

## Statement of Dusty Horwitt, JD

*Senior Counsel, Environmental Working Group*

Oversight Hearing on the Draft Supplemental Generic Environmental Impact Statement Relating to Drilling for Natural Gas in New York State Using Horizontal Drilling and Hydraulic Fracturing Before the New York City Council Committee on Environmental Protection Friday, October 23, 2009 at 10:00 a.m.

Submitted for the Record

Mr. Chairman, distinguished members of the committee: My name is Dusty Horwitt, and I am Senior Counsel at Environmental Working Group (EWG), a nonprofit research and advocacy organization based in Washington, DC, Oakland, California and Ames, Iowa. I thank the members of the Committee for this opportunity to testify.

For the last several years, Environmental Working Group has used government and industry records to track a virtually unprecedented increase in oil and gas drilling in the Western United States. We have found that much of this drilling has been completed with exemptions under most major federal environmental laws. As part of our work, we have investigated the practice pioneered by Halliburton known as hydraulic fracturing that is the subject of today's hearing.

Last year, we worked with Theo Colborn, a distinguished scientist in Colorado who has identified dozens of chemicals used by the natural gas industry. We found that at least 65 chemicals used by the natural gas industry in Colorado – many of them used in hydraulic fracturing – were listed or regulated as hazardous substances under six federal statutes including the Clean Air Act, Clean Water Act and Superfund but are largely exempt from these laws when used in oil and gas drilling. We have continued to investigate hydraulic fracturing this year and have uncovered some troubling information about chemicals used in this process.

I'd like to add to the testimony I presented to the committee last year by making a few comments about New York State's Department of Environmental Conservation's 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.

We have reviewed much of the document and believe that the state is still not taking seriously the threat that hydraulic fracturing and natural gas drilling poses to New York City's drinking water. Nor is the state taking seriously the risk of water contamination in other parts of New York. Our analysis confirms our belief that New York State should not allow drilling in the watershed for New York City's drinking water supply nor should it allow drilling in other areas where drinking water supplies might be compromised. Given the seriousness of this issue and the 800-page length of the draft EIS, the state should give citizens more than 60 days to comment.

## Petroleum Distillates are a Major Concern

Perhaps the leading reason to prevent natural gas drilling and hydraulic fracturing near drinking water supplies is the use of petroleum distillates. The DEC notes that “diesel-based fracturing fluid is not proposed or reviewed by this Supplement....”<sup>1</sup> However, Environmental Working Group has recently conducted an analysis which found that diesel – like any substance distilled from crude oil – is a petroleum distillate.<sup>2</sup> And the DEC has identified at least 14 different petroleum distillates that are used or proposed for use in the Marcellus Shale formation in New York.<sup>3</sup> The DEC has also identified as chemicals that are used or are likely to be used in New York’s Marcellus Shale formation aromatic hydrocarbons that are likely to be found in petroleum distillates.<sup>4</sup>

Environmental Working Group will release its complete analysis of petroleum distillates within the next few weeks, but I will share a few of our findings today. Our research shows that petroleum distillates are likely to contain benzene, one of the aromatic hydrocarbons identified by the state.<sup>5</sup> The EPA has found benzene to be a known human carcinogen that is toxic in water at levels greater than five parts per billion.<sup>6</sup> Petroleum distillates are also likely to contain all of the so-called BTEX chemicals – benzene, toluene, ethylbenzene and xylene.<sup>7</sup> The EPA has concluded that all of these substances are toxic in water at very low levels.<sup>8</sup>

Diesel has received much of the attention when it comes to dangerous fracturing fluids. But when companies say that they will not use diesel and then use petroleum distillates, the data shows that it’s a bit like promising not to smoke Marlboros and

---

<sup>1</sup> New York Department of Environmental Conservation. Draft Supplemental Generic Environmental Impact Statement Well Permit Issuance for Horizontal Drilling And High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs (hereinafter DSGEIS), at 7-41.

<sup>2</sup> U.S. Environmental Protection Agency. Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, Assessment and Standards Division, Office of Transportation and Air Quality, Chapter 5: Fuel Standard Feasibility, April 2003. Accessed online August 23, 2009 at <http://www.epa.gov/otaq/cleaner-nonroad/>.

<sup>3</sup> Id. at 5-45-5-51, 5-53.

<sup>4</sup> Id. at 5-45-5-51, 5-53-5-54.

<sup>5</sup> Mehlman, Myron A. Benzene: A Haematopoietic and Multi-organ Carcinogen at Any Level Above Zero. 9 (no. 1) European Journal of Oncology 15 (2004). Kopstein, Melvyn. Potential Uses of Petrochemical Products Can Result in Significant Benzene Exposures: MSDSs Must List Benzene as an Ingredient, Journal of Occupational and Environmental Hygiene, 3: 1-8 (January 2006).

<sup>6</sup> U.S. Environmental Protection Agency. Consumer Factsheet on: BENZENE. Accessed online August 18, 2009 at [http://www.epa.gov/safewater/contaminants/dw\\_contamfs/benzene.html](http://www.epa.gov/safewater/contaminants/dw_contamfs/benzene.html).

<sup>7</sup> Mehlman, supra note 5. National Park Service (NPS). 1997. Environmental Contaminants Encyclopedia, Fuel Oil, General Entry. Accessed online August 28, 2009 at <http://www.nature.nps.gov/hazardssafety/toxic/fueloil.pdf>.

<sup>8</sup> See, e.g. U.S. Environmental Protection Agency (EPA Toluene). 2009. Consumer Factsheet on: TOLUENE. Accessed online August 18, 2009 at [http://www.epa.gov/safewater/contaminants/dw\\_contamfs/toluene.html](http://www.epa.gov/safewater/contaminants/dw_contamfs/toluene.html).

then smoking Camels, Kools, Virginia Slims and every other type of cigarette. As far as the toxic components, the products are roughly the same.

A major concern with petroleum distillates is benzene. To put the toxicity of benzene in perspective, and to demonstrate the risks to water supplies for New York City and other towns, consider these facts from the DEC's draft EIS. The DEC estimates that the amount of water used to hydraulically fracture a single well in the Marcellus Shale will range from about one million gallons to eight million gallons.<sup>9</sup> The DEC estimates that the amount of friction reducer mixed with the water will comprise about 0.08 percent of the total fracturing solution.<sup>10</sup> Petroleum distillates are commonly used as friction reducers and are also used in other components of fracturing solutions.<sup>11</sup> Therefore, the amount of petroleum distillate used for fracturing a well in New York is likely to range from 800 gallons to 6,400 gallons (0.08 percent of between one and eight million gallons of water). Published levels of benzene in petroleum distillates with names similar to those used or likely to be used in New York range from 700 parts per million for 140° flash aliphatic solvent, to 1,000 parts per million for Stoddard Solvent to 4,000 parts per million for kerosene to 93,000 parts per million in naphtha solvents.<sup>12</sup>

In other words, these levels of benzene range from 140,000 times the EPA's safe level to 18.6 million times the EPA's safe level. These figures mean that if 800 gallons of petroleum distillate were to contaminate a water supply, depending on the benzene concentration, it would likely take somewhere between 112 million gallons (800 X 140,000) and 14.9 billion gallons (800 X 18.6 million) of water to dilute the benzene to EPA's safe level. If 6,400 gallons of petroleum distillate were to contaminate a water supply, it would likely take somewhere between 896 million and 119 billion gallons of water to dilute the benzene to EPA's safe levels.

For comparison, the total amount of water used daily by New York City according to the DEC is 650 million gallons,<sup>13</sup> or less than the amount of water that would be needed to dilute the benzene in a spill of petroleum distillates in many scenarios. In some cases, even the total amount of water used each day by the entire state of New York (9-10 billion gallons per day)<sup>14</sup> would not be enough.

---

<sup>9</sup> Id. at 5-73, 6-137.

<sup>10</sup> Id. at 5-44.

<sup>11</sup> Id. at 5-60-5-61. See also Chesapeake. Hydraulic Fracturing Fact Sheet, May 2009. Submitted to U.S. House of Representative Committee on Natural Resources. See also Chesapeake. 2009. Media Resources, Hydraulic Fracturing Fact Sheet, May 2009. Accessed online August 18, 2009 at <http://www.chk.com/media/pages/mediareources.aspx>.

<sup>12</sup> DSGEIS at 5-46, 5-48-49, 5-51, 5-53. Mehlman, supra note 5. Kopstein, supra note 5.

<sup>13</sup> DSGEIS at 6-10. The New York Department of Environmental Protection puts the figure at one billion gallons per day for New York City and several nearby counties. See New York Department of Environmental Protection. New York City 2008 Drinking Water Supply and Quality Report. Accessed online October 22, 2008 at <http://www.nyc.gov/html/dep/pdf/wsstate08.pdf>.

<sup>14</sup> DSGEIS at 6-9.

To be sure, it is possible that all or part of the petroleum distillate used to fracture a well would not contaminate water supplies. Some or all could be trapped underground. Petroleum distillate that is spilled prior to fracturing or after fracturing in drilling wastewater might be absorbed by soil or otherwise contained before it reaches water supplies.

But the amounts of petroleum distillate likely to be used are significant and petroleum distillate in the form of diesel will be used to power drilling equipment even if diesel is not used in hydraulic fracturing. The DEC reports that an average of 29,000 gallons of diesel fuel was required to complete fracturing jobs in the Marcellus Shale in West Virginia and Pennsylvania.<sup>15</sup> This diesel used to run equipment will likely add to the total amount of petroleum distillate used for the fracturing fluid. The result is an increased likelihood that, somewhere in the process, some quantity of petroleum distillate will spill or leak, threatening water supplies with benzene contamination. It is also important to note that there may be thousands of wells drilled in New York, each of which could cause benzene contamination.<sup>16</sup> And, as we have seen, a little bit of benzene goes a long way.

### **Recent Cases of Contamination Linked to Fracturing, Drilling**

Contamination from benzene or related chemicals associated with drilling is not just a hypothetical scenario. In the summer of 2008, in one of the few government tests ever conducted on water contamination near natural gas fields, the Bureau of Land Management found benzene in drinking water wells in Sublette County, Wyoming. Although researchers did not identify the source of the contamination, the only likely source in the otherwise rural area is intensive natural gas drilling involving hydraulic fracturing.<sup>17</sup>

In May 2008, Colorado outfitter Ned Prather drank water from the tap in his rural cabin. The water was contaminated with all of the BTEX chemicals (benzene, toluene, ethylbenzene and xylene), including 100 parts per billion benzene. Natural gas companies have drilled 18 wells within 3,000 feet of the spring that supplies his water, there is a pit of production water on a hill overlooking his cabin, a second pit was reclaimed shortly after Prather took his toxic drink, and in the winter of 2007, a company spilled nearly 8,000 gallons of diesel fuel on a nearby hill when a spigot was accidentally left open. The Denver Post reported that "bad water has decimated his outfitting business. Hunters don't want to stay in a cabin with suspect water or to harvest deer and elk they fear could be drinking contaminated water." Thus far, medical tests have found no damage to Prather, but he has suffered unexplained health problems that predate his toxic drink. His hands and head shake and the tremors have

---

<sup>15</sup> Id. at 6-120.

<sup>16</sup> Id. at 6-144.

<sup>17</sup> Lustgarten, Abrahm. Buried Secrets: Is Natural Gas Drilling Endangering U.S. Water Supplies? ProPublica, Published on the front page of the Denver Post, November 17, 2008.

grown worse recently. "Not that many people have turned up a glass and drank that much benzene at one time," he said.<sup>18</sup>

In March and April 2004, the natural gas company EnCana fractured an improperly cemented well in Garfield County, Colorado. Gas escaped from about 7,000 feet underground, entered a natural fracture about 3,000 feet below the surface, and traveled laterally about 3,500 feet from the well where it contaminated Divide Creek, forcing local residents to drink bottled water. Inspectors found high levels of benzene in the water (99 parts per billion) the day after residents noticed unusual bubbles in the creek. One nearby resident, Lisa Bracken, described the creek as having so many bubbles that it looked like a "popped can of soda." Another nearby resident, Steve Thompson, said that "I came down with a funnel and scooped some of the biggest bubbles with it....I lit the bubbles with a match, and they burned like gas. It even melted my funnel."<sup>19</sup>

A report prepared for Garfield County found that the contamination also included methane gas and toluene, ethylbenzene and xyleneithin. In August 2004, the COGCC fined EnCana a record \$371,200 and imposed a moratorium on drilling within a two-mile radius of the seep.<sup>20</sup> EnCana has operated an air sparge system for the past four years to reduce benzene levels in the creek. This system involves the injection of air into the creek to dissipate benzene into the atmosphere.<sup>21</sup>

In the spring of this year, Pennsylvania officials fined Cabot Oil and Gas for an 800-gallon diesel spill from a truck that overturned.<sup>22</sup> It is unclear whether benzene contamination resulted from the spill, but diesel typically contains benzene. Recently, state officials ordered Cabot Oil and Gas to stop hydraulic fracturing operations in Susquehanna County, Pennsylvania after the company was involved in

---

<sup>18</sup> Lofholm, Nancy. Fears of Tainted Water Well up in Western Colorado, The Denver Post, October 12, 2009.

<sup>19</sup> Chakrabarty, Gargi. Toxic Bubbles Trouble Silt; Divide Creek Tainted by Natural Gas Leak, Toxic Benzene, Rocky Mountain News, April 13, 2004, at 1B. Chakrabarty, Gargi. Commission OKs Record Fine for EnCana Gas Seep, Rocky Mountain News, August 18, 2004, at 3B. Thyne, G. Review of the Data for the West Divide Creek Gas Seep. Prepared for Garfield County, by Science Based Solutions Inc. August 6, 2004. Personal communication with Geoffrey Thyne, October 22, 2009. Colorado Oil and Gas Conservation Commission, Library, Public Presentations, Materials Related to the July 14-15, 2009 Commission Hearing in Glenwood Springs, West Divide Creek 2009 by Geoffrey Thyne. Accessed online October 22, 2009 at <http://cogcc.state.co.us/>.

<sup>20</sup> Id.

<sup>21</sup> Personal communication with Geoffrey Thyne, October 22, 2009. Colorado Oil and Gas Conservation Commission, Library, Public Presentations, Materials Related to the July 14-15, 2009 Commission Hearing in Glenwood Springs, West Divide Creek Gas Seep Overview by EnCana. Accessed online October 22, 2009 at <http://cogcc.state.co.us/>. U.S. Environmental Protection Agency, Underground Storage Tanks, Air Sparging. Accessed online October 22, 2009 at <http://www.epa.gov/swerust1/cat/airsparg.htm>.

<sup>22</sup> Lustgarten, Abrahm. Frack Fluid Spill in Dimock Contaminates Stream, Killing Fish, ProPublica, September 21, 2009. Accessed online October 22, 2009 at <http://www.propublica.org/feature/frack-fluid-spill-in-dimock-contaminates-stream-killing-fish-921>.

three spills in nine days.<sup>23</sup>

The DEC has noted that many states have reported no contamination from hydraulic fracturing,<sup>24</sup> but we are not aware that any states have even looked for contamination from fracturing, including New York. Late last year, we sent a Freedom of Information Law request to the DEC asking for any tests that the agency had conducted on water contamination from hydraulic fracturing. The DEC said that it had conducted none, nor did it have tests conducted by others.<sup>25</sup>

In addition to the recent discovery of benzene in water wells in Sublette County, Wyoming by the Bureau of Land Management, the EPA this spring found that 11 of 39 water wells near Pavillion, Wyoming were contaminated with substances that may be linked to nearby gas drilling. More tests are planned.<sup>26</sup>

And Garfield County, Colorado officials released a study last year that linked methane contamination in water wells to methane in the same rock layer a mile and a half underground where gas companies are drilling. The scientists who conducted the study did not determine how the gas reached the water, but their results provide evidence that gas or other contaminants from drilling could work their way to the surface from deep underground. "It challenges the view that natural gas, and the suite of hydrocarbons that exist around it, is isolated from water supplies by its extreme depth," Judith Jordan, the oil and gas liaison for Garfield County told ProPublica.<sup>27</sup>

### **Disclosure Needed: Nurse's Near-Death Experience Could be Repeated**

The DEC has proposed that companies be required to disclose their fracturing chemicals before fracturing begins.<sup>28</sup> While this requirement is a step in the right direction, it is unclear whether this disclosure would be to the DEC or to the general public. It is critical that the public know what chemicals companies are injecting into each well including Chemical Abstract Services (CAS) numbers so that the public and first

---

<sup>23</sup> Lustgarten, Abrahm. Pennsylvania Orders Cabot Oil and Gas to Stop Fracturing in Troubled County, ProPublica, September 25, 2009. Accessed online October 22, 2009 at <http://www.propublica.org/feature/pennsylvania-orders-cabot-to-stop-fracturing-in-troubled-county-925>.

<sup>24</sup> DSGEIS at 5-144-5-145

<sup>25</sup> Environmental Working Group Freedom of Information Law Request to New York Department of Environmental Conservation, December 12, 2008. New York Department of Environmental Conservation response to Environmental Working Group, January 14, 2009.

<sup>26</sup> U.S. Environmental Protection Agency. Site Investigation, Analytical Results Report, Pavillion Area Groundwater Investigation, Pavillion, Fremont County, Wyoming, August 19, 2009. Hurdle, Jon. U.S. Finds Water Polluted Near Gas-drilling Sites, Reuters, August 27, 2009.

<sup>27</sup> Lustgarten, Abrahm. Officials in Three States Pin Water Woes on Gas Drilling, ProPublica, April 26, 2009. Accessed online October 22, 2009. Versions of the story appeared in the Albany Times Union, Denver Post, and Pittsburgh Post-Gazette.

<sup>28</sup> DSGEIS at Appendix 6, Proposed Environmental Assessment Form (EAF) Addendum.

responders can easily know what chemicals are being used. The DEC deserves credit for including CAS numbers in the DSGEIS.

Public disclosure is especially important because one of the companies that supplied information to the DEC about chemicals proposed for use in fracturing shale formations in New York is perhaps the most infamous fracturing company in terms of public disclosure. In Durango, Colorado, in 2008, a valve broke on a tank carrying 300 gallons of a fracturing fluid called ZetaFlow manufactured by Weatherford, the Houston-based company that supplied chemical information to DEC. About half of the ZetaFlow spilled out. According to Clinton Marshall, who was one of the workers transporting the chemical, most of the spill was captured by a spill container, implying that some of the spill escaped. Cathy Behr, a nurse who later treated Marshall came in contact with the ZetaFlow that had spilled on him. As a result, Behr became gravely ill, suffering respiratory failure, heart failure and liver failure. As Behr's doctor worked to save her life, Weatherford refused to disclose the chemical's contents, citing trade secrets. Behr later recovered (Slowthower 2008, Hanel 2008a, Hanel 2008b).

ZetaFlow is still advertised on Weatherford's website. "This ZetaFlow system can be used on all types of formations, including a variety of sandstones, carbonates, coals and shales," the company says.<sup>29</sup> ZetaFlow is not mentioned in the DSGEIS, but the DEC must ensure that before ZetaFlow or other chemicals are used in the state, their names and constituents are made publicly available. And the state should prohibit the use of any chemicals, such as ZetaFlow, that are not proven safe.

## Recommendations

The DEC deserves credit for proposing tougher standards for high-volume hydraulic fracturing such as water well testing before drilling<sup>30</sup> and limits on the volume of wastewater that can be stored in pits and the duration that such water can remain in pits.<sup>31</sup>

However, the risks from drilling, particularly with benzene, are so great that Environmental Working Group continues to recommend that the DEC prohibit drilling in the watershed for New York City's drinking water supply and in all other areas where drinking water supplies might be compromised. These risks are compounded by the fact the DEC likely lacks adequate staff to enforce proposed or existing standards as Speaker Quinn demonstrated in her questioning of the DEC last September. Our upcoming investigation of petroleum distillates indicates that staffing shortages also exist for state and federal agencies charged with enforcing the Safe Drinking Water Act.

EWG also urges the DEC to adopt our recommendations made at previous city council hearings. These recommendations include:

---

<sup>29</sup> Weatherford, ZetaFlow, Conductivity Enhancer, Fines Control and Load Recovery Agent. Accessed online October 22, 2009 at <http://www.weatherford.com/weatherford/groups/public/documents/search/searchresults.hcst?phrase=zetaflow&x=0&y=0>.

<sup>30</sup> DSGEIS at 7-38.

<sup>31</sup> Id. at 7-30-7-31.

- 1) Requiring public disclosure of chemicals used to drill each well prior to drilling including chemicals used in hydraulic fracturing and
- 2) Prohibiting the use of chemicals that could compromise the quality of water supplies and that are not demonstrated to be safe for humans and the environment.

The state should apply our recommended standards to all oil and natural gas drilling even if such drilling does not include “high-volume hydraulic fracturing” or horizontal drilling. Drilling for oil and natural gas involves extremely toxic chemicals that are harmful at microscopic levels. Just because drilling uses a lower volume of fracturing fluid or is strictly vertical does not mean that it is safer.

Thank you for this opportunity to testify. I look forward to your questions.