



Before the New Jersey Senate Environment and Energy Committee
Testimony on S-253
“Frack Waste Bill”
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June 7, 2012

Waste produced by natural gas drilling and hydraulic fracturing (“fracking”) is considered by the US Department of Energy to be highly toxic, ten times more toxic than produced waters from off shore oil drilling.¹ The U.S. General Accounting Office concludes that the wastewater produced by hydraulic fracturing in shale formations is of such poor quality and varies so greatly in its make-up that it is difficult and expensive to treat.² There are no treatment plants in New Jersey that are designed to treat wastewater from hydraulic fracturing.

The “flowback”³ that erupts back to the surface when a gas well is fracked carries many contaminants, many of them health and environmental hazards. According to the Department of Energy, the produced waste “...can include, but are not limited to: salts (chlorides, bromides, and sulfides of calcium, magnesium, and sodium); metals (including barium, manganese, iron, and strontium); oil, grease, and dissolved organics (including benzene and toluene); naturally occurring radioactive materials; and production chemicals from hydraulic fracturing...Exposure to these contaminants at high levels may pose risks to human health and the environment”.⁴

Radioactive materials are contained in the flowback from Marcellus Shale well development. The Marcellus Shale contains radionuclides including uranium-238, thorium-232, and their decay products. Radioactive concentrations in the Marcellus Shale formation are at concentrations 20 to 25 times background, making shale gas wastewater extremely radioactive.⁵ Sampling and data-

¹ U.S. Dept. of Energy, Argonne National Laboratory, “A White Paper Describing Produced Water from Production of Crude Oil, Natural Gas, and Coal Bed Methane”, January 2004.

² US General Accountability Office, ***Information on the Quantity, Quality, and Management of Water Produced During Oil and Gas Production***, GAO-12-56, January 2012.

³ In shale gas stimulation employing hydraulic fracturing, the mix of water, chemicals and proppants that are injected during hydraulic fracturing returns to the surface mixed with formation water from the deep geologic layer that is being stimulated – this is “flowback”.

⁴ U.S. Dept. of Energy, Argonne National Laboratory, “A White Paper Describing Produced Water from Production of Crude Oil, Natural Gas, and Coal Bed Methane”, January 2004.

⁵ Marvin Resnikoff, Ph.D., Radioactive Waste Management Associates, “Comments on Marcellus Shale Development”, October 2011.

gathering by New York State detected radiological parameters in Marcellus Shale flowback, including Radium-226⁶, the longest lived isotope of radium with a half-life of 1600 years. Gross Alpha, Gross Beta, Total Alpha Radium and Radium-228 were also found.⁷ Radium-226, a decay product of the Uranium-238 decay chain, is taken up like calcium into bone⁸ where it concentrates. Radium-226 can cause lymphoma, bone cancer, and diseases that affect the formation of blood, such as leukemia and plastic anemia. The radioactive decay product of radium is radon, which is very dangerous and is the second leading cause of lung cancer in the United States.⁹ EPA has set federal air limits, cleanup standards, and a maximum contaminant level for radium 226 and 228 under the Safe Drinking Water Act due to human health hazards.¹⁰ EPA has the authority to regulate all Naturally Occurring Radioactive Materials (NORM), but generally has not done so, leaving a regulatory gap in terms of human health and a lack of data regarding impacts to the natural environment, such as aquatic life.¹¹

There are many other highly dangerous materials in frack waste, including arsenic, mercury, and hazardous hydrocarbons such as BTEX. Barium, bromides, Total Dissolved Solids that are high in toxic salts, and other pollutants, many of which are carcinogenic or have other health effects, are known to be present in sampled Marcellus Shale frack wastewater from Pennsylvania and West Virginia. New York State has identified 154 parameters¹² in this wastewater and in testimony before the U.S. Senate, Dr. Conrad Volz of University of Pittsburgh verified that levels of barium, benzene, bromides, 2-butoxyethanol (2-BE) and strontium, all exceeded safe levels set by USEPA in discharges from a “brine” treatment plant in Pennsylvania that discharges frack wastewater to Blacklick Creek, a tributary to the Allegheny River.¹³

The threat of radioactivity being released into waterways became an issue in Pennsylvania in 2011 when the USEPA notified PADEP that radioactivity must be tested for in the State’s waterways due to discharges of gas drilling wastewater.¹⁴ EPA also advised PADEP that existing permits for publicly owned sewage treatment works and waste facilities did not allow the acceptance of gas drilling wastewater without “critical provisions necessary to effective processing and treatment” of the wastewater.¹⁵ This led to the State asking wastewater discharge facilities in the state to stop discharging gas drilling wastewater but not all discharges have stopped. Still, the

⁶ Ibid. Table 5.24.

