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Environmental Litigation, Mediation, Enforcement & Compliance, Counseling

October 2, 2014

By Electronic Mail to  
[marcellushealth@gmail.com](mailto:marcellushealth@gmail.com)

Dr. Donald Milton  
Maryland Institute for Applied  
Environmental Health  
School of Public Health  
University of Maryland  
College Park, MD 20742

Re: “Potential Public Health Impacts of Natural Gas  
Development and Production in the Marcellus  
Shale in Western Maryland” (July 2014):  
Comments on Final Report

Dear Dr. Milton:

On behalf of Damascus Citizens for Sustainability Inc., NYH2O Inc., and Citizens for Water and for myself as a resident of Maryland, I am submitting the following comments on the final report cited above. We will confine our comments to a few issues. We must emphasize at the outset that one of these issues is of paramount importance to any public health study involving shale gas development, but has been completely left out of the final study. We should also note that we raised this issue in comments we submitted on the detailed scoping report for the study.

The issue in question is radon contained in natural gas produced from the Marcellus shale deposits. The scoping update in Section 8 of the final report lists “radon and naturally occurring radioactive materials” as a topic that the impact assessment plan was expanded to include. While this may have been in response to our scoping comments, the discussion of radon in the final report is limited to a single sentence which states:

*“The majority of attention has been focused around radioactive radium (and to a lesser extent radon, which is largely assumed to be released at well heads [59]) as an indicator for NORM, though other radionuclides may also be present and pose cumulative risks.”*

Final report at p. 45. The cited reference 59 reads “*U.S. Environmental Protection Agency (1974) Safe Drinking Water Act, US Congress.*” and gives no indication of how it relates to the proposition – that radon is largely assumed to be released at well heads – for which it is cited.

The statement that radon “is largely assumed to be released at well heads” is absolutely wrong as a matter of fact. Researchers at the U.S. EPA reported as early as 1973 that gas from

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shale deposits across the United States contains radon at activity levels ranging from 5 picocuries per liter (pCi/l) to 1450 pCi/l with an average across all deposits of 37 pCi/l (Johnson 1973, summarizing the results reported by prior investigators). (Citation provided in attached Fact Sheet and copy of report submitted by separate email). Researchers at the U.S. Department of Energy reported in 1980 that radon was present in the gas produced from the eastern Devonian shales (including the Marcellus shale) at an average level of 151 pCi/l (Gogolak 1980). (Citation provided in attached Fact Sheet and copy of report submitted by separate email). More recently, researchers from the U.S. Geological Survey found radon levels of up to 79 pCi/l from three wells selected by the gas industry in the Marcellus shale in Pennsylvania. (Rowan 2012) (Citation provided in attached Fact Sheet and copy of report submitted by separate email). The USGS team emphasized that there is a need for far more testing considering how paltry their sample was in light of the more than 40,000 Marcellus shale oil & gas wells that have been drilled in Pennsylvania alone between January 1, 2000 and December 31, 2012.

Having established that Marcellus shale gas contains radon (and its radioactive decay products, also known as “progeny”), the remaining question is whether the presence of radon and its progeny in Marcellus gas presents a public health issue for Maryland. The answer to this question involves two more issues. First, does exposure to radon and its progeny represent a public health issue? The very clear and undeniable answer to this question is “yes.” Every public health organization around the world has concluded that radon is a carcinogen and that exposure to it should be kept at a level that is as low as reasonably achievable. Based on a broad consensus among experts on ionizing radiation such as the National Academy of Sciences’ Committee on the Biological Effects of Ionizing Radiation report “Health Effects of Exposure to Radon, BEIR VI (1999), the U.S. Environmental Protection Agency and the Agency for Toxic Substances and Disease Registry attribute approximately 21,000 lung cancer deaths per year to exposure to radon and its progeny. Recognizing that there is no threshold, or “safe” level of exposure, EPA recommends initiating mitigation measures for radon levels equal to or greater than 2.0 pCi/l and urges aggressive mitigation for radon levels equal to or greater than 4.0 pCi/l. The World Health Organization recently reduced its reference level for mitigation actions to 100 Bequerels per cubic meter (Bq/m<sup>3</sup>) which is the equivalent of 2.7 pCi/l. See, *WHO Handbook on Indoor Radon: A Public Health Perspective* (2009), available at [http://whqlibdoc.who.int/publications/2009/9789241547673\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241547673_eng.pdf). For more information regarding radon, see the EPA website at, <http://www.epa.gov/radiation/radionuclides/radon.html>.

