

Science as an Inkblot Test

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The famed Rorschach inkblot test has been widely used for decades by psychologists to understand personality traits of their patients. Because each inkblot is complex and contains features that can be interpreted in various ways, the patient's response indicates much about his or her mindset prior to taking the test.

Recently, we've seen people reacting to a scientific paper in much the same way they react to a Rorschach test. The paper in question is the Duke University study of methane contamination in water wells near Marcellus drilling operations. Few papers have generated as much public reaction as the study authored by Stephen Osborn and his colleagues. And, like an inkblot test, that reaction has been colored by one's prior stance on Marcellus development.

On one hand, opponents of Marcellus development have welcomed the paper as proof that drilling and hydrofracking will inevitably lead to water pollution. For example, Natural Gas Watch stated on its website that the study "demonstrates unequivocally that fracking does, in fact, contaminate the water in the area where is used."

On the other hand, some supporters of Marcellus development have been highly critical of the study. For example, a commentary titled "Durham Bull" posted to the pro-industry website Energy in Depth provided a lengthy accounting of the study's reported faults. Even the Pennsylvania Department of Environmental Protection's Secretary Michael Krancer called it "biased science by biased researchers."

The public's attention and quick reaction to the study are encouraging in one respect because it means the public is actually paying attention to science. However, the highly polarized reaction is troubling because a careful, objective read of the study reveals its strengths and limitations.

In the weeks following the study's publication, the technical professionals of the Institute for Energy and Environmental Research for Northeastern Pennsylvania engaged in a thoughtful review of the paper. The team included geologists, environmental scientists, chemists, and water quality experts. We identified many parts of the report that deserve to be understood by all stakeholders associated with Marcellus shale development. To assist the public in thinking through issues raised in the Duke article, we developed a commentary that has been posted to the Institute's website, <http://www.IEER-NEP.org>.

According to the commentary, the Duke study – which was peer-reviewed and published in a respected journal – clearly found that some drinking water wells close to Marcellus gas installations had higher levels of methane than those far from

gas drilling. Moreover, the authors used molecular fingerprinting techniques to convincingly show that the methane originated from deep earth sources, and not shallow sources like wetlands or soils. Interestingly, the authors did not find evidence of contaminants from hydrofracking in the wells that they tested.

The commentary also points out several limitations to the Duke study. For example, the study did not conduct baseline testing for methane to determine levels before drilling commenced. Therefore a cause-and-effect relationship between drilling and methane contamination cannot be established. Also, the study could not address why many water wells located near drilling sites had low levels of methane.

The commentary concludes that the study provided a necessary first step in understanding potential contamination of groundwater by Marcellus drilling. However, more research is needed to convincingly establish whether drilling and hydrofracking really causes pollution.

It is incorrect to characterize the Duke study as either proving that hydrofracking causes water pollution – or that it represents junk science. Both supporters and opponents of Marcellus development should try to view this study and future ones with open minds. Objectively reading the science on this issue will allow us to more rationally discuss the costs and benefits of Marcellus shale gas development, especially in northeastern Pennsylvania. After all, it's research, not an inkblot.

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