⁷ Ibid.

⁸ <http://www.epa.gov/radiation/radionuclides/radium.html#inbody>

⁹ Ibid.

¹⁰ Ibid.

¹¹ Glenn C. Miller, Ph. D., **Comments to Delaware Riverkeeper Network on the Delaware River Basin Commission’s Draft Proposed Natural Gas Development Regulations**, 2011.

¹² New York State Department of Environmental Conservation, *Revised 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*, September 2011, Table 5.9.

¹³ Volz, Conrad Daniel, PhD., Before the Senate Committee on Environment and Public Works and its Subcommittee on Water and Wildlife, Joint Hearing, April 12, 2011.

¹⁴ USEPA letter from Shawn M. Garvin, Regional Administrator to The Honorable Michael Krancer, Acting Secretary, PADEP, 3.7.11.

¹⁵ USEPA letter from Shawn M. Garvin, Regional Administrator to The Honorable Michael Krancer, Acting Secretary, PADEP, 3.7.11, p.2.

cutback in what is being processed in-state has caused gas drillers in Pennsylvania to send waste elsewhere, such as Ohio. But gas waste injection wells in the Youngstown Ohio region then became overloaded, causing earthquakes. Ohio has put a moratorium of waste being injected in some of Ohio's disposal wells. The squeeze for places to dispose of this waste has led to operators traveling very long distances to get rid of their waste. New Jersey is a likely target because of its proximity to the Marcellus Shale region. And the drilling pace has kept the frack waste flowing - 1.4 billion gallons of frack waste was produced in Pennsylvania alone in 2011.¹⁶

But the shipping of frack wastewater to New Jersey facilities is not new. In 2009-2010, 1,386,595 gallons of fracking wastewater was sent to DuPont's Chambers Works facility in Salem County primarily from Susquehanna County. Traveling hundreds of miles to get rid of toxic wastewater is part of doing business for shale drillers. Another 1.4 million gallons were sent to Bucks County PA for discharge into a tributary to the Delaware River, Neshaminy Creek. Both these discharges – to DuPont and to Hatfield Township Municipal Treatment Plant in Bucks County - were illegal because they were not approved by the Delaware River Basin Commission, the agency in charge of water resources of the Delaware River Watershed. And yet no enforcement action has been taken by any agency—PADEP, DRBC or NJ Department of Environmental Protection. These environmental agencies have not prosecuted this illegal wastewater dumping; and more – legal and illegal -- could be happening that we don't even know about. That's why we need the New Jersey Senate to stand up for our drinking water and communities. No one else has our back.

Further compounding the frack waste backlog is the lack of enough landfills and drilling mud processing facilities in the Marcellus Shale region. That is why drilling mud and drill cuttings have been brought to New Jersey to Clean Earth facilities in Kearney in Hudson County and Carteret in Middlesex County. 737.92 barrels (30,786 gallons) of "drilling waste" or drilling mud was taken to Clean Earth of North Jersey between July and December 2011 and 478.90 tons of drill cuttings were sent to Clean Earth of Carteret between July and Dec 2011.¹⁷ The waste that went to Kearney was called "drilling waste" or "drilling mud" and was measured in barrels, not tons like the drill cuttings that went to Carteret. It is debatable whether this waste was considered a solid or a liquid by the receiving facility and it is unclear how distinctly the definition of solid and liquid is applied at the source—the gas well site.

There have been instances in New York State where runny sludgy-type waste was delivered to landfills as "solids". Since there is no adopted regulatory standard at the source where the waste is loaded or at the receiving end as to what is a "waste solid" and what is "wastewater", the terms are inexact and operators have used this to ship waste to landfills that perhaps should have gone to wastewater facilities (which may be more expensive but required by law). This is an important reason why the proposed bill should be amended to include solids, sludge, cuttings and other by-products; if these materials are not included, the Bill could be creating a dangerous loophole that can be easily exploited by operators who want to dispose of the waste fluids as inexpensively as possible.

¹⁶ <https://www.paoilandgasreporting.state.pa.us/publicreports/Modules/DataExports/DataExports.aspx>

¹⁷ <https://www.paoilandgasreporting.state.pa.us/publicreports/Modules/Waste/WasteByWasteFacility.aspx>

Also, frack waste solids and cuttings have all the same contaminants and can even pose greater health risks. Contaminants concentrate in the residual sludge – for instance, membranes screen out toxic levels of salts from the “brine” produced by fracking and radioactivity concentrates in wet rock cuttings that are produced by drilling, producing a waste with proportionally higher radioactivity. The cuttings, separated from the drilling fluid by screens, may contain up to 20% radioactive liquid.¹⁸ These materials are typically shipped off to a hazardous waste plant or landfill. Were radioactive cuttings received in Carteret? This facility is not designed to accept highly radioactive materials – concentrated radioactive waste has to be sent a licensed disposal facility that is designed to handle radioactive wastes, such as Energy Solutions in Utah.¹⁹ That kind of facility does not exist in New Jersey.