Second, if Marcellus shale gas from western Maryland is transported and distributed to markets in Maryland or to export facilities such as Cove Point, people in Maryland will be exposed to the radon and progeny in this gas. The radon activity levels in Marcellus shale gas are orders of magnitude above the EPA and WHO reference levels discussed above, and, given a half-life of 3.83 days for radon, would not decline significantly before Marcellus shale gas travels (at average pipeline speeds from 10 to 15 miles per hour) from western Maryland to distribution markets such as the Baltimore-Washington metropolitan area. Of course, any communities between these two points, such as Cumberland, Hancock and Frederick, MD, would be exposed to radon from consumption of this Marcellus gas as well. Further, compressor

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stations along the route would most likely be powered by burning gas from these pipelines. Of course, because radon is a noble gas that does not react with other elements, it would pass through the compressor engines and into the surrounding environment with the other exhaust gases, potentially exposing people living near the compressor stations to radon.

Clearly, radon in Marcellus gas produced in western Maryland would be a very significant public health effect. Indeed, it could well be the most significant public health impact from western Maryland shale gas. We urge you to revisit the radon issue and substantially revise the final report to consider the public health impacts from exposure to radon in Marcellus shale gas.

The second issue we want to mention is the discussion of methane as a public health issue. The final report significantly expands the discussion of methane emissions from unconventional gas wells. We would offer three additional pieces of information related to methane issues that have been published since the final report was prepared. First, the list of sites for which the Pennsylvania Department of Environmental Protection (PADEP) has issued letters to property owners informing them that oil & gas development has impacted their private water wells (known as “determination letters”) has increased to over 240 cases. A new listing from PADEP of these determinations with links to the actions taken by the agency was published on August 29, 2014. A copy of this PADEP document is being submitted by separate email to you.

Second, the National Academy of Sciences published in July, 2014, a new paper by Ingraffea et al. regarding loss of structural integrity (i.e. casing or cement failure) in over 9% of the oil and gas wells spudded in northeastern Pennsylvania since 2009. Such well failures will likely lead to migration of methane and other hydrocarbons, as well as other chemicals used in the drilling process or released from the production zone (such as radium, radon, barium, strontium and other elements) into the environment. A copy of this report, “*Assessment and risk analysis of casing and cement impairment in oil and gas wells in Pennsylvania, 2000–2012*” is being submitted by separate email to you.

Third, the National Academy of Sciences published on September 30, 2014, a new paper by Darrach et al. entitled, “*Noble gases identify the mechanisms of fugitive gas contamination in drinking-water wells overlying the Marcellus and Barnett Shales,*” that provides additional insight on the mechanisms that may be the cause of drinking water contamination from unconventional oil & gas development. A copy of this report is being submitted by separate email to you.

Finally, and perhaps most relevant and important for this Marcellus shale gas public health impacts study, we are submitting by separate email a report published July 10, 2014 by Concerned Health Professionals of New York, entitled “*Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas and Oil Extraction).*” This document describes and summarizes 340 separate reports, papers, articles and

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other documents addressing the public health risks and harms from unconventional gas and oil development using high volume, high pressure hydraulic fracturing. We urge you to carefully and fully review the material in this compendium to update your evaluation of the public health impacts from allowing Marcellus shale gas development in Maryland. We also recommend that you connect to the PSE Healthy Energy Library utilizing the link provided on page 2 of the Compendium.

In closing, we wish to express our gratitude for the opportunity to provide comments on this very important document. Especially in light of the potential that Marylanders across the entire state be impacted by such environmental impacts as radon in natural gas delivered to their homes, we would urge you to communicate back to the Department of Health, the Department of the Environment, and the Governor that a state-wide public health impacts study is required prior to any decision about shale gas development in our state.

If you have any questions concerning our comments, please contact me by telephone at either (240) 912-6685 (office) or (202) 262-9664 (cell) or by email at [jjzimmerman@comcast.net](mailto:jjzimmerman@comcast.net).

Sincerely,

/s/ J.J. Zimmerman

John J. Zimmerman

*Counsel to Damascus Citizens for Sustainability  
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cc: B. Arrindell  
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