NORMS have required decontamination elsewhere such as at 140 sites since 2005 in Texas's Barnett Shale).[3] The wastewater is stored in open pits at the well site posing air and water pollution risks.
- **Horizontal drilling**: The well bore is directed down and extended horizontally to access the shale (usually about a mile down and at least a mile horizontally). This expands the amount of gas that can be recovered from each well. It takes between 2 and 9 million gallons of water to frack a deep horizontal well.[4] Multiple wells are often developed on each pad requiring 3-5 acre pads, miles of driveways and feeder pipelines, noisy and brightly lit construction sites, increased stormwater runoff, fragmented habitats, air polluting machinery and thousands of truck trips to the site.

These practices have impacts: Environmental pollution is reported around the country near natural gas wells either from spills, accidents or well development practices[5]. However, gas drilling is exempt from many provisions of federal environmental laws.[6] Virtually no human health studies are underway to assess the impacts on people. For instance, the situation is so severe that in Colorado a Health Impact Assessment has been called for due to pollution problems there.[7]

Examples of pollution:

- In Dimock Twp., Susquehanna Co., PA natural gas (methane) has intruded into the local water, fouling water wells and forcing homes on water tanks after a water well exploded in January, 2009.[8] In September, 2009, 3 spills of fracturing fluids occurred; 2 entered Stevens Creek, causing a fish kill. In Western PA and West Virginia, 30 miles of Dunkard Creek that borders both states was ruined in a weeks-long disaster that came to a head in September, 2009; 161 species of fish, mussels, and salamanders died in the stream, which flows to the Monongahela River. A water quality emergency occurred in the fall of 2008 and twice again in 2009 on the Monongahela from an overload of gas drilling wastewater that led to a bottled water advisory for 325,000 people, including Pittsburgh[9]. In Bradford Twp., McKean Co., PADEP found Schreiner Oil and Gas responsible for contaminating at least 7 water supplies with methane and/or high levels of iron and manganese, ruining local wells.[10]

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[1] www.emnrd.state.nm.us/OCD
[2] Don Hopey, "State concerned about waste water from new gas wells", Pittsburgh Post Gazette, 12.21.08 and http://www.riverreporter.com/issues/08-12-18/frac.pdf
[3] "Radioactive Waste Surfaces at Texas Gas Sites", Peggy Heinkel-Wolfe, Denton Record-Chronicle, 11.11.07.
[4] "Gas Well Drilling and Development, Marcellus Shale, June 12, 2008 Commission Meeting", www.srbc.net
[5] http://www.earthworksaction.org/pubs/Spills.pdf, http://www.earthworksaction.org/oilgaspollution.cfm
[6] http://www.earthworksaction.org/COtoxics_reg_gaps.cfm
[7] Witter, et al, "Potential Exposure-Related Human Health Effects of Oil and Gas Development: A White Paper", Colorado State University, University of Colorado, page1 and 21
[8] Steve McConnell, "Gas driller found in violation for 'polluting' groundwater", Wayne Independent, 3.10.09
[9] PADEP News Release 10.22.08, "DEP investigates source of elevated total dissolved solids in Monongahela River", http://www.ahs.dep.state.pa.us/newsreleases/default.asp?ID=5337&varQueryType=Detail
[10] http://www.ahs2.dep.state.pa.us/newsreleases/default.asp?ID=5494&varQueryType=Detail

- In Susquehanna Co., diesel spills related to gas drilling by Cabot dumped 100 gal., 800 gal. and 100 gal. of fuel on the ground in 3 separate incidents.[11] In McKean Co., PADEP found Schreiner committing pit and other gas well violations, endangering the community and environment.
- In Pavillion, Wyoming, the USEPA has investigated contamination of 11 water wells near Encana Corp. gas wells that had been developed with hydrofracking. Methane and 2-butoxyethanol phosphate were found by EPA.[12]
- In an incident in Louisiana, 20 cattle died from drinking fluid next to a hydrofracked natural gas well.
- In Hickory, PA, farmer Ron Gulla's fish pond has been polluted and polluted runoff continues to ruin his farm[13]; PADEP says the lack of pre-drilling condition data lets Range Resources off the hook. PA's shale region is experiencing pollution from natural gas storage facilities, pipelines and gas wells[14].
- In Arkansas, two major wastewater companies were shut down after high salt levels were found in a reservoir and fish kills occurred in a local creek.[15]
- Newsweek recounted a fracturing fluid spill that sent a worker to the hospital and is being investigated as the cause of his nurse's near death illness[16].
- Wyoming geologists found benzene 1,500 times the level safe for people in a water well near hydrofracked gas wells.
- Hundreds of water contamination reports are documented in CO, Alabama, Ohio, Texas, and PA.[17]

Wastewater from natural gas development, high in total dissolved solids (TDS), salts and containing toxins and "flowback" contaminants, must be disposed of at a treatment plant but there are not enough facilities. Sewage plants can't handle the contaminated waste. Injection wells and mines are being considered as disposal sites, some companies are re-using wastewater at gas well sites. PADEP has proposed regulations in November for effluent standards for TDS, chloride, and sulfate, but they allow interim permitting while standards and rules are worked out for how to dispose of the wastewater.[18] Air pollution is emerging as a major human health and environmental problem in drilling areas, especially where drilling has been occurring for a period of time[19]; NYSDEC's DSGEIS projects that gas development may violate existing air standards.[20]

Explosions, accidents, fires, and emergencies come with natural gas exploration and well development. These require municipal emergency response, even though in some ways municipalities are being prevented from having controls over gas drilling operations within their borders – gas companies are suing Pennsylvania towns to stop local regulation, such as stormwater, wellhead, floodplain and zoning ordinances.[21] Examples of emergencies:

- In Leidy Township, Clinton County, PA, a gas well exploded into flames Sept. 14, 2008; special firefighters from Texas were brought in to contain the fire, which was expected to burn for weeks.[22]
- In Appomattox County, also on September 14, a Williams Gas Co. pipeline that runs from the Gulf Coast to New York exploded without warning, destroying 2 homes and damaging 6 others, hurting 5 people, causing the evacuation of a neighborhood of hundreds, and leaving a 50 foot crater behind.[23]
- In Greene County, PA a worker was killed and another badly injured when a coalbed methane gas well exploded.[24]
- In Dallas-Ft. Worth, Texas, drilling in shale by Chesapeake Corp. may have caused earthquakes. Wells drilled deep to store flowback water from natural gas wells are blamed for inducing earthquakes according to geoscientists.[25]
- In Ohio, one home exploded, another home narrowly averted an explosion, and 46 wells in the area are contaminated by methane gas that leaked from a Ohio Valley Gas Company well into the aquifer. The problem is still unresolved and homes are on bottled water and some are vacated while water lines are built to the neighborhood.[26]

What you can do: Get more info. and sign up for action alerts at www.delawareriverkeeper.org

PROTECT OUR CLEAN WATER! WE CANNOT SACRIFICE WATER FOR GAS!

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[11] http://www.riverreporter.com/issues/09-03-12/news-gasglance.html
[12] http://www.propublica.org/feature/epa-chemicals-found-in-wyo.-drinking-water-might-be-from-fracking-825
[13] http://uk.reuters.com/article/environmentNews/idUKTRE5422TG20090503?sp=true
[14] http://uk.reuters.com/article/environmentNews/idUKTRE5422TG20090503?sp=true
[15] Lauren Trager, "Department of Environmental Quality Tells Two Wastewater Companies to Shut Down", KARK News, 12.15.08
[16] Jim Moscou, "A Toxic Spew?" Newsweek, 8.20.08.
[17] Abraham Lustgarten and ProPublica, "Drill for Natural Gas, Pollute Water", Scientific American, 11.17.08.
[18] http://www.pabulletin.com/secure/data/vol39/39-45/2065.html
[19] http://earthworksaction.org/pubs/DishTXHealthSurvey_FINAL_hi.pdf; Wyoming-DEQ_pinedale anticlncomments.pdf
[20] New York State Department of Environmental Conservation, "Draft Supplemental Generic Environmental Impact Statement..." Sept. 2009.
[21] Brief of Amici Curiae, Nockamixon Township, the Delaware Riverkeeper, Delaware Riverkeeper Network, American Littoral Society, and Damascus Citizens for Sustainability in Support of Appellants, In the Supreme Court of Pennsylvania, Western District, July 8, 2008.
[22] Jim Runkle, "Gas Well Fire Could Burn for Weeks", Loch Haven Express, 9.16.08
[23] Candice Nelson, Carrie Sidener, "Gas Company Talks to Families about Explosion", WSLS and Lynchburg News and Advance Reporter, 9.16.08, and Candice Nelson, "Community Moves Forward after Appomattox Explosion", 9.16.08.
[24] Don Hopey, "Gas Well Incident Claims 1 in Greene County", Pittsburgh Post-Gazette, 12.3.07.
[25] Thomas Korosec and Jim Polsen, Cehsapeake Water Wells May Have Caused Earthquakes, Bloomberg.com, 8.14.09.
[26] Joan Demirjian, "Home near gas well on brink of explosion" Chagrin Valley Times, 10.22.08. http://www.chagrinvalleytimes.com/NC/0/274.html

CATASTROPHIC THREAT TO THE DELWARE RIVER WATERSHED

If gas drilling is permitted within the Delaware River Watershed area, the results will be catastrophic. In the Delaware River Basin alone, hundreds of billions of gallons of fresh water will be usurped and mixed with highly toxic chemicals in order to extract the gas from the shale rock.

