



## Radioactive Waste from Horizontal Hydrofracking

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In a previous paper,<sup>1</sup> I compared the horizontal hydrofracking of shale to a "pipe bomb." Real bombs have been used to frack shale, including at least one nuclear device at Rulison, Colorado.<sup>2</sup> The bomb worked, but the gas was too radioactive to be marketable. Ironically, the horizontal hydrofracking of Marcellus shale poses a similar problem – it produces radioactive waste. The frack fluid effectively leaches radioactive radium out of the shale. When the frack water is pumped back out of the well, it is laced with radium, a potent carcinogen.<sup>3</sup> Based on a recent article in *Scientific American*, the amount of radium in water from the Marcellus is 267 times the safe limit for disposal, and thousands of times the level considered safe to drink.<sup>4</sup>

In New York, municipal treatment plants filter or settle sediment out of water. Using this method to treat 'produced' water from fracking operations would effectively reduce the sediment in the wastewater to a radioactive sludge, which, depending on the level of contamination, would have to be disposed of as a HAZMAT waste. New York state municipal treatment plants are simply not equipped to do this. Handling the radioactive wastewater would put municipal water treatment workers at risk.

One relatively safe method of disposal would be to inject the radioactive wastewater into a seismically inert formation – such as a salt dome – via a disposal well. Texas has almost 12,000 such permitted disposal wells, all of which are in seismically inert formations. There are few areas in New York that are seismically inactive.<sup>5</sup> And there are only 4 permitted disposal wells in New York State.<sup>6</sup> New York State is simply not prepared to handle the billions of gallons of radioactive wastewater that the Marcellus is capable of producing. To be treated, that wastewater would have to be reduced to a slurry, by some yet-to-be-built facility, not by municipal wastewater plants. And that slurry would have to be injected into a seismically inert formation. In theory, all of this is doable, if problematic. But the practical challenges of disposal have yet to be addressed by local governments or the NY DEC. Without appropriate disposal systems in place, radioactive waste is likely to be dumped at municipal water treatment plants, which will be left with radioactive sludge that they cannot get rid of safely. Since some of these radioactive wastes may be shipped across state lines for disposal, they present an interstate problem, which would necessitate the scrutiny of the EPA, which has regulatory authority over radioactive wastes.

Radium decays into radon, a highly carcinogenic gas and the second leading cause of lung cancer.<sup>7</sup> Unfortunately, radon is found at elevated levels in the Marcellus shale.<sup>8</sup> Parts of the Marcellus are particularly "wet" with propane,<sup>9</sup> which has physical properties similar to radon. So radon gas may separate out of Marcellus gas with propane, presenting a health risk to workers who handle Marcellus source propane, and potential hazards to users of such propane, if radon contaminants are not removed prior to sale.<sup>10</sup> Radon contamination may pose a risk to persons that use Marcellus gas in the field, in compressors, truck engines and other equipment.

The risks posed by these radioactive wastes need to be addressed by local governments, the DEC and the EPA before horizontal hydrofracking of shale can be allowed to proceed in New York state.

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<sup>1</sup> "Potential Leaks from High Pressure Hydrofracking of Shale," September 8, 2010.

<http://63.134.196.109/documents/NorthrupEPAFinal9-12-10.pdf>

<sup>2</sup> <http://en.wikipedia.org/wiki/Rulison>

<sup>3</sup> <http://en.wikipedia.org/wiki/Radium>

<sup>4</sup> <http://www.scientificamerican.com/article.cfm?id=marcellus-shale-natural-gas-drilling-radioactive-wastewater>

<sup>5</sup> <http://63.134.196.109/documents/HydroQuestEPAComments9-11-10withfigures.pdf>

<sup>6</sup> <http://www.dec.ny.gov/energy/29856.html>

<sup>7</sup> <http://www.epa.gov/radon/pubs/citguide.html>

<sup>8</sup> [http://ny-radon.info/NY\\_general.html](http://ny-radon.info/NY_general.html)

<sup>9</sup> <http://www.pipelineandgastechology.com/Headlines/2010/09/item67443.php>

<sup>10</sup> <http://www.neb.gc.ca/clf-nsi/rsftyndthnvrnmnt/sfty/sftydvsr/1994/nbs199401-eng.pdf>