WASTEWATER WASTELAND

AN INVESTIGATION OF FLOWBACK FLUID DISPOSAL IN NY

BY ALEX BISSELL

Photo: Harry Boyd's farm, following a wastewater dump by Appalachian Energy Inc.

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Introduction

New York's neighbor, Pennsylvania, is already knee-deep in high-volume, horizontal, slickwater hydraulic fracturing, and has seen the havoc that the operation can wreak. As the illegal dumping section of this paper will demonstrate, citizens there cannot depend on the government to protect them from a gas drilling industry with dollar signs in its eyes. Even for those who live within the borders of New York, Pennsylvania's problems have been lapping at its shores.

In New York, under the 1992 *Generic Environmental Impact Statement* (*GEIS*), hydraulic fracturing and horizontal drilling were allowed, although never combined. The addition of slickwater chemicals also appears to be a new aspect to the methodology of drilling.The volume of water used in early hydrofracking was not projected to exceed 80,000 gallons. Since then, new techniques in the industry now use water in excess of 300,000 gallons per stage (NYS, 2009, p. 51). This has prompted a review of the 1992 *GEIS* and the drafting of a supplement that takes the new developments into account.

Until that supplement to the GEIS is completed, drilling into shale gas units is rarely being permitted in NY. The Marcellus formation is the most prominent shale, stretching all the way from Chautauqua County to the Delaware River valley ("Marcellus shale," 2011), although there are also other layers considered in the SGEIS, such as the Utica Shale. However, one thing is for sure, gas companies will not soon abandon designs to drill into Marcellus shale, as the expected profits are too huge.

Hydraulic fracturing is not an issue that is going away any time soon, and it is up to the citizens of New York to make sure the government appointed to serve them has their best interests in mind.

This paper is an investigation into a small portion of the larger issue of hydraulic fracturing or "hydrofracking", namely, how the waste fluids from the process are described, and some of the methods for "disposal" of those fluids.

Terms and Definitions

Clearing the Waters

The muddy political waters that surround gas drilling give rise to an equally unclear lexicon. Phrases like "fracturing fluid," "flowback water," "produced water," and "drilling fluid" often float ambiguously over the thing they are meant to describe. In order to proceed with a precise discussion it is important to first define the terms associated with drilling practices. To that end, Mr. Kappel, a hydrogeologist with the US Geological Survey, was called on to clarify which words apply to each fluid.

It should be noted that even given this glossary of well-defined definitions, there are still instances where the lines are blurred. Mr. Kappel himself has stated that all of the solutions involved in the drilling process comingle to some extent, so that there may be a little bit of one in each of the others. For example, in a permit hosted on the New York Department of Environmental Conservation's website for a Chemung County drilling operation (2006), the term "produced water" is used interchangeably with "brine" (p. 1).

Brine

Merriam-Webster's Collegiate Dictionary (2003) defines brine as "water saturated or strongly impregnated with common salt" (p. 155). However, in the context of drilling waste, this term, even more than most, seems to be used imprecisely. It may refer to produced water, which often has high salinity, or it may be used to refer to just about any of the other fluids, as they all have high salt (NaCl) content. As will be explained later, the chlorides in drilling waste derives from the formation itself, and any liquid that passes through it is sure to come back up with some level of salinity.

Drilling Fluid

Mr. Kappel explained that after vertical drilling, during which they may use air or fracturing fluid to bring cuttings to the surface, as they drill the curve and the horizontal leg the well operators use "drilling mud." It is usually a mixture of bentonite, water, and several other chemicals. In Pennsylvania, Mr. Kappel said, petroleum products were sometimes used as part of the chemistry. It can be based on anything from freshwater to a polymer- or oil-base (NYS, 2009, p. 118). The purpose of the mud is to maintain the shape of the wellbore against external pressure from formation fluid, keep the drill-head cool and clean, and suspend drill cuttings to be re-

turned to the surface as flowback during preliminary vertical and horizontal drilling (EPA, 2000, p. G-3).

One of the ingredients that go into this substance are what are known as "cross-linkers," which keep the liquid (be it water, petroleum, or otherwise) in a viscous state for the initial fracturing. Once it is time for the mud to come back out of the well, chemicals known as 'breakers' are used which return the liquid from a gel to a more watery state. This allows the mud to surface more easily, along with the cuttings from the drill head. The cuttings are then separated from the fluid and deposited in a pit, while the fluid is recycled back into the well; however, some of it inevitably ends up in the cuttings pit. This is known as "drilling fluid."

