

Comments to EPA
on the
Scope of the Hydraulic Fracturing Research Plan
by the
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1.0 Who are we ?

The Weiden Lake Property Owners Association (WLPOA) represents a covenanted community that maintains a dam and a 70-acre lake in the watershed of the Ten Mile River, a tributary of the Delaware River located just south of Narrowsburg, NY. Our protective covenants apply to 2500 acres in the watershed and are intended to maintain the natural beauty and environment of the area, including limiting development and commercial activity, providing green belts around the lake and streams, and protecting wetlands. The Weiden Lake drainage area is mostly forested and the streams and wetlands exhibit particularly high water quality, including streams that provide trout habitat.

2.0 Why are we concerned with hydraulic fracturing ?

The Ten Mile River Watershed sits over the Marcellus Shale formation and the "Millenium" gas transmisson pipeline crosses directly through the watershed, a few miles upstream of our Lake. Drinking water for our houses is supplied by wells that tap underground aquifers. Our lake and streams are fed by surface runoff as well as by springs that tap groundwater. Some springs are also used for drinking water, and the surface waters support abundant wildlife. Protecting the quality of the surface and groundwater is essential to our community and our environment.

There are active proposals to use hydraulic fracturing to obtain gas from the Marcellus Shale in our area, and there are active exploration programs in nearby counties. Gas well drilling and the associated hydraulic fracturing in the Weiden Lake drainage area have the potential to degrade the environment and introduce contaminants into our groundwater and surface water. We are concerned about the effects that this would have on our health and on the health of the ecosystems that provide us with recreation, food, and other benefits.

In particular, issues that would be of concern to us and that are appropriate for EPA to study include:

- Alteration of subsurface geology by well drilling or fracturing could allow methane, other hydrocarbons, natural toxins, or fracturing fluid contaminants to enter aquifers used for drinking water.
- Water withdrawals from aquifers or surface waters within the watershed could deplete drinking water supplies, lower lake levels, or reduce stream flow.
- Access roads to and pipelines from drilling sites would fragment forests and increase runoff in the headwaters area of our watershed, diminishing water quality in our wetlands, streams, and lake.
- Extreme weather (e.g. an East Coast hurricane) can cause severe flooding events in the watershed. Such unpredictable occurrences could distribute poorly contained fracturing fluids throughout the watershed, and downstream into the Delaware River, potentially contaminating surface water, groundwater, and water wells over a wide area.
- Accidental release of fracturing fluids containing contaminants to streams or lakes could render them unfit for recreation (e.g. swimming) or affect the health of fish or their suitability for human consumption.

3.0 What is our general assessment of the proposed scope of the study ?

EPA seeks stakeholder input on the scope of the proposed study of hydraulic fracturing impacts on drinking water. A review by the EPA Science Advisory Board found that there are several areas that can be enhanced and focused (EPA-SAB-10-009, p. 10). We agree. To be useful, the study should result in assessments that will allow us to evaluate and respond to hydraulic fracturing proposals in our watershed. Significant revision of the proposed scope, within an overall results-oriented framework, is required to achieve this goal.

Effectively defining a scope for an investigation of an environmental issue requires, first, that there be an overarching framework that sets out goals and objectives, hypotheses to be tested, and the types of guidelines and policies that will be considered based on the results obtained. We did not find such a framework articulated in the materials provided. As a result, the proposed scope contains some elements of an effective scientific research program, but is neither complete nor focused.

Given the Congressional impetus for the study, it is clear that the main objective should be to address the desire for EPA "to assess the potential risks to drinking water posed by hydraulic fracturing" (SAB web site, Background summary on the Hydraulic Fracturing Research Plan page). The four-pronged approach proposed by EPA stops noticeably short of the desired assessment, including only 1) data gathering, 2) cataloging risks, 3) identifying data gaps, and 4) developing research questions and products such as models and tools (Environmental presentation, p.7). A fifth component should be added, namely:

Analyzing data, cataloged information, and research results to assess the potential of hydraulic fracturing to affect drinking water in specific settings throughout the country, both in areas experiencing gas drilling at present and in areas likely to be targeted for gas drilling in the near future.

We submit that one such major regional assessment should be for potential future gas drilling in the Marcellus Shale region of the Upper Delaware Watershed.

A further concern is that the timeline for achieving concrete results from the study is unspecified. Some comments in the background presentations suggest that a limited number of short term "case studies" will be conducted over the next few years, as a preface to a longer-term study. We must emphasize that the public concern reflected in the Congressional request to EPA is a result of an immediate need for accurate and usable information. Gas drilling using hydraulic fracturing is currently being considered over large and environmentally sensitive sections of the Susquehanna and Delaware River basins. In particular, exploratory drilling leases are already being sought in our watershed. Therefore, in order to be useful:

The study plan must be designed to provide, within one year, at least an interim assessment of conditions under which hydraulic fracturing can affect drinking water.

Our third general concern is that the case study approach envisioned by the SAB was introduced in the context of identifying additional knowledge and filling in data gaps in the existing literature (EPA-SAB-10-009, p. 11). While effective for those purposes, case studies are not an adequate method for identifying human health effects that are distributed throughout a population, such as might result from the diffusion of contaminants through a drinking water aquifer. The observations from a limited number of such case studies are of dubious value in determining human health risks. Therefore, it is also necessary to take a broad look at populations and ecosystems in areas where hydraulic fracturing is already being practiced to detect the signs of potential effects:

In addition to the case studies, statistical assessments of population health and water quality data should be conducted in hydraulic fracturing and similar control regions to determine if there is evidence for differences due to hydraulic fracturing.

Finally, we comment that the lifecycle approach may identify pathways by which normal hydraulic fracturing processes can result in exposure to contaminants, but this is not sufficient. Equal attention must be given to accidental releases of drilling fluids or other contaminants that, while potentially rare, may cause acute and irreparable impacts to human and ecosystem health. Therefore, we recommend that:

The study should identify failure modes in the hydraulic fracturing process that would lead to contaminant release to water resources, characterize the nature and probability of such failures, and assess the magnitude and duration of the associated human and ecosystem impacts.

4.0 Comments on Selecting Case Studies

We have also reviewed the EPA white paper "Opportunity for Stