

A Broad Look At The Environmental Issues Of Natural Gas Drilling

INTRO

There is a lot of *concern* about the environmental issues related to drilling natural gas wells. There is a lot of *confusion* about those issues as well. The industry prefers to withhold information and wants you to believe that everything is just fine. On the other hand, many of the environmental groups would have you believe that each new well is the start of another Love Canal episode. I'm convinced that the truth is somewhere in the middle. But it's hard to find a web site or news article related to gas well drilling that is complete and unbiased. I should mention though, one very good source of fact based information is the Oil & Gas Accountability Project's, "Oil & Gas At Your Door?" (see sources at end). What I've tried to do in this report is separate the truth from the nonsense and put this information into perspective. The opinions expressed in this report are *my own* opinions and should not be considered the opinions of the steering committee or the group as a whole.

THE DEC

One of the best reasons for writing our own lease is to have some control over environmental issues. Although our NY DEC claims to be our 'protector', many question whether they will be able to handle any increase in gas drilling in our area. New York has only 4 site inspectors compared to Pennsylvania's 32. You have to wonder how they'll be able to cover the territory and be at the drill sites during critical stages. At a recent local meeting, I felt that they provided vague, incomplete answers to serious questions. When pressed further, it became apparent that they 'regulate' the drilling companies more through the 'permitting process' rather than on-site monitoring. I think that there are some real weak spots in the DEC policies which are mentioned further in this report.

RESEARCH

One of the main things that struck me while doing my research was '*the numbers*'. There aren't a large number of publicized accidents, spills, etc.. Why is that? Normally, whenever there's an incident involving water, soil or air pollution, the media is all over it. When visiting environmental sites to find examples of 'gas wells gone wrong', it's mostly the same few incidents and locations that keep showing up. Considering the number of wells drilled all over the US in the past 10 to 20 years, you'd think that there would be many more well publicized incidents if well drilling is as hazardous as some claim.

Critics say there isn't enough information about the effects of drilling. I say, if you want to study the effects of drilling, just look to Texas, the most-drilled state in the

nation. The state of Texas alone had over *1.5 million wells* drilled in the last century, yet they still have ample supplies of drinkable water and usable land. It has 266,820 active oil wells and 88,048 active gas wells ... that's a total of 354,868 *active* oil and gas wells. Closer to home, there have been *over 75,000 wells drilled in New York State* in the last century. *Over 100 of them are in Broome and Tioga counties.* I was unable to find reports of any gas well related catastrophes here in NY or in Texas.

But, there *have* been problems elsewhere. Colorado, New Mexico, and Wyoming are clear examples of mismanagement and lack of monitoring by 'the authorities' (Bureau of Land Management, EPA, and State Agencies). But in each case, the scope of the drilling had a lot to do with the problems. The drilling in those areas has been so heavy and so concentrated that the terrain resembles an ant farm. The agencies failed to stay *ahead* of the situation and in some cases common sense was ignored.

If the Marcellus ever truly becomes 'the next Barnett' we may need to adapt. But, for the near future, we will not see the extreme level of drilling that caused all the air pollution in Wyoming. And if common sense is used, we won't see soil pollution like New Mexico or water pollution like Colorado (reasons explained later). I believe the pace of drilling here will proceed slowly when you consider that 1) many gas companies are still focusing on the Barnett Shale in Texas 2) there are several other new and emerging gas fields in the nation 3) there are a limited number of drill rigs in the US 4) the Marcellus Shale covers a huge area, including PA and West Virginia.

ENVIRONMENTAL CONCERNS

I've separated the environmental concerns into two categories: MINOR and MAJOR:

Minor Concerns:

Noise, Lights, Dust, Truck Traffic, Road Deterioration, Loss of 'Green Space', Loss of Hunting Area, Habitat Fragmentation

I just don't get excited about the above mentioned issues. There *will* be noise, odor, dust, dirt, and mud. Roads will be torn up by heavy truck traffic and some trees will be cut down. But all of these issues are temporary. Roads can be repaved, grass and trees grow back, and life will return to normal when the drilling is finished. I remember during my childhood, having our neighborhood torn up for new gutters, sewers, and pavement ... a project that took many months. It was loud, dusty, smelly, and inconvenient, but we survived and everyone was happy with the results. Imagine if a large corporation bought a chunk of wooded land locally to build a new factory. Most would see it as a 'great thing' for our area in terms of the jobs and economic boost it would provide. Yet, we'd experience many of the same inconveniences. Gas leasing and production can provide jobs and a serious economic boost as well. You don't get something for nothing.

* It's important to note that, although a typical *vertical* well may take 4 to 6 weeks to complete, some of the newer *horizontal* drilling plans may take 2 to 3 times longer. This is due to the fact that they can drill several 'offshoot' wells from the same horizontal drill pad. Although this is more of a nuisance in the early going, it greatly reduces the number of roads, pits, and pads required.

Major Concerns:

Water Pollution, Soil Pollution, Air Pollution, Water Table Depletion, Catastrophic Accidents (blowouts, explosions, fires, etc.)

For many people, the biggest issue is the chemicals that are added to the frac water and drilling muds. Exactly *what chemicals* are used and *how much* is not fully known. The Energy Bill of 2005 exempts oil & gas companies from having to disclose the proprietary chemical contents of drilling & completing processes. But the most commonly sited hazardous chemicals reported to be in these fluids are: acetone, benzene, ethylbenzene, toluene, and xylene. These are all toxic and/or carcinogenic substances that have well-known and serious negative health effects.

What hasn't been made clear is the *level of risk* assumed at the *concentrations* used. If a drilling accident or spill occurred, would the exposure level from soil, water, or air contamination be lethal, moderate, or minuscule? And how does it compare to the exposure we experience every day from products in our homes, automobile exhaust and our local factories? We need to put it in perspective. Again, the industry says this almost never happens and if it ever did, the exposure levels would be so low that it would not present a serious problem. On the other side are the environmentalists who claim that it *does* happen and it *is* a serious problem. What's the real story?

Water Pollution - How often does it happen? Again, let's look at Texas. The Texas Groundwater Protection Committee's *Joint Groundwater Monitoring and Contamination Report – 2004* (TGPC, 2005) lists 1,440 groundwater contamination cases (of all types) in a twenty-county study area. This 20 county area *includes* the Barnett Shale 'sweet spot' where *heavy* drilling has occurred. What they discovered was that the vast majority of cases did not involve oil & gas field operations but rather spills and leaks of finished petroleum products. Of these cases:

- 1,428 cases *were not related* to oil & gas field operation and involved contamination by gasoline, diesel, or products, mostly (1,020) related to releases from petroleum storage tank facilities.

- 12 cases *were related* to gas & oilfield activities.

The report did not state the scope of the contamination and the impacts each case had, but it puts it into perspective ... *only 12 out of 1,440* contaminations were due to gas & oilfield operations. By comparison, it doesn't seem to be a huge problem, even

in heavily drilled Texas.

Here at home, the NY State Office of the Attorney General states that, “*Oil spills from leaking underground storage tanks at homes and gas stations are the largest single threat to groundwater quality in the United States today.* An estimated 1.2 million tanks nationwide, many of which were installed prior to new regulations in 1988, are a concern because tanks corrode quickly when buried unprotected in the soil. Corrosion, and other factors such as improper installation, spills during product delivery, and piping failures, have already caused *more than 400,000 confirmed underground storage tank leaks* nationwide.” A 1998 survey by the DEC found that gasoline spills contaminated more than 800 private wells and *forty-seven public water supply wells* in New York State. This is something that *is* happening, but no one’s talking about shutting down gas stations. An occasional well accident is something that *could* happen and people are talking about abandoning the natural gas industry.

Nonetheless, water pollution from gas and oilfield operations *can* happen, and it can happen in a couple of different ways:

- Well Casing/Cement Failure - After the well casing (piping) is put in the ground, the drilling company pumps cement along the outside of the casing from top to bottom. This seals off the surrounding rock layers from the gas and high pressure frac water, preventing contamination of any underground water. If the cementing of the well casing is not done properly, or if the cement does not seal off as it should (during the high-pressure frac’ing process), the frac water could flow up along the outside of the well bore and into other layers of rock which may contain well water. * The DEC doesn’t require that the cement be tested for strength as it is in bridges and buildings.

From what I’ve been able to determine, well casing or cementing failures *are* an extremely rare occurrence as the industry claims. I’ve only found 2 cases where *gas well casing failures* caused water well pollution. I saw mention of another in Madison, Ohio but apparently it was only methane that found it’s way into the water (no fluids). I could not find any further details about that one. I wouldn’t doubt that there are more, but for all the hours of searching I did, this is all I could come up with.

CASE #1 - In Grandview, Texas, (Jan 2008) it is thought (but not proven) that the well casing or concrete failed during the frac’ing process of a newly drilled gas well. In this case, high sulfate concentrations, other contaminants, and traces of toluene were found in 3 water wells within a couple hundred yards of the gas well. The water wells were drilled into a shallow groundwater supply called the Woodbine aquifer. At two different times after the incident, the landowners had the water tested by independent labs which confirmed the previous results. The article did not state what the actual levels were but, in each test, the toluene was *below* the EPA max. acceptable level. * It should be noted in this case that the EPA had tested this aquifer several years *before the drilling took place* and found that 61% of the samples were above the EPA limits for sulfates with traces of other gasoline additives, insecticides,

pesticides, and solvents. So it seems believable that the gas well was not responsible for *all* of the contamination. The original news article never mentioned this, nor have any of the environmental sites that are using this incident as an example. I've not been able to find any reports of the contamination spreading to any other local wells.

CASE #2 - In Clark, Wyoming, (Aug 2006) a drilling rig hit an extremely high-pressured gas pocket at about 8,500 feet. The gas shot up the well with enough force that it *blew out* a weak spot in the side of the well casing (underground). In this episode, one water well on an adjacent property was affected and it has tested above EPA limits for toluene. As in case #1, the article did not say what the exact toluene levels were. Were they way above the limit or just slightly above? No mention was made of any follow-up testing and what the results might have been. Monitoring wells have been dug all around the affected area. Again, I have been keeping an eye out for articles and reports of the contamination spreading, but have found none.

Note: Environmentalists often cite two cases in Texas (towns of Chico-2005 & DeBerry-1997) where nearby water wells were contaminated, but these were *not gas wells* involved. They were 'injection wells' (discussed later) into which the state of Texas allows all kinds of drilling wastes to be pumped at high pressure. It was determined that the operators were pumping into the wells at excessive pressures.

This is the type of accident (well casing/ cement failure), though, that would pose the biggest risk to a major aquifer. But how much of a risk? Critics warn that one well accident could condemn the drinking water for large portions of the state. How likely is this? The first accident mentioned above affected only 3 nearby water wells, with toluene levels below EPA limits. The second blowout did put toluene levels above the EPA limit but has so far only affected one nearby water well. How much effect would this type of accident truly have on a major aquifer, where the dilution rate would be considerable? With the millions of wells drilled in this country, can anyone find a case of an entire aquifer being *condemned* due to a gas drilling mishap? I can't, and something of that magnitude would be hugely publicized. As I said before, this type of failure is extremely rare. Part of the reason may be that, this the last thing that the drilling company wants. If it does happen, the well is ruined and it's a *major* loss for the gas company at \$3 - \$5 million per well.

- Pit Failure - Most drilling companies keep their contaminated waste water in open earthen pits that have a one-piece poly liner covering the bottom and sides of the pit. Accidental contamination can occur if the waste water escapes from the pits into the surrounding soil and leaches into a nearby water supply. These spills can be caused by poor pit construction (cave-ins), torn liners, and stormwater overflows. In my opinion, these pits are the weakest link in the whole drilling process.

This type of accident occurs more frequently, but again, in relation to the number of wells drilled, it's not an everyday occurrence. There are however, several recent and well publicized incidents of contamination due to waste water pits leaking. Four of those incidents occurred in Garfield County, Colorado where the drilling companies located their pits right on the banks of a popular irrigation-source river. The pits leaked and the waste water went right into the river (duh!). Colorado has

since introduced legislation that prohibits the use of open pits within a certain distance to rivers and streams. In such cases, drillers are now required to use 'closed loop' systems where the water is pumped directly from the well equipment into a holding tank. * The NY DEC has no such regulation and allows pits to be within 50 ft of rivers and streams (duh!). It's been shown that 'closed loop' systems actually save the drilling companies money while reducing their liability. With environmental pressure building, we'll see more of these systems in use.

One of the issues here is the *thickness* of the poly liners used in these pits. I've heard that some liners are only about 6 mil, while other states such as Michigan require 50 mil. * Unfortunately, the NY DEC has no spec for the liner thickness. There's been a lot of attention paid to Hickory, PA, where a pit liner leak apparently contaminated a landowner's pond. This case has been exploited by the 'anti-drilling' environmental groups, one of whom made several videos of the landowner and a few neighbors relating the problems they've experienced due to the gas wells. These videos are very one-sided, long on sentiment and short on fact but they can be seen at damascuscitizens.org.

New Mexico is another area often cited by environmental groups and, it's true, they've had some serious pollution due to these waste pits. However, most of it is due to the fact that, for a long time, they never even required pit liners. Drilling companies are required to immediately report pit failures or any other episode resulting in contamination. Small pit/liner leaks may take several days to notice with small volumes released. Major pit/liner leaks are usually noticed quickly. Requiring a thicker pit liner may be an option when writing the terms for our lease.

- Ground Spills - Accidental ground spills of gasoline, diesel fuel, and other liquids can occur on a drill site just like any other industrial or construction site. Most spills of this type are small spills because human error is involved and the mistakes are quickly detected/corrected. Determining an average frequency of these incidents is very difficult, but after reviewing several monthly reports (for the state of Texas), it would seem that a typical month might record 30 well-related spills of all types. The spill materials are put into 3 categories, "crude oil, gas well fluid, and products". Of the 30 incidents, 5 might involve *gas well fluids* from a tank (as opposed to a pipeline or other container). Reasons for the spills were things such as "opened wrong valve", "internal rust or corrosion".

- Injection Wells - In some states drilling companies are allowed to drill "disposal wells" deep into porous rock formations. They then pump the contaminated waste water from drilling operations into these wells. The wastes are supposedly down so far that they can never make their way back up to the strata where fresh water supplies exist. * The DEC says that there are 'a few' injection wells in NY and that those are used for solution salt mining. A search on the DEC web site for all active wells in NY seems to indicate that this is true. It's unclear however, how they monitor what wastes actually wind up in these wells. Injection wells are something that we *don't want* in our area and, if need be, we can word our lease to prevent this from happening.

- Water Table Disturbance - Any time a well is drilled *through* a water table, it's bound to 'stir up' the water and sediment. This can happen with water wells or gas wells and it is *not uncommon*. One article I read explained that, naturally occurring hydrogen sulfide and salt tend to lie on the bottom of the aquifers, but when disturbed, they can mix with the water to deliver an unpleasant taste and odor. But the disturbance is usually minimal and clears up a short time afterward. In extreme cases, very small water wells can empty into the well shaft before the crews have a chance to set the casing and concrete. These small wells are typically very shallow and will be replenished over time by rain water or 'bleed' from another nearby underground pool.

Disturbing other layers of rock close to the water table can sometimes cause low levels of natural gas to find it's way into water wells. This can happen even when drilling another *water well* on an adjacent property. In some cases, the problem may actually be due to a rusted or corroded casing of the *water well* itself. A Canadian study has shown that the fugitive methane is often neutralized (oxidized) by bacteria in the water. But with larger amounts of methane, for wells located outside of any structure, simply installing a vented well cap may provide sufficient venting prior to water entering the home.

Should any of the above conditions occur, the DEC should be notified and they will have the drilling company set up an alternate water supply. In any event, this emphasizes the importance of pre-drill water testing and having a properly worded lease to help ensure that the drilling company corrects the situation and/or pays for another suitable water well for you.

Soil Contamination - The causes of soil contamination are the same as for water contamination mentioned above. In addition, some states allow 'land farming'. This where the small pieces of rock from the drilling operation are washed and then spread over any nearby fields. There are some concerns about this practice due to the fact that the bits of shale and other materials brought up by the drilling process may have a low level of radioactivity. These materials are known as NORM (Naturally Occurring Radioactive Materials). So how bad is this stuff?

This is one thing that the DEC *has* tested (from NY wells) and it has been found to be extremely low level, in most cases indistinguishable from 'background' readings. Terry Engelder, prominent Geology Professor at Penn State, says the level of radioactivity is so low that it is comparable to that given off by the luminescent dials we find on wrist watches. Regardless, the DEC has said that on-site land farming is not allowed; that all such wastes are to be trucked to an off-site, certified waste disposal area.

Air Pollution -

- Exhaust From Machinery - The largest source of air pollution would probably be

the exhaust from trucks, generators, and drill rigs, all of which are operating around the clock. Environmental sites warn of the 'smoke belching' diesel engines releasing benzene and other particulate matter into the air. But, how is this any more threatening to our environment than the machinery found at big construction sites or the highway repaving projects that we see every summer? And how does it compare to the countless numbers of diesel engine tractor trailers rolling on our local roads? Gas well drilling sites are just temporary whereas those big rigs are rolling through our community all day, every day.

One problem area often mentioned by environmental sites is Boulder, Wyoming, where pollution from vehicles and equipment in the gas fields -- along with dust, weather and geography -- have helped raise ozone levels to those of big cities in the summertime. Does this mean that any area getting gas wells will suffer the same fate? The simple answer is, no. The scope of the operations there is on a scale that we are not likely to see. These are federal lands that were opened up to an *army* of drillers. They did not have individual property owners to deal with and they didn't utilize directional drilling. Rather, they put in over 1,000 vertical wells using tight 40 acre spacing at a density of 64 wells per sq. mile (see photos at www.voiceforthewild.org/blm/Jonah_field/). For us to see that level of activity, they'd have to pull every drill rig from the Barnett Shale, ship them up here, and drill non-stop for over a year. Adding to the problem there are other unique factors. Ozone needs sunlight to form, and environmental officials believe the ozone levels in Wyoming this past winter were exacerbated by heavy snow cover, which intensified the sunlight by reflecting it off the snow. In 2007, when the area had little snow cover, there were no elevated ozone readings. Also contributing to the situation are geographical factors of the area. Rare temperature inversions occur there (cold air is trapped close to the ground) and the surrounding mountains actually help hold the pollution in the valley.

Directional drilling in our area will help reduce the overall air pollution because operators can extract the same amount of gas from one *horizontal* well drill pad as they can from 16 *vertical* well drill pads. That's 15 fewer drill pads, roads, and pits that need to be built by excavators, bulldozers, dumptrucks, etc..

- Evaporation - Some of the toxic chemicals used may also contribute to air pollution. Benzene and some other toxicants found in frac water are highly evaporative chemicals that do not mix well with water. Being lighter than water, they can sit on the water's surface, evaporate, and be discharged to the air. I'm not sure that this is a bad thing. Not that we *want* chemicals in the air, but isn't it better to have it in the air than the water? Isn't this exactly what 'scrubbers' do when they treat soil and water from spill areas? They evaporate chemicals and discharge to the air. But, *what is the quantity* that we're talking about here? And if it's so hazardous, why aren't the drill site workers who are around it every day falling over dead? The fact is acetone, benzene, toluene, and xylene all break down in the atmosphere within days. But, let's put it in perspective.

In 2002, Lockheed Martin reportedly released 23,766 lbs. of known and suspected toxicants into the air and water while Hadco released 12,020 lbs. Add to that the

emissions from all the other factories, gas stations, and home furnaces in the area and the numbers would be huge. Or again, let's compare it to the benzene produced by the motor vehicles we drive. Based on average benzene emissions from auto tailpipes, a Wisconsin study estimated that, on a one mile section of Interstate 90/94, motor vehicles unleashed approx. 4,260 lbs. of benzene per year. *That's just a one mile section!* The bottom line is, if your driving your car in traffic, you're sniffing benzene. It seems inconceivable to me that evaporation from a few temporary waste water pits could equal or exceed those figures.

- Flaring - Before putting a new gas well online, the operator often needs to get rid of excess frac water from the well. They do this by igniting a stream of gas direct from the wellhead, a practice known as flaring. This can be a long, noisy process that may be repeated for several days and for hours at a time. On the other hand, flaring can be avoided altogether if the operator has equipment that can separate the large amounts of water that initially comes out of a new well. Concerns have been raised about the chemicals released from flaring because, along with the methane there are other gases, frac fluid, etc. being burned.

I have not seen any reliable reports stating what the emissions of this activity are, probably because no two flaring situations are the same. The makeup of the gas, the well pressure, and the duration will always be different. I've seen claims that there are as many as 200 different components given off by flaring but they never mention in *what amounts*. Many critics fail to recognize the difference between gas well flaring, oil well flaring, and refinery flaring. Gas well flaring is a short-term, temporary activity, not something that continues on throughout the life of the well. But, lets compare it to another industry. The asphalt manufacturing process reportedly releases *millions* of pounds of the exact same toxins found in oil & gas production. When you think of the miles and miles of roads in the US, there has to be *way* more air pollution from asphalt than gas production. If you're opposed to gas drilling are you also advocating that we stop paving our roads, parking lots and driveways?

* The DEC states that operators are supposed to notify surrounding property owners before flaring operations begin. Operators are required to obtain flaring permits if they are going to flare for over 72 hours straight. But the only way the DEC will find out about violations is if someone issues a complaint to them.

- **Water Depletion** - It reportedly takes 3 to 5 million gals of water (or more) to drill and complete a well. There's a lot of concern over where this much water will come from and what the loss of that much water will do to our ecosystem. First of all, most people do not have a good idea of what a million gallons is, so let's clarify. It's approximately one and a half Olympic sized swimming pools. Or, if you're more measurement minded, it's the volume of one 51 foot cube. It is doubtful that drilling companies will try to drill water wells onsite to furnish their water needs. Time is money in this business and, even with a *good* water well, it would take them 2 to 3 weeks to fill their tanks. Their preferred source will be surface water (ponds, rivers, etc.) It should be obvious that *extensive* dewatering of our ponds, rivers and streams is

not a good idea. But when water and flow levels are normal they should be able to tolerate some *limited* donations. And what harm would there be if *large* quantities were taken from the Susquehanna River when it's near flood stage?

Drilling companies cannot just help themselves to the water. They must apply for permits with the Susquehanna River Basin Commission (SRBC), who will determine how much water they can obtain at any one time. It's encouraging that the SRBC already caught and shut down a couple of Pennsylvania drilling operations for taking local water without the proper permits. The Pennsylvania DEP then held a meeting with 150 oil and gas industry leaders to make sure that they knew the rules. Hopefully, they will be just as diligent in NY. * I've heard that the SRBC only accepts permits twice a year. This is not very accommodating to drillers and may actually *invite* noncompliance.

Some drilling companies have already contacted local municipalities with requests to purchase water. The amount purchased will be controlled by our local water officials, who will determine how much can be spared. It deserves mention that the drilling companies are paying a hefty price per gallon for this water and, if handled properly, the revenue from these sales will be a welcomed addition to our cash-strapped local systems. The need for water may present money making opportunities for others in our area as well.

The shortage of water is an issue that many drilling companies have already faced in some gas-rich but water-starved areas of the country. And they've come up with some solutions. Most drillers now recycle as much water as possible. In addition, they've combined efforts with the local communities to build retention ponds that are filled a little at a time when the community water supplies can afford to 'donate'. They've also channeled unwanted runoff from heavy rains into the ponds, thereby reducing the need to access community water supplies. It seems to me that, if increased drilling is coming our way, it would make a lot of sense to build some of these retaining ponds. We could also have 'water sales' every time the Susquehanna is ready to overflow it's banks. One way or the other, this is another area where our lease can be worded to prohibit taking water directly from our properties.

Catastrophic Accident Possibility

- Blowouts - Occasionally, a *large* release of gas may accidentally occur at gas well sites. This is known as a blowout and it can happen when unusually high-pressured pockets of gas are encountered during drilling. Normally, the weight of the drilling muds and mechanical devices known as 'blowout preventers' keep these surges in check. But, on rare occasions the pressure is so great that it overcomes all resistance and blasts out through the top (or side) of the well casing. Of concern is how quickly the methane dissipates and whether or not it contains large quantities of hydrogen sulfide (sour gas). Evacuation of surrounding homes could be required, much the same as if a gas main were to rupture somewhere. Depending on the pressure involved, blowouts may take up to several days to be brought under control. There have been a couple of very rare cases where sour gas wells were lethal to those

very near the well site. It's believed that the gas in the Marcellus Shale is of high quality (sweet gas) and does not contain large amounts of hydrogen sulfide.

- Explosions - In extreme cases, the friction caused by the rushing gas (from a blowout) can heat up the well casing to the point that the gas ignites resulting in an explosion. The resulting fire makes working conditions more difficult and it can take a couple of weeks to bring the situation under control. Again, evacuation of surrounding homes could be required especially if the threat of wildfires exists during the dry season.

Blowouts are certainly very serious situations but they rarely happen and getting gas out of shale rock like the Marcellus is not that easy. Typically, shale needs to be prodded and poked (frac'ed) in order to obtain enough pressure to make even an average producing well.

But this does bring up the question of preparedness. In heavy drilling states like Texas, they have 'Well Control Companies' who specialize in taking care of emergency situations related to well drilling. Do we have any companies like that in NY? If so, how far away are they? And could our local emergency crews handle situations like this? Is evacuation education & planning a regular part of training for our emergency crews? Should we have at least one specialist in the area?

SUMMARY

I believe that I've shed light on the main things that the industry would prefer you didn't know. I believe that I've also put into perspective some of the claims of the critics. Keep in mind I've listed nearly *everything* that can go wrong with a gas well and it may be intimidating. But again, put it in perspective. If you listed *everything* that can go wrong with the Lockheed Martin plant, or the Exxon Mobil tank farm, or even local gas stations it would be intimidating as well. The fact is these things don't happen frequently and *the numbers* say that well drilling isn't any worse than many other industries that we take for granted. In fact, it's far better than some.

I truly believe that environmentalists serve an important purpose in our society. They are constantly monitoring the world around us and making us aware of potential dangers. But all too many of their dire warnings include phrases such as, "might lead to", or, "could possibly result in", or, "at risk of". This might be OK if we are venturing into a new arena, but the truth is, we have enough history on well drilling to determine what the risks *really* are.

We live with risk every day. Try doing an internet search for gas trucks and pipelines exploding, or tankers leaking, or factory farm pollution and see how many 'hits' you get. You know that LP canister on your gas grill? Check out how many of those claim lives and destroy property. One study shows your risk of becoming ill and dying from benzene (all sources) is only half that of being struck by lightning; that you're approximately 10 times as likely to die from electrocution, 55 times more likely to die by drowning, and 481 times as likely to die by an accident in the home.

The *numbers* say that you're 589 times more likely to die in a car accident and 13,125 times more likely to die if you smoke cigarettes. Death from gas well causes doesn't even register on the scale.

What this all boils down to is potential vs. probability vs. need - or more simply, *risk vs. need*. Whenever we hear of someone dying in an auto accident, we're reminded that the *potential* for our own death is there every time we drive. But we weigh the *probability* vs. the *need* to travel and we continue driving. By getting behind the wheel, we're saying that over 43,000 deaths per year by auto accident is an acceptable *risk vs. the need* to drive. By comparison, there is a *much* smaller number of deaths and contaminations per year attributed to gas wells yet, many say it's not worth the risk. If you argue that the risk associated with drilling gas wells is *not* acceptable, then you are essentially saying that we don't *need* the natural gas. Or, maybe you're just saying 'not in my back yard'. The fact is, we *do* need the gas. And we have no choice but to drill these wells where the gas is located.

When I look at *the numbers*, I'm not convinced that the risks outweigh even the *financial* needs. This area of ours has been economically depressed for some time. And it doesn't seem like there's a lot of hope for the future. I don't know how some of our local farmers have managed to hang on for all these years. And many others who were once gainfully employed by local factories have lost those jobs and are now 'just getting by'. With middle-class incomes disappearing, fuel prices skyrocketing, and the economy in recession, unfunded mandates are forcing our cash-strapped local governments to raise property taxes and cut services. What's the outcome of this downward spiral? I consider these issues just as much a part my *environment* as the 'green' issues. Could gas well activity help change this? Absolutely.

It's estimated that the financial benefits of the Barnett Shale play has pumped 5 to 6 *billion* dollars back into the local Dallas-Fort Worth economy and will *continue* to do so for some time. In addition, there have been generous grants to schools and community organizations by the oil and gas companies. I'm *not* saying that I think it's OK for these companies to pollute our environment as long as we get some money for it. I'm saying that, in terms of accidents and pollution, I don't see *the numbers* that make them any *worse* than other big businesses. And in light of the potential benefits to our local economy, I think the risks are worth it on a financial basis alone. And those risks can be reduced by using improved technology, equipment, and procedures.

But there's more. To address this issue fully, we need to look at the big picture. What kind of risk is our nation taking by *not* continuing to develop our oil and natural gas resources? Where will our oil and gas come from? The economic security of this country is of prime importance to all of us. And having ample, ready supplies of natural gas may play a key role in keeping this country afloat in the near future. What I'm talking about is an energy crisis situation known as 'Peak Oil'.

Many industry experts say that it's not a matter of 'if' but rather, a matter of 'when' this global crude oil crisis takes place. Emerging countries like China and India are *rapidly* increasing their oil consumption and they will continually be

fighting for a larger and larger share of the available global oil supply. The true 'giant' oil fields that provide much of today's oil are mostly mature fields with declining production. These experts claim that newer, smaller oil fields are not coming on line fast enough, and their production will not be large enough to even offset the *declines* of the existing fields, let alone make up for the *increase* in demand. At some point, they warn, supplies will fall far short of demand. Basic economics says that, when demand greatly exceeds a limited supply, prices skyrocket and the product goes to the highest bidder.

If you haven't read about how 'Peak Oil' could affect our nation, you owe it to yourself to do so. For an enlightening, but *worst-case scenario*, try reading the remarks of James Howard Kunstler (http://www.kunstler.com/spch_hudson.htm). Whether or not you agree with the author's bleak portrait of the future, I think we need to at least *listen* to these arguments and ask ourselves, "Is it possible?" And, if so, shouldn't *this risk* play a part in determining the needs associated with natural gas drilling"?

If "Peak Oil" becomes a reality to the extent some think it could, the negative impact on our economy and our way of life could be devastating. Cheap gasoline would be a thing of the past, with many of us unable to afford to drive our vehicles. The cost of any product that's shipped or trucked (that's just about everything) would skyrocket, causing sales to plummet and companies to go out of business. Heating oil would be unaffordable, so large numbers of people would go back to using wood and coal stoves, which are about 50 times more polluting than gas furnaces. Huge numbers of trees would be chopped down to burn. Even garbage service would be unaffordable, so people would turn to burning and illegal dumping to get rid of their trash. If you believe these experts, the environmental effects of *not* drilling could be devastating.

No one knows for sure if 'Peak Oil' will ever happen. There are those who think that it's just a big scare story or even something dreamed up by the oil and gas companies to help open doors to more drilling. But the fact is, many of the warning signs are there and 'Peak Oil' happened once before, although just on a national level. Only 50 years ago people laughed at the suggestion that the US could not supply all of it's own oil needs. But they were wrong. At least back then, we had a safety valve and could purchase foreign oil. Now we find ourselves heavily dependent on foreign oil and ever closer to supply problems. This time we have no back up plan and many think our national 'leaders' are failing us by not standing up and addressing this situation *now*.

If 'Peak Oil' comes about, this nation will need *all types* of energy sources available. The emerging renewable energy sources (wind, solar, etc.) must play a big part, but they will take decades to develop and won't even come close to providing all of this nation's energy needs. We'll need every bit of domestic oil and natural gas we can get our hands on. Having a 'not in my back yard' attitude is not going to get it done. If there's even a *slight* chance of our oil supply being greatly diminished by uncontrollable foreign events, then I'm of the opinion that the need outweighs the risks and we should pursue drilling.

That said, I *would* like to see the EPA, the DEC, and local officials learn from previous problems and become better prepared to handle increased drilling activity and become more proactive to *prevent* possible incidents. I *would* like to see pressure put on our state legislators to enact legislation *requiring* the DEC to take these actions. ‘Greener’ drilling procedures *can* be employed while still maintaining efficiency and profitability. Implementing better safeguards and regulations *can* be done and has already been done in New Mexico and Colorado. There are already signs that certain local legislators and environmental groups are not going to let what happened in Wyoming, Colorado, and New Mexico happen in New York. These are highly controversial issues and you can bet that they will be monitored closely.

Many feel that, if there’s gas below us, the oil & gas companies will be coming to get it one way or another, especially if this nation faces some type of energy crisis. Jill Morrison, of the Powder River Basin Resource Council (Wyoming), warns of unseen problems but states, “ .. this is the richest industry in the world, and they’re going to come whether you want them or not.” Indeed, many of our neighbors have already signed leases, increasing the chance that oil & gas companies will be here sooner or later. Signing a *good* lease is one way we landowners can protect ourselves. Our goal is to develop a lease with the necessary environmental provisions, yet still remain marketable to the oil & gas companies. But there must be a balance of protection vs. risk vs. need.

Kevin Lewis

Some Web Site Sources

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- Industry Issues -
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1817691>
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