Hydraulic Fracturing Fluid

When initial fracturing of a well takes place, "fracturing fluid" is what goes into the well to do the job. Although the industry closely guards the proportions of its components, besides water and sand, Mr. Kappel explained that it contains chemicals whose purpose is as biocides, corrosion-inhibitors, scaling agents, acids, and surfactants. The biocides are used to kill bacteria that might be introduced to the formation fluid during the fracturing process. Because the formations often contain iron and sulfur, the bacteria thrive in that environment, producing a slime and constricting the passage of methane to the surface. As for the other components, corrosion-inhibitors are used to prevent the brine from eating away at the pipes, scaling agents are used after pressure-changes cause other chemicals to produce scale on the side of the pipes, and acids are used to reduce the amount of precipitants, calcium for example, produced by the bedrock.

Mr. Kappel stated in his interview, "All the chemistry they put down the hole has a purpose." While that may be true, it does not mean they do not also have unintended, often toxic, side effects. On example from The Endocrine Disruption Exchange's *Health Effects Spreadsheet*, which is based on a compilation of sources like Material Safety Data Sheets, is bentonite has been demonstrated to have adverse effects on the human sensory, respiratory, gastrointestinal, liver, and immune systems, as well as being a known carcinogen (2011).

Many of the other chemicals that have been analyzed also exhibit harmful side effects. Boric acid, a common cross-linking agent, is documented to cause damage to the skin, eyes, respiratory system, liver, gastrointestinal tract, brain, nervous system, kidneys, as well as the cardiovascular and reproductive systems ("Health effects spreadsheet," 2011). All of the components Mr. Kappel named, the biocides, corrosion-inhibitors, scaling agents, acids, and surfactants, all have similarly toxic profiles. The Endocrine Disruption Exchange's Multi-State Summary states that "over 78% of the chemicals are associated with skin, eye, or sensory organ effects, respiratory

effects and gastrointestinal or liver effects," and "the brain and nervous system can be harmed by 55% of the chemicals (2011).

Formation Fluid

Formation fluid is liquid that is already present deep in the rock, and comes to the surface during drilling and gas production. While natural, it is far from harmless. The Marcellus Shale formation has been documented to contain high levels of uranium, thorium, and radium, as well as bromide, arsenic, and barium. It is saline and radioactive.

The Marcellus Formation, though currently located under the mainland of the United States, was deposited as sediment more than 350 million years ago in what was then a large salt-water body (Soeder, 2009, p. 1). This accounts for the high salinity of the liquid within the rock, but often there are also other compounds present besides sodium chloride, these can include inorganic compounds like bromide, arsenic, and barium (Soeder, 2009, p. 5), and it may also be saturated with radioactive elements. According to John Harper of the Bureau of Topographic and Geologic Survey (2008) the Marcellus shale has been documented to contain "uranium and thorium contents that are greater than 10 parts per million and that may approach 100 parts per million" (p. 6).

Flowback Fluids

The liquid that is left over after fracturing is called flowback fluid or flowback water. It is made up of spent fracturing fluid and formation fluid. Mr. Kappel said that, to his knowledge, the average return for fracturing fluid is ten-to-eleven percent. "So," he explained, "if they push in a hundred-thousand gallons, on average they'll get back about ten-thousand gallons, that's the flowback water."

Typical concentrations of flowback constituents based on limited samples from PA and WV, and regulated in NY can be found in Table 5-9 in the NYS Department of Environmental Conservation's 2009 draft SGEIS. Included in these flowback samples were Benzene, Bromide, 4-Nitroquinoline-1 –oxide, Bromoform, Cadmium, Chloride, Ethyl Benzene, Sulfate, high Total Suspended Solids, and Xylene.

Testing for many of the chemicals used in hydraulic fracturing may be a difficult and fruitless endeavor, for several reasons. The Community Science Institute (CSI) notes that the "federal Energy Policy Act of 2005 specifically exempted hydraulic fracturing fluids from the Safe Drink-

ing Water Act and [as] a result of these exemptions, energy companies are free to treat these chemicals as trade secrets" (2009). While there is some indication of what elements may be involved, the specific compounds that the industry uses are often long chemical chains that would be difficult to test for without knowing specifically what to look for. Another complication which CSI identifies is "that no one knows for sure what kinds of underground mineral formations will be encountered as the well hole is drilled," which may contaminate the water with "metals like iron, lead, and arsenic as well as naturally occurring radioactive materials (NORMS) like uranium, radium and radon" (2009).

Produced Water

Once the well begins producing gas, what comes up along with that gas is known as produced water. It includes formation water and hydraulic fracturing fluid which did not come up as part of the initial flowback fluids. Mr. Kappel explained that once the gas comes up, it is put through a glycol tank to strip all of the water molecules from it, leaving just the methane. The excess water is then stored in a holding tank at the well site, and then trucked off for disposal. These trucks, carrying produced water, which also contains frac fluid, are usually labeled "brine".

Because of the salinity of this fluid, one of the methods of disposal used in other states, such as Pennsylvania, is application to winter roads as a de-icing measure. With this option, the harmful compounds also present in the water are spread onto the roads along with it, making their way into the surrounding environment. While this procedure is currently outlawed in New York under the *GEIS*, in neighboring States drilling companies have demonstrated that they are very willing to bypass the law and dump illegally.

Other common practices are only marginally more safe, such as disposal via traditional wastewater treatment plants. These facilities are often ill-equipped to properly test, treat, and release the incoming drilling waste, especially in the enormous quantities involved with high-volume hydraulic fracturing.

Are New York's Plants Ready?

Overview

If the number of wells being drilled each year in Pennsylvania is any indication of what to expect in New York, then the state might be inundated with a similar number one day soon. For each well that is developed, according to the *SGEIS*, "300,000-600,000 gallons of water per

stage" of drilling can be expected (2009). A significant portion of that water will make its way to New York's wastewater plants for treatment and release, probably into drinking water sources throughout the state. The important question that needs to be asked is whether or not those facilities are ready to handle this new and hazardous form of waste.

Auburn

The Auburn Sewage Treatment Plant is one of the few in New York State that accepts wastewater from gas drilling wells. Bruce Ross, assistant civil engineer at Auburn, was contacted to provide information on the state of drilling waste treatment at the facility. He stated that they receive waste of this sort practically every day, although he emphasized that they do not accept horizontal frac-water. Mr. Ross was also emphatic that the plant does not accept material from Marcellus shale; however, when asked what formations they do accept it from he mentioned Trenton Black River, Oriskany, and Queenston. While Trenton Black River and Oriskany are not shale, Queenston certainly is. The reason why the Queenston may be developed while other shales may not is that, as Mr. Kappel explained, "Queenston grades between between a sandstone and silstone and a shale." But just how sure can they be that gas is coming from sandstone, say, and not shale?

In his interviews, Mr. Ross also spotlighted the difficulties that come with accepting drilling waste. He spoke of a time, in 2008, when confusion over the definitions of the various fluids almost led to a fiasco with the DEC. They had been accepting brine at the treatment plant when a call from the DEC came, asking if they had been accepting drilling fluid. Mr. Ross recalled, "When I asked the people at the plant, they said, 'Well, we take brine,' but they didn't know any difference and neither did anybody else at that time."

Another area which Mr. Ross addressed was the lack of radiation testing at the Auburn plant in particular, and at other facilities across the state. As stated previously, uranium and thorium are very often present in the Marcellus shale formation and likely leech into the brine. A chemical that also comes up again and again is radium, another highly radioactive element. In a document known as a 26 R, drilling corporation Ultra Resources reported that the wastewater they were putting out registered radiation levels at 892 pCi/L Radium-226 and 2589 pCi/L Radium-228 (Greene, 2011, p. 79). According to the EPA's "A Regulators' Guide to the Management of Radioactive Residuals from Drinking Water Treatment Technologies" (2005), the acceptable limit for the presence of radium-226 and 228 in drinking water is 5 pCi/L (p. 9). Mr. Ross stated, regarding radiation testing, "We tested once. . . it was at least an indication of what might have been happening, but we don't do it on a regular basis."

What makes this lack of testing even more concerning is the fact that dilution of the waste may not remove the health-risks associated with radiation. A study by the Environmental Protection Agency (EPA) recently provided to the *New York Times* elucidates this issue. One passage states, "Using . . . conservative assumptions . . . potentially significant risks (greater than 1×10^{-5}) are estimated for the person consuming the most seafood under all modeled scenarios" (Environmental Protection Agency, 2010). Keep in mind that this study is referring to test results taken from the open ocean, and not from a river or stream, which, one would assume, would compound the risks even further.

One of the built-in protections for the water treatment plant that Mr. Ross cited was the permit process, in which the wastewater haulers affirm that "they're not to bring horizontal well water or anything from the Marcellus formation." However, this defense is not as comforting as it might seem at first glance. The final draft of the plant's discharge permit states, "the City of Auburn may conduct random monitoring from a tanker truck," the operative word here being "*may*." While the threat of random testing is a good thing, it needs to be backed up by real action in order to be an effective measure.

All in all, the process for permitting, monitoring, and treating drilling wastewater seems to be anything but quick and easy. In a busy facility like the one at Auburn, how can one be assured that every load of waste goes through is examined as thoroughly as it should be? "It's very tricky," Mr. Ross said in closing, "and I think the reason most places don't take it is because it's a nightmare to try and control."

Watertown

Another water treatment facility in New York that accepts flowback fluid is the Pollution Control Plant at Watertown. Unlike Auburn, Watertown has only accepted drilling waste from one well, and only a "one time shot," as Chief Operator Michael Sligar described it. The well which provided this material was Ross 1 in Maryland, New York. According to the "Empire State Oil and Gas Information System," the well was developed by Gastem USA Inc. and has a drill depth of 4,950 ft.; however, the formation which is being tapped, the well's type, and the well's status are listed as "confidential" (2009). The company's own press release states, "Gastem is pleased to announce that the Ross No.1 vertical well was recently completed in the Marcellus Shale" (2010).

In 2009, Gastem began developing Ross 1 and applied for and were permitted to send their waste to Watertown. Two of the first loads that were shipped to the plant were rejected, because of an apparent miscommunication between the developer and the facility. Mr. Sligar

stated that, "this was before the hydrofracking operation started . . . and all it was supposed to be was just groundwater." However, initial analysis of the water they received showed an unusually high amount of total dissolved solids. In response, they told Gastem not to send any more tankers until thorough testing had been completed. When Gastem sent two more, they were turned away from the facility.

The period during which Watertown accepted out-and-out drilling waste was in January of 2010. A total of 35,000 gallons was accepted, shipped in a series of seven tankers over a three day period. Mr. Sligar reiterated several times during his interview the battery of tests that were performed on the fluid. He listed, "organic compounds, volatile organic compounds, semi-volatile organic compounds, then the inorganic things that we'd be interested in at the sewage plant, like total dissolved solids, alkalinity, those kinda things. . . and we even had it tested for radioactive materials." Mr. Sligar did not, however, specify what the results of the tests were.

In closing, Mr. Sligar stated that although Watertown has not accepted further drilling waste at their facility, "It's not that we wouldn't, it's just that nobody has made an application to us." This leaves open the possibility of waste water making its way to the plant in the future, and what's worrying is that, once the current restrictions on the industry are lifted, the quantities of fluid in question would be much greater than 35,000 gallons.

Drilling Waste Dumping

Neighboring States

Outside of New York the tidal wave of drilling waste has already struck, leaving a swath of destruction in places like Pennsylvania and Ohio. It is important to pay attention to what goes on in neighboring states because the same industry that has wreaked so much havoc there is now lobbying to get a foothold here, and to ignore their past indiscretions would be a terrible mistake.

The Victims

The problem with an industry left to police itself is that the individuals involved may not always be the most scrupulous, especially when cutting corners means turning a higher profit. Harry Boyd, one of the many Pennsylvanians who have fallen victim to greedy gas drilling corporations, illustrated the advantages for developers who dump rather than follow the legal procedure.

"Let's say, for example," he explained, "that I'm [the owner of a drilling corporation] and I'm going to find five or six people who want to invest in a well." Once the corporation finds investors, they come up with the total cost of the investment, including the disposal of fracturing fluid. The investors then pay the corporation the total cost; however, if the corporation, instead of paying to have waste disposed of properly, dumps it illegally, whatever money was allotted for that expense they get to keep. Spread out over several wells, the corporation begins to accumulate a very tidy sum.

Hiram Lewis

On the 5th of December, 2010 Mr. Lewis, a citizen of Pennsylvania, was traveling with his son along Route 19 on their way to his son's hockey game. As they crested the top of a hill, Mr. Lewis saw a tanker pulled off by the side of the road ahead. The truck's driver stepped down from the vehicle and, according to Mr. Lewis, looked up and down the road in a suspicious manner. He then opened the tanker's valve and let its contents drain onto the roadside.

Incredulous, Mr. Lewis slowed and turned his hazard lights on. He parked his truck just up the road from the tanker, the driver of which eyed him nervously. Mr. Lewis luckily had a video camera, which he uses to shoot his son's hockey games, in the truck with him. As he stepped from the truck the tanker's driver shut the valve off and climbed back into his vehicle. The video, which can be found on YouTube under the title "FracDump.mpg," begins as the tanker pulls back onto the road.

Mr. Lewis walked to the area where the dumping happened and took a sample of the fluid, which he described as, "a smoky color, like 'Frost Gatorade.'" He then proceeded to his son's hockey game. As he held the camera in his hand to shoot the game, he recalled, a tingling crept over the fingers that had touched the strangely-colored water. This developed into a burning sensation and lasted more than an hour-and-a-half.

After returning home, Mr. Lewis reviewed the video and found he had recorded the tanker's number. It belonged to the company Midwest Underground Inc., who state on their own website that they are experts in "pipeline construction and horizontal directional drilling" (2011). Armed with this information, he contacted the Department of Environmental Protection (DEP) and asked them to investigate the issue. They were slow to respond and, when they did, they told him the tanker had been carrying freshwater. When Mr. Lewis asked them how they had deduced this, they replied that a water hauler called "Al's Water Service" was situated nearby. Mr. Lewis asked if they had talked to the man who drove the tanker and, as he recalls, they responded, "No, why would we do that?"

Around the same time, Mr. Lewis had a baseline test done on the water. The results came back, confirming his suspicions that it was anything but "fresh." They showed that the sample had high total dissolved solids, high salinity, and high conductivity, all of which are characteristic of drilling wastewater.

It seems that the DEP is more interested in arriving at easy conclusions than considering the truth. When the government will not police an industry, it is left to the citizens, and Mr. Lewis has been in contact with a local prosecutor who is pressing charges with the Attorney General's office against the man who drove the tanker.

Harry Boyd

Before 2007, Mr. Boyd was merely an Ohio landowner and organic farmer hoping to turn a profit on a new investment. Now, in 2011, he is the victim of a drilling company run amok. The perpetrator, Appalachian Energy Inc., is owned by one Phillip J. Billick, also the founder of Air Compliance Testing, Inc., an air quality testing company that "assists with formulating test protocols, often negotiating with the EPA to achieve more reasonable and/or realistic testing requirements" ("Air compliance testing," 2008).

Photo: Wastewater tanks in the foreground and Mr. Boyd's home visible in back

Used with the permission of Harry Boyd

When first approached, Mr. Boyd recalls, "I was on the reluctant side to do it, but I did after negotiating back and forth with them not to dump any of this fracturing fluid on the ground, but to haul it away like you're supposed to." Appalachian Energy Inc. portrayed itself as a drilling company more than willing to cooperate and headed by an individual with a background in environmental protection; however, as Mr. Boyd's story will illustrate, beneath the surface Mr. Billick was anything but what he claimed to be.

Photo: A pool of wastewater next to a tank on Mr. Boyd's property

Used with the permission of Harry Boyd

In 2007, asked if he wanted to sign a drilling lease, Mr. Boyd eventually agreed, but added two addenda to the contract: one, that he would be present whenever they drilled, and two, that they would not dump any material on his property. With those stipulations squared away, drilling was to begin on a Wednesday. However, at around 9:00 pm on the night before, Mr. Boyd stopped by his farm and, to his surprise, found workers just finishing up a fracturing operation. What was even more shocking was that, rather than collect the flowback water in tankers, they had opened the well's valve and let the excess fluid flow down Mr. Boyd's hill. He was furious, but powerless to stop them.

Mr. Boyd contacted the state, but they did little more than show up and ask the drillers to stop dumping. "They basically gave up at this point," he said, "My farm has never been remediated… and it's been almost three years." He estimates that around half-a-million gallons of wastewater total were dumped on his property. When he received the Material Safety Data Sheets (MSDS) from the drillers, which are required by law to be provided upon request, they showed that the waste contained chemicals like diethylbenzene, ethylene glycol, formaldehyde, hydrochloric acid, and xylene, among other things, all of which are highly toxic even in minute quantities.

In closing, Mr. Boyd said that his message is to "protect yourself, first and foremost" when dealing with these companies. "Once you sign a lease with these people," he said, "You are basically married to them for the rest of your life, and the rest of your kids' life too."

The Recycling Process

Industry Claims

In Pennsylvania, the drilling industry talks a big game when it comes to recycling their water, and it has enabled them to bypass the skepticism of some of the more credulous listeners; however, do their claims stand up to investigation?

To begin with, it is important to recall just what it is the industry has been claiming. The figure for water reuse circulating the media right now is "ninety percent," and the main source for that number is Marcellus Shale Coalition. This group describes itself on its website as, "an organization committed to the responsible development of natural gas from the Marcellus Shale geological formation and the enhancement of the region's economy that can be realized by this clean-burning energy source" (2011). It is made up of many of the big names in the industry, and notable players like Chesapeake Energy Corporation and Talisman Energy USA, Inc. There are nearly forty names on the "full member" list in total, and well over a hundred "associate members."

Their claims are based on data provided by Pennsylvania's Department of Environmental Protection (DEP) which suggests that wastewater in excess of two-hundred million gallons, or around six million barrels, was recycled ("Pennsylvania department of," 2011). When contacted to ask for sources to back up their claims, the Marcellus Shale Coalition failed to answer or return any calls.

The Truth

The claim that these corporations are recycling ninety percent of their fluids is difficult to support, as one might suspect, and a quick investigation confirms this. The fact of the matter is that it is based on exaggerations and outright inaccuracies. Furthermore, it would appear that the industry is working on making the facts even more difficult to obtain.

In an e-mail uncovered by the *New York Times* it appears that the Marcellus Shale Coalition have lobbied the DEP, proposing that permits be revised so that written notice is required to be given only for wastewater that "flows back within thirty days of the completion of fracing operations at the subject well," and that "no additional requirements are necessary" (Walker, 2009). This would mean that once the well is developed and producing gas, wastewater would only be required to be tracked for a month afterwards. As Mr. Kappel, of the USGS, suggested in his interview, "the yields [from wells] will generally play out over decades," a period considerably

longer than thirty days. Even more concerning is the fact that wells generally become more contaminated with the passage of time. "From start to finish, the water is more dilute to more concentrated," Bruce Ross, assistant civil engineer at Auburn, explained, "So, you're gonna have more chlorides, and more dissolved solids by the time the well is at completion."

The whole idea of recycling, in this case, is that the wastewater is reused at well-sites instead of being sent to water treatment plants to be treated and released into the environment. The claim that a rate of ninety percent is being achieved is based on data provided by National Fuel Gas Co., which has recently been called into question. It is being reported that the numbers were presented as being in the millions, when, in reality, they were actually in the hundred-thousand range. This sort of misrepresentation should not be surprising given that the party providing the data themselves have interests in gas drilling.

One of the main concerns with the continuous reuse of wastewater is that, eventually, it will no longer be of use, and by that point it will be considerably more toxic than it was after the first use. In a report called "Radioactivity in Marcellus Shale" by Radioactive Waste Management Associates, "Drilling fluid can be reused many times and radium will progressively concentrate in it after each reuse" (2010). In Pennsylvania, much of this spent drilling fluid has been administered to icy roads because of its high salt content. In a report submitted by gas drilling company Ultra Resources Inc., previously referenced in the water treatment plant section above, the levels of radiation contained in their waste registered well above what is considered safe for human consumption (Greene, 2011, p. 79). This same fluid was then spread across roads in Tioga County and allowed to disperse into the environment. Behind their environmentally-friendly pretenses, this is the industry's ultimate idea of recycling once the water has outlived its usefulness.

Conclusion

Is New York really ready to let this industry come flooding into its beautiful landscapes and the lives of its hardworking citizens? When the issue is considered in its entirety, a picture emerges that is anything but reassuring. The gas drilling companies have shown a propensity for obscuring the truth, exaggerating their claims, and cutting corners at the expense of ordinary citizens.

Furthermore, as Mr. Boyd's story illustrates, the government cannot always be expected to protect the individual or to have their best interests in mind. Mr. Lewis' story shows that government officials may do the minimum required of them if allowed. In both of these cases the message is clear, it is up to New York's citizens to protect themselves.

Photo: Emaciated deer on Harry's property, believed to be sickened by wastewater pollution.

Used with the permission of Harry Boyd

Additionally, the wastewater plants that will be expected to handle drilling waste, should the fifty-seven permits presently in Albany be allowed, are ill-prepared. While two facilities, out of the many in the state, have dealt with this category of waste, it has not been on a scale even remotely comparable to the deluge that will surely inundate New York. Even with the modest quantities which these plants have treated there have been miscommunications and miscalculations reported all along.

This issue is not going away, and it cannot be ignored. New York's citizens have to stand up and let the government know what they want, for their own good, as well as for the good of their children, and the environment itself. If the industry is allowed to police itself, what it will surely produce is a wastewater wasteland where the bounty of New York's resources once was. This tragedy cannot be allowed to happen, at any cost.

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