From: "Bruns, Dale"
To: Edward Hanlon/DC/USEPA/US@EPA
Date: 02/28/2011 04:56 PM
Subject: Comments on the EPA "Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources"

To: EPA's SAB (on the Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources

From: Dale A. Bruns, Ph.D.

Subject: Review and Comments on the EPA "Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources"

Date: February 28, 2011

I am writing to provide comments on the EPA Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources. I am an aquatic ecologist at Wilkes University, but I am writing as a private citizen who is a scientist, and not as a representative of Wilkes. However, I am a co-PI on a water quality research project with DOE NETL that will be addressing related issues but focused more on surface waters, watersheds, and aquatic ecology relative to Marcellus gas development in northeastern and northcentral PA. Therefore, my comments reflect this perspective.

1. The Draft Plan is well-written and comprehensive. Although other potential affects from hydraulic fracturing (HF), such as impacts to terrestrial and aquatic ecosystems, are not addressed, these are acknowledged. The Plan proposes a good balance of approaches that includes retrospective and prospective case studies, with an emphasis on both existing data and additional data to be collected as appropriate. After peer review and editing, this plan should be fully funded and supported since the science and engineering behind best practices (and how to deal with existing problems) of field operations for HF need to be highlighted and implemented where needed. Other aspects of potential environmental concerns (e.g., aquatic ecosystems) should be addressed in the near future with an analogous plan.

2. The Draft Plan mentions surface waters and connectivity (e.g., p. 21) between surface and groundwater resources at various places; however, the final plan should provide additional detail in this regard. Fate and transport of chemicals via surface waters or recharge areas (e.g., wetlands) due to accidental spills, etc., will require better spatial resolution of this connectivity.

3. The Plan specifies watershed assessments and various spatial scales, especially from pp.20-23 (and p. 70 in Appendix A) of the document. Additional detail regarding watershed analyses and perspectives should be flushed out the in final plan. Likewise, the use of GIS (p. 21) appears implicit in many of aspects of the plan – but additional references (e.g., see below) to watersheds

and GIS analysis might be added at the appropriate level of technical detail in the final document.

4. Cumulative affects from HF and gas field development in Marcellus are mentioned on p. 23. However, given the rapid development of the Marcellus Play starting about 2006-2007, and the fact that the research plan to address impacts are only being reviewed in 2011, there appears to be a significant gap for the science and data to catch up with actual field operations and the number of wells already in operation, in development, and being planned. My understanding is that only 2% of the Marcellus Play has already been developed. Various cumulative affects can be envisioned and may be implicit in the current Draft Plan. However, given the rate of development, and the "catch-up" mode for doing the science and research, the final document should more fully develop an approach to assessing potential cumulative affects at various scales.

5. For case studies, some mention is given for man-made pathways of contaminants (e.g., p. 34 and p. 73, Appendix A). However, other sources of potential pollution may include agricultural chemicals, agricultural runoff, urban runoff, and/or industrial effluents. For contaminants such as TDS or benzene, these other sources could be contributors to water pollution or confound data interpretation on determining the relative affect from HF related activities or accidents. Therefore, in the final plan, some additional detail and indication should be given to collating (and collecting where needed) existing data from other sources of potential man-made pollution (and associated pathways, e.g., runoff) – how these may be evaluated in any case studies and related regional or local analyses.

6. Watershed analysis of land use and impacts to surface water quality and aquatic ecosystems has matured in the last 10 years. A multivariate approach is now the standard for such studies (Van Sickle, J., 2003. Analyzing correlations between stream and watershed attributes. Journal of the American Water Resources Association 39: 717–726). For the final plan, it would seem appropriate that for both USDW and surface drinking water resources, and any regional to local analyses of water quality affects and potential impacts (including those from other sources – see point 5 above) that some discussion and reference to these multivariate methodologies would be appropriate. This material might be placed in an appendix to complement other tools and watershed models discussed in Appendix H. Others references that might apply to combined groundwater and surface water analyses include:

· Allan, J. D., 2004. Landscapes and riverscapes: the influence of land use on stream ecosystems. Annual Review of Ecology and Systematics 35: 257–284.
· Gergel, S.E., M.G. Turner, J.R. Miller, J.M. Melack, E.H. Stanley. 2002. Landscape indicators of human impacts to riverine systems. Aquat. Sci. 64:118-128.
· Gove, N., E., Edwards,R.T., Conquest, L., L., 2001. Effects of scale on land use and water quality relationships: a longitudinal basin-wide perspective. Journal of the American Water Resources Association. 1721-1734.
· King, R.S., M.E. Baker, D.F. Whigham, D.E. Weller, T.E. Jordan, P.F. Kazyak, and M.K. Hurd. 2005. Spatial considerations for linking watershed land cover to ecological indicators in streams. Ecological Applications 15:137-153.

7. In Table 7, p. 44, Bradford and Susquehanna Counties are identified as a "finalist" for a retrospective case study. I would endorse this selection. It was indicated above that I am a co-PI on a DOE NETL water quality research project (mostly surface waters and watershed analysis) in this region. We have not selected study site(s) yet but plan to coordinate with other federal and state agencies and communities in the near future – as appropriate in this regard. Both of these counties and respective watersheds are currently under our consideration. At a minimum, we would like to contribute to this HF Research Plan when it is implemented after peer review – and as appropriate to our expertise, scope of work, and funds. Specifically, we would want to leverage resources, avoid duplication, and share data and analyses on a complementary basis with other researchers and agencies. We already maintain regular communication and coordination with DOE NETL researchers in this regard.

8. I am familiar with a variety of EPA documents (from RCRA and CERCLA applications) regarding environmental risk assessment, management, and perception. It would seem that the data and results from the HF research conducted by way of this Plan would eventually be interfaced with how such data and studies are used from a "risk management" perspective. Perhaps another brief section or an appendix would detail some of the risk methodologies used in hazardous waste management – and its relevance to assess safe operations of HF or to correct ambient problems.

9. Finally, it would also seem implicit in the Draft Plan, or the next natural step for EPA, that the data and analyses from these HF environmental studies on drinking water resources would be made available to the public in various formats and media. Again, a short section, or reference might be made in the final plan on how this research and related data will inform the public and communities. EPA's Windows to My Environment might be one way to share relevant data and information. It should be pointed out that Wilkes University (and partners) is developing a Marcellus Clearinghouse Web Site for northeastern and northcentral PA. This effort is part of our DOE NETL project noted above and we would welcome opportunities to work with EPA and partners in this regard. Our site is still under development at http://energy.wilkes.edu.

Thank you for considering my comments. I can be contacted via email or phone.

Best regards,

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