But because Utica Shale is located in New Jersey, the issue of frack waste is not an import issue—it is a discharge, treatment, disposal and storage issue for New Jersey-produced frack waste as well. The Utica is much deeper than the Marcellus shale so much more waste will be produced – the drill bores will be longer and produce at least twice as much in muds and cuttings, and will require much larger volumes of water and chemicals to frack and will, in turn, produce much larger quantities of flowback. The radioactivity and other deep geology pollutants that comprise the flowback from the Marcellus exist and could be worse for the Utica. Utica Shale wells in Ohio are proving to contain “wet” gas, which means they are high in hydrocarbons and oil, posing additional environmental impacts from the off-gassing of polluting volatile organic compounds from frack pits and well sites.

Frack waste, whether from New Jersey or elsewhere, must be banned from New Jersey. We don’t have the facilities to safely treat it now and we won’t know how to design those plants until the federal government finishes studying how to treat the waste safely. EPA is developing standards, expected to be proposed in 2014. This will only address part of the management issues and will leave some critical loopholes in place that pose environmental threats. Because of a 1988 oil and gas industry waste exemption from the Resource Conservation and Recovery Act (RCRA), these regulations will not regulate the wastewater as hazardous, even though there are hazardous constituents in the wastewater.²⁰ The list of RCRA exempt wastes includes produced water, drilling fluids and muds, drill cuttings, hydrocarbons, hydraulic fracturing fluids, pit sludges, certain gases and hydrocarbons, workover wastes and sediment from the bottom of tanks.²¹ The treatment regulations will be proposed by EPA without reclassifying the waste, which will not address the essential problem that hazardous waste is being handled as if it were not hazardous, posing pollution issues. There is also no incentive for companies to minimize hazardous waste since they do not have to meet the high level of management and treatment this hazardous waste

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Oil and Gas operations are exempt from portions of major federal environmental laws including: Clean Air Act; Clean Water Act; Safe Drinking Water Act; Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act (the Superfund Law); and Emergency Planning and Community Right-to-Know Act. Amy Mall, et. al., Natural Resources Defense Council, *Drilling Down*, October 2001, p.iv.

²¹ U.S. Environmental Protection Agency, “Exemption of Oland Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations,” p. 10-11, <http://epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf>

requires for all other generators. So the conundrum of “what to do with frack waste” is far from being answered.

The proof of how difficult this issue is can be seen in all the pollution problems that are occurring where shale gas is being developed. Some of these are caused by poor performance by operators where violations of environmental permits by drillers have reached about 11 per day in Pennsylvania.²² Some are caused by inadequate regulation and oversight of gas drilling, hydraulic fracturing, and well site and wastewater handling practices such as water, air and soil pollution being investigated in Washington County, Dimock, Beaver County, Butler County, Bradford County, Susquehanna County and other areas in Pennsylvania.²³ Some are due to deficiencies in the processes used to extract and produce shale gas and the lack of adequate regulation of how to dispose of the waste.

We cannot afford that in New Jersey, the most densely populated state in the Nation, with the highest number of superfund sites in the Nation. We can't tolerate any more pollution entering our waterways, especially frack waste. The technology and the regulations that govern how waste from gas drilling and fracking must be treated to be safe, has simply not been developed.

This is the moment in time when New Jersey could institute a ban on frack waste that will be effective at stopping current dumping but also force protections to prevent pollution from frack waste generated here in NJ if they drill the Utica. NJDEP is not doing this for us; no one is stepping up to prevent pollution from frack waste here and now. We need the Legislature to affect a ban on the discharge, disposal, processing and long term storage in New Jersey. We need you to have our backs.

²² http://www.depreportingservices.state.pa.us/ReportServer/Pages/ReportViewer.aspx?/Oil_Gas/OG_Compliance

²³ <http://thetimes-tribune.com/news/dep-asks-gas-driller-to-help-remedy-franklin-twp-methane-spike-1.1287791#axzz1pIWELhB8>; <http://www.propublica.org/article/so-is-dimocks-water-really-safe-to-drink> ; <http://shale.sites.post-gazette.com/index.php/news/daily-headlines/24402-3202012-another-nepa-methane-spike-new-well-sites-in-beaver>; <http://shale.sites.post-gazette.com/index.php/news/archives/24313-dep-fines-chesapeake-over-multiple-incidents>; <http://shale.sites.post-gazette.com/>