The Marcellus
Thirty-six percent of the Delaware River Watershed (4,928 square miles) lies within the Marcellus Shale region. This shale rock, up to a mile and a half deep, is said to be rich with natural gas, trillions of cubic feet worth. The gas industry says that the Marcellus Shale, spanning 600 miles across parts of four states (NY, PA, WV & OH), will become the nation's largest gas field.

Drilling in Delaware River Watershed
In northern Wayne County, Pennsylvania alone, over 1400 property owners have signed gas drilling leases. Under current law, companies could end up putting a well every 40 acres in New York and Pennsylvania. This would result in over 50,000 wells within the Delaware River Watershed, in effect, transforming it into an industrial zone. The amounts of fresh water consumed and polluted could reach 400 billion gallons. (It takes between 3 and 5 million gallons of fresh water to fracture each horizontal well).

Impacts Elsewhere
Colorado, Wyoming, New Mexico and Texas have learned some hard lessons about the impacts of natural gas extraction. These states have experienced serious water contamination, air pollution and environmental degradation. Now it is happening in PA. In Dimock, PA, a water well exploded soon after drilling began and by the end of the year(2009) the PA DEP declared a 9 square mile area contaminated by Cabot from the drilling. Subsequent tests found gas and volatile organic compounds in the private water wells of at least nine families. People and animals that drank this water became ill. Families have been forced to drink, cook and bathe with bottled water. In western PA and in Susquehanna County, PA the contamination events keep multipling.

Toxic Chemicals in Drilling Fluids
New technologies pioneered by Halliburton made it possible to extract natural gas from rock formations such as the Marcellus Shale. Horizontal drilling and hydraulic fracturing use drilling fluids that contain an industrial brew of toxic chemicals: biocides, surfactants, acids, scale inhibitors and friction reducers.

Health Impacts
Chemicals added to the fracturing fluids are linked to human health effects, including, cancer; liver, kidney, brain, respiratory and skin disorders; and birth defects. Scores of these chemicals, including benzene, flourenes, ethylene glycol and methanol, even when diluted, can be injected into water supplies at concentrations that pose a threat to human health. The drilling companies have exemptions given to in relation to hydraulic fracturing and waste handling to major provisions of the Safe Drinking Water Act, Clean Air Act, Clean Water Act, the Superfund Act, Community Right to Know Act and other protective legislation. Most of these exemptions were passed in the 2005 Energy Policy Act.

Groundwater Contamination
The vertical portion of the well intersects layers of soil, clay, rock formations and aquifers, thus providing opportunities to contaminate water resources. Between 70 and100% of the fracturing fluids can remain underground, a potential source of groundwater contamination for years to come. Then add splills, legal and illegal dumping, chemical handleing "accidents" and "human error.

Hazardous Wastewater
The remainder of the fracking fluids flow back out of the well. This so-called "produced water" is laced with the toxic drilling fluids plus addition contaminants that come from deep below the earth. If drilling wastewater is taken to a conventional sewage treatment plant, the plants are incapable of processing these hazardous materials. Typically, they dilute the wastewater and then return it to waterways, again threatening drinking water supplies. In October 2008, this occurred in the Pittsburgh area contaminating drinking water sources along the Monongahela River for over 380 thousand people.

Radioactive Rock/Toxic Metals
The Marcellus is considered to be highly radioactive. These materials are brought to the surface during the drilling process. In some regions of the Marcellus, acid-producing minerals such as pyrite and sulfides are found. If toxic metals such as arsenic, cobalt, chromium, molybdenum, nickel, vanadium and zinc are mobilized, they could move through the soil and contaminate surface or groundwater. Parts of the Marcellus contain the poisonous hydrogen sulfide gas that is released into the air during the gas extraction process.

An Industrialized Landscape
To begin, many wells are spaced at one per 160 acres. As the drilling continues, companies will start to infill down to one well per 40 acres and as little as one per 20 acres. The end result is the industrialization of an area and extensive clear cutting of trees to make way for the typical 5-acre well pads and roads and pipelines leading up to them. For instance, the PA DEP has said that "they do not expect the wells to be any closer than1000 feet apart", or one every 22 acres.

Damascus Citizens for Sustainability (DCS)
DCS seeks to prohibit gas drilling activities within the Delaware River Basin, thus preserving the quality of the water that sustains over 17 million people. For the past two and a half years, DCS has been at the forefront educating the public about the hazards of the gas extraction industry. DCS has also hired a team of environmental attorneys to develop legal strategies to respond to this threat. In addition, DCS has retained a world- renowned watershed management expert to work with public officials to develop strategies to protect the **public health** from the gas extraction activities. DCS has paid special attention to the Delaware River Basin Commission which is responsible for regulating water withdrawals and water quality within the watershed. DCS has closely monitored all applications coming before the Commission.

For more info and to learn what you can do now, please visit us at

DamascusCitizens.org ***and*** **NYH2o.org**

Want the truth about gas drilling?

www.DamascusCitizens.org

Working to protect our community and homes,
The Upper Delaware River Basin and Beyond

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Visit our sister organization NYH2O.org

Philadelphia Independent Media Center

Industrial Foam found in Bedford County Creek: Natural Gas Production Contamination Suspected

by Nastassja Noell | 11.18.2009

Foam has been found in Scheaffer Creek, a tributary of the Juniata River watershed which supplies Pennsylvania's capital. Springs and ponds downhill from Spectra Energy's drilling pads first showed the foam weeks ago. The Pennsylvania Department of Environmental Protection (DEP) has not tested for specific chemicals associated with natural gas drilling, and is telling residents that the foam is only laundry soap. Residents are worried that the cancer causing chemical 2-BE is present in their drinking water supplies.

Clearville, Pennsylvania used to be a healthy rural town, a paradise for hunters, fishermen, and farmers. The town is deep in Bedford County, surrounded by numerous state game lands historically rich with turkey, grouse and deer, streams thick with fish and aquatic life. The soil was black and alive, and the vegetation is thick and green in the summertime. Folks used to be able to drink straight from these creeks when they were out stalking a deer or taking a hike to pick berries.

Wayne and Angel Smith of Clearville, PA, don't use chemicals on their farm. Their blueberry bushes, milk from their cows, and their spring water were safe and non-toxic -- until the gas drilling started. Uphill from the Smiths, rumbling drill rigs ran day and night, and soon after the wells were capped, their cows started to die. So did their neighbor's cows. Same with the cats, horses, and all their hens too. Arsenic was found in their wells in high levels, iron too, the DEP claimed it was naturally occuring but internal documents state that DEP agents could find no naturally occuring reason for the arsenic levels to "spike". Then three gas compressor stations came in, surrounding the Smiths on three sides with more noisy, toxic industrial machinery and noxious fumes. Last August the Steckman Ridge Compressor Station blew motor oil all over the valley's farmlands -- the company warned everyone not to eat from their gardens without washing off the oily residue with soap -- and then the toxic gas compound toluene showed up in water tests. And the battle extends to emminent domain, as landowners battle the federal government's attempts to turn their property rights over to the natural gas companies that are already poisoning their lives.

Wayne and Angel worked for 13 years to create a healthy and sustainable organic farm, and now their land is being destroyed, along with all of their years of hard work. Gas drilling over the past 4 years has changed this paradise into what Angel Smith calls "a nightmare." Now residents are having to buy water filtration systems that cost more than $10,000 so that they don't have to drink or bathe in natural gas production contaminants. Artesian wells, streams, and ponds have recently been bubbling with a thick chemical foam, and water runs are showing a pink liquid which floats on the surface.

Schaeffer Creek, which is currently deep in a foam that looks like lemon meringue pie, is a tributary of the Juniata River watershed which feeds the drinking water supplies of Harrisburg,

Pennsylvania's capital. Also downhill from drilling activities is Evitts Creek, which gives drinking water to 50,000 residents living in the city of Cumberland, Maryland. The Safe Drinking Water Act requires community water sources to be clean of harmful contaminants at a cost to local taxpayer; communities downstream will be burdened with the increased costs of new filtration technologies that still cannot remove all the harmful contaminants associated with natural gas production.

Residents first noticed that Schaeffer Creek was foaming back in early August, but by the time the DEP got to the site the foam had washed downstream; additionally, the DEP did not test the water for chemicals used in natural gas production. Today, Schaffer Creek is foaming once again, fed by the springs and a pond which recently tested positive for methyl blue active substances (MBAS), a group of substances which include fracking chemicals called surfactants. The DEP told residents that the foam is 'just detergent from someone's laundry,' but this is a rural area and uphill from the springs and pond are drilling pads, not houses. The natural gas industry, including Craig Lobins who is a leading DEP oil and gas division official, repeatedly exclaim to the public that natural gas production fluids are "just soap."

The drilling pads uphill from the foaming pond and springs may have buried some of the drilling wastes on site, as is legal by Pennsylvania state regulations when the wastes are buried 18 inches underground. Groundwater can carry contaminants downhill, and the contaminants from natural gas drilling and fracking include radioactive uranium, radium and lead along with mercury, and hazardous chemicals. These chemicals then leak into nearby aquifers.

2-Butoxylethanol (2-BE) is a foaming agent used for natural gas production and is proven to cause cancer in animals. 2-BE is a primary component of AirFoam HD, a product that has been found on drilling pads in Pennsylvania -- the MSDS sheets for Air Foam HD state that is dissolves in water and that chronic exposure causes cancer. Testing for 2-BE costs over $100 per test, and the cost burden is on the landholder -- the DEP has failed to test for drilling or fracking chemicals in their standard tests which are only performed when landowners report problems in their water supply, not before the problems occur. Residents who will soon have natural gas production occurring in their region or upstream from their groundwater supply must hire an independent water testing company to do a "baseline test" to show the lack of contaminants prior to the drilling. Without a baseline test, it is more difficult to convict a drilling operator for water contamination - the drilling operator can claim that there is no proof that the contaminant was not in the groundwater supply prior to the drilling.

"If you have a gas company that you can't fight cause they went through FERC [Federal Energy Regulatory Commission] and you have a DEP gas and oil division backing the gas company up, then how can you win?" said Wayne Smith, but his wife Angel reminds us that the battle is long going and not conventional. "If you can help one more person that doesn't have to go through what we've gone through, then that's worth it, that's winning to us. Most people are about the big bottom dollar, but its not the monetary dollar that important, its helping the next person that's important."

http://www.phillyimc.org/en/industrial-foam-found-bedford-county-creek-natural-gas-production-contamination-suspected

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February 23, 2010

Congress to Investigate Safety of Natural Gas Drilling Practice Known as Hydraulic Fracturing

The top Democrats on the House Committee on Energy and Commerce have asked eight oil-field companies to disclose the chemicals they've used and the wells they've drilled in over the past four years. Last week, Waxman also revealed two of the largest gas drilling companies have pumped hundreds of thousands of gallons of diesel-based fluids into the ground in violation of a voluntary agreement with the Environmental Protection Agency. [includes rush transcript]

Filed under natural gas drilling, Sundance Film Festival

Guests:

Josh Fox, director of *GasLand*. Won Special Jury Prize for Documentary at the Sundance Film Festival. In *GasLand*, Josh Fox travels across the United States to meet people whose lives have been impacted by natural gas drilling.

Lisa Bracken, lives on a wildlife sanctuary near Divide Creek in Colorado. Divide Creek suffered environmental damage in a blowout cause by natural gas drilling. She appears in *GasLand*.

Joe Levine, co-founder of the groups Damascus Citizens for Sustainability and NY-H2O, which oppose the gas drilling.

AMY GOODMAN: We turn now to the latest in the growing public scrutiny of the natural gas drilling practice known as hydraulic fracturing, or fracking. The House Committee on Energy and Commerce has launched an investigation into whether fracking is contaminating water supplies and posing other dangers to the environment and public health.

The Energy committee's top two Democrats, Henry Waxman of California and Ed Markey of Massachusetts, have asked eight oil-field companies to disclose the chemicals they've used and the wells they've drilled in over the past four years. Last week, Waxman also revealed two of the largest gas drilling companies have pumped hundreds of thousands of gallons of diesel-based fluids into the ground in violation of a voluntary agreement with the Environmental Protection Agency.

The developments come amidst a major environmental debate over hydraulic fracturing here in New York and surrounding areas. Both the federal EPA and New York City's environmental agency have come out against state plans to allow natural gas drilling inside the Marcellus Shale watershed, which supplies drinking water to some 15 million people, including nine million New Yorkers. On Wednesday, state regulators in Pennsylvania will open a public comment period on a proposal for drilling permits in the Delaware River watershed.

For more, we're joined by three guests.

Here in New York, Joe Levine is co-founder of the groups Damascus Citizens for Sustainability and NY-H2O, which oppose the gas drilling.

We're also joined by Josh Fox, director of the forthcoming documentary *GasLand*, which won the Special Jury Prize for Documentary at the 2010 Sundance Film Festival in Utah last month that *Democracy Now!* broadcast from for the week. In *GasLand*, Josh Fox travels across the United States to meet people whose lives have been impacted by natural gas drilling.

And we're joined on the phone by Lisa Bracken. She's in *GasLand*. She lives in a wildlife sanctuary near Divide Creek in Colorado. Divide Creek suffered environmental damage in a blowout caused by natural gas drilling.

Well, let's begin with Josh Fox. Absolutely incredible film, *GasLand*.

JOSH FOX: Well, thanks. Thanks a lot, Amy.

AMY GOODMAN: Tell us how you got interested in fracking and exactly what it is.

JOSH FOX: Well, my family's home is in the Upper Delaware River Basin on the Pennsylvania side of the Delaware River, and we were asked to lease our land for gas drilling. In 2008, we got a letter in the mail, offered a significant signing bonus of almost $100,000. And then I heard reports of this technique called hydraulic fracturing and how dangerous it was and began to look into it and soon discovered a world of complete insanity: towns that were turned completely upside down,

widespread water contamination, people that could light their water on fire right out of the sink, all manner of upheaval.

And for where I'm at, you know, in the Upper Delaware, which is part of a combined watershed that gives 15.6 million people their water, this was really alarming. And so, being a filmmaker, I got on the road and went to about thirty different states—the film focuses on about ten of them; it's a road movie—and, you know, went from place to place and discovered the same story, that the gas drilling companies were saying one thing and that the people were getting something quite different, and uncovered this Orwellian nightmare of, you know, people being promised a great deal of money and then, you know, ending up with towns that were ruined.

And so, you know, as I went along on this trip, I became more and more interested in how this happened and found out that the 2005 energy bill, which was pushed through Congress by Dick Cheney, exempted the oil and natural gas industries from the Safe Drinking Water Act.

AMY GOODMAN: Wait. Repeat that.

JOSH FOX: Yeah.

AMY GOODMAN: The 2005...

JOSH FOX: It's hard to believe—2005 energy bill, there's something in there called the "Halliburton Loophole," which exempts the natural gas industry, specifically for hydraulic fracturing, this technique, this new technique that they use to extract the gas, from the Safe Drinking Water Act.

And the technique itself injects an enormous amount of toxic material into the ground, causes these mini earthquakes through hydraulic pressure. A lot of that—and we don't actually know what's going on under the ground, because when the Safe Drinking Water Act—when they were exempted from the Safe Drinking Water Act, they—all the science stopped. The EPA was taken off the job. But what we were finding was—across the country were these chemicals showing up in people's water. Methane and other volatile organic compounds, such as benzene, toluene and xylene, were showing up in people's water supplies. And so, you know.

AMY GOODMAN: Josh, I hate to interrupt you for a clip of your own film—

JOSH FOX: That's alright.

AMY GOODMAN: —but let's turn to *GasLand*. In this clip, Josh visits the home of Mike Markham of Colorado. Markham demonstrates how his tap water is so toxic that he can set it on fire.

> **JOSH FOX:** I saw it go up for a second.
>
> **MIKE MARKHAM:** Yeah, we'll just give it a second here.
>
> **JOSH FOX:** Whoa! Jesus Christ!
>
> **MIKE MARKHAM:** That's the best I've done!

AMY GOODMAN: Now, that was amazing, but for our radio listeners, they might not understand what happened—

JOSH FOX: What just happened.

AMY GOODMAN: —in that wordless demonstration.

JOSH FOX: Well, this is Mike Markham, whose water supply is still hooked up. He noticed bubbling and gurgling in his well, and there was pockets of some kind of gas or air. And he—you know, when this happens and they complain to the Colorado Oil and Gas Commission, they come over and they stick a cigarette lighter underneath the sink to see if their water is flammable. So, a lot of people in that area, which is a heavy gas drilling area, would go ahead and test it themselves. And he discovered, lo and behold, that he could light his water on fire. So what you see right there is this enormous explosion coming right out of Mike's sink. I ended up doing it myself, you know, and lighting the water on fire out of the sink just moments after him.

AMY GOODMAN: Isn't water supposed to put out fire?

JOSH FOX: It is, you know, and in a lot of these cases, you have—

AMY GOODMAN: You have the cones, where you have someone take a cone and put it outside on their property.

JOSH FOX: Right.

AMY GOODMAN: We're showing this image now. Explain what it is.

JOSH FOX: Well, that's in Divide Creek in Colorado, where they had—hydraulic fracturing creates underground fractures. And in that case, they showed that this underground fracture migrated all the way up from, I think it was, a number of thousand feet down underground and got this plume of natural gas. And when you have natural gas unrefined, you have benzene and toluene and these other volatile organics that are carcinogenic going right up into the creek. They could light the creek on fire.

And, you know, this phenomenon of lighting water on fire is fairly widespread in these areas. And when that happens, the gas company will swoop in, replace the people's water supply, give them cisterns that they then fill up, you know, however much water they need. And in many cases—

AMY GOODMAN: And keep on filling up the cisterns.

JOSH FOX: Yeah. Well, in many cases, people have to sign a nondisclosure agreement just to continue to get that, that water.

AMY GOODMAN: Lisa Bracken, speaking of Divide Creek, Colorado, is with us now in—from Garfield County. Explain what happened to your family, Lisa, to your dad, to your property.

LISA BRACKEN: Hi. Well, before I really say too much, I'd like to sort of preface my comments with the fact that I'm not a Republican or a Democrat. I'm actually an independent voter, and I consider myself a person of common sense.

So, when EnCana came into our neighborhood back in 2003, it was—"Orwellian" is a pretty good word to describe it.

AMY GOODMAN: You said "EnCana"?

LISA BRACKEN: EnCana, yeah, EnCana Oil and Gas. That's the operator that's in our area and has been here for over half a decade. And, boy, I tell you, in that time, it was just unfathomable what we experienced. They came in just so aggressively and began exploration without, you know, obviously, sufficient regard for any kind of human health and safety, personal property rights, anything like that. And they were after one well in particular, because it sat on a very shallow formation, and they could get to it much more inexpensively by drilling fewer feet. And so, you know, they came in.

Word had it that there was a competition in this field between them and another crew working simultaneously in the area, which is common in the gas fields. I mean, anywhere these guys work on construction sites, you know, crews take great pride in sort of, you know, getting ahead of their competitors on the same job site. And there's, you know, good reason for that economically, but sometimes safety suffers. And in our particular case, you know, we think that's what happened.

They were working on the Schwartz Well, and they lost thousands of feet of cement. What that means is, when they were putting the—when they were drilling the hole to access the gas thousands of feet down—in our particular formation it's about 7,000 feet down—they encountered what they believe was a fault, a large fissure underground, which basically the wet cement fell into. So they were trying to case the side walls to keep gas from coming up, which really—it isn't a cohesive cementing job anyway, even under the best circumstances, because it isn't required to be. But even the way they were doing it, they lost thousands of feet. Well, instead of re-cementing the job, they fracked it anyway. And so, you know, shortly thereafter, we saw gas seeping up in the creek.

That's—we're part of that clip. Where that clip does come from is that time period when we could actually light a match to what we called a "mother vent." It was about the size of a softball, bubbling with raw gas coming up. Of course, raw gas contains benzene, toluene, xylene, all kinds of toxic compounds. So it isn't just the frack fluid that we had to be concerned about coming up into the environment; it was also the natural gas. And boy, it was a monumental effort to get the state involved, because, once again, there was a lack of regulation. But—

AMY GOODMAN: Your dad used to drink the water on your property?

LISA BRACKEN: Yeah, he was an outdoorsman, and he would spend a lot of time in the canyon. When we bought this property twenty years ago, we dedicated it as wildlife habitat. And, you know, we'd looked everywhere all of our lives for a place that was quiet and peaceful. And we're very spiritual, Native American background. And so, it's very important for us to have that connectivity with nature.

And it has been constantly under siege since EnCana came into the neighborhood. Our wildlife population has dropped to maybe 15 to 30 percent of what it was, and that's on any given year since they've been here. So, we've found dead wildlife. And in absence of wildlife, we've found—I actually found and filmed a frog that I put on YouTube that was paralyzed in the most recent seep found in 2008. It was swimming near a gas expression. And that remains uninvestigated.

So, the fact that the EPA was taken off the job has been a very unfortunate thing. We have been largely unable to inspire our county, our state, the EPA, anyone, to even conduct groundwater monitoring, where we've actually had diesel compounds come up near where that frog was found, so—which, by the way, I rehabilitated. It was pretty neat to be able to get that frog back on its fours and put it back in the water. But I felt kind of bad about putting it back in the same water, so—

AMY GOODMAN: Your dad got sick?

LISA BRACKEN: He did. He died of pancreatic cancer several years ago.

AMY GOODMAN: At the age of...?

LISA BRACKEN: He was sixty-four. And there's no family history of anything like that. But he had been drinking the water. And we didn't know that the stuff was in it. And he always boiled it, because, you know, there's *Giardia* and other natural, you know, bacterial concerns, but he had been drinking it for probably a couple of months before we found out that there had been this blowout. You know, they didn't tell us. They don't tell you. You have to fight to find out what's going on.

AMY GOODMAN: Let me bring Joe Levine into the conversation—

LISA BRACKEN: OK.

AMY GOODMAN: —co-founder of Damascus Citizens for Sustainability and NY-H2O. Your group, why you got involved?

JOE LEVINE: We got involved solely on this issue, first in Damascus, Pennsylvania. I live in Brooklyn, but also live half—the other part of the time up in the Upper Delaware. In Damascus township, some people came to me, some farmers, and said, "We have an issue." And it was sort of a slightly sinister operation where landsmen were coming around and trying to sign farmers onto leases for gas drilling.

So we began an investigation into this, and it was really quite easy to find out what was going on. There were thousands, you know, hundreds of reports that we were able to find on the internet right away from Texas and Colorado and Wyoming and the West. And so, we formed an organization there to try and get the word out in the Upper Delaware and then thought we had to sort of enlighten the people in New York, so we formed NY-H2O, and because New York is significantly impacted.

Drilling is targeted for the New York City watershed, as well as the Upper Delaware River Basin—in fact, the entire southern tier, most of the entire southern tier of upstate New York, as well. And there could be 10,000 wells, 40,000 wells, 50,000 wells in this area that I talk about. And the impacts from this would be quite significant. And to allow this to happen in a watershed area, especially one like New York City's, but anybody's water supply, is potentially catastrophic. In fact, that's what the New York City DEP said.

AMY GOODMAN: The Department of Environmental Protection.

JOE LEVINE: Yes, correct.

AMY GOODMAN: Let's turn to another clip from *GasLand*. This is Dr. Theo Colborn, zoologist and expert on chemical pollution from fracking.

> **DR. THEO COLBORN:** Every environmental law we wrote to protect public health is ignored. Once the public hears a story, and they'll say, "Well, why aren't we out there monitoring?" We can't monitor until we know what they're using. There's no way to monitor. You can't.

AMY GOODMAN: Josh Fox?

JOSH FOX: Well, I mean, this addresses, I think, what Waxman and Markey are doing. All throughout the nation, these—and this is in thirty-four states where we have this gas drilling happening. Theo Colborn is talking about the fracking chemicals. There's 596 of them. They are proprietary, for the most part. We don't know their compositions. We know something about them, but the companies are not required to disclose exactly what's in those chemicals. The only reason we know something about them is because of Theo's work looking into what's called the manufacturers' safety data sheets, real detective work, and her being a chemist, you know, looking into the health effects of those chemicals. This is what's—

AMY GOODMAN: And you had the water analyzed as you traveled the country.

JOSH FOX: We did have quite a bit of testing. See, also in the 2005 energy bill, the burden of proof was shifted from the corporations to the citizens. So you have citizens all throughout these areas, which is a huge amount of the country, having to go out and try to prove, on their own, what's actually happening. And there is no

talented agency like the EPA who is being able to go in there and do the investigation that's necessary. So people are doing things like getting their own water tested, finding those air samples. You have a mayor in Texas who did his own air quality study, which found fifty-five times the level of benzene in the air.

AMY GOODMAN: Wait one second. This mayor is the mayor of Dish?

JOSH FOX: The mayor of Dish, yeah.

AMY GOODMAN: Right. Dish became famous. They renamed their town so that everyone in their town for ten years could get a dish, DISH Network?

JOSH FOX: Well, right. Yeah, that was a kind of a promotional thing. And it just sort of happened that he called—

AMY GOODMAN: But now they're seriously suffering.

JOSH FOX: Yeah. Well, he called me up, and he said, you know—this is the mayor of Dish; as I was driving, he heard that I was coming to Texas—"Come and take a look at what we've got going on here." And so, you know, all throughout the country you have people who are conducting their own investigations. This is what I ended up doing in my film.

AMY GOODMAN: And Josh, you begin and end *GasLand* with the companies testifying. Where were they testifying? Because now we're going to see a congressional hearing.

JOSH FOX: That was in a—right, that was in a subcommittee hearing. I think it was the Subcommittee on Energy. They were looking into hydraulic fracturing. And there was some quite—

AMY GOODMAN: And they're testifying, saying they don't want to be regulated.

JOSH FOX: They were—well, in fact, they've already had $140 million in the last couple of months, arguing against what's called the FRAC Act, which was proposed by Maurice Hinchey and Diana DeGette, which would repeal the Safe Drinking Water Act exemption. And it only has, I think, fifty sponsors at the moment, so it's also—there's a mirror bill in the Senate, which is Bob Casey and Chuck Schumer, I believe. But the FRAC Act would restore the Safe Drinking Water Act, and it's something that we talk about in the film. And, you know, in this congressional hearing, they're arguing very hard that they don't need to be regulated under the Safe Drinking Water Act.

And as Joe was mentioning, you know, all throughout New York state, and right now New York state is deciding what to do with their proposal for gas drilling. And, you know, in this region, this is a very, very serious issue for a huge amount of people's water supply, with these chemicals that contaminate in very, very small amounts. And just from what I saw going across the country in my investigation was that this was a problem everywhere I went.

So, the fact that the companies are lobbying so hard against it, I think—and then, in this congressional hearing, it's kind of amazing to watch. They get nailed. You know, they really can't stand up under the cross examination of Diana DeGette, which is pretty—it's really theatrical.

AMY GOODMAN: The Colorado Congress member.

JOSH FOX: Yeah, the congresswoman from Colorado. It's incredibly theatrical, too. It's a lot of—kind of fun to watch. And for me, you know, going from basically my back porch in Pennsylvania all the way across the nation to wind up in Congress, and watch these things play out, and certainly now with Waxman and Markey's

committee calling for an investigation into the chemicals, it's amazing to have watched this thing go forward. So I think when you're able to see the whole film, I think there's a kind of mystery involved that's really thrilling. And so, it's great to be here to talk about it. At the same time, I think what I uncovered, you know, or what was coming to me through all these other people who were talking about it, is this incredible threat, you know, to the nation's water supply, but also to people's health. I mean, health problems throughout these regions are really rampant. So, to me, this is really a public health story.

AMY GOODMAN: Well, we're going to have to leave it there, but I thank you very much for this journey you took across the country. It is truly remarkable—

JOSH FOX: Thanks.

AMY GOODMAN: —what you have exposed. Josh Fox, director of the new film that won the Special Jury Prize at Sundance called *GasLand*. Joe Levine, co-founder of Damascus Citizens for Sustainability and NY-H2O, thanks for joining us. And also Lisa Bracken, speaking to us from right near Divide Creek in Garfield County in Colorado. She's one of the people that, well, Josh visits in *GasLand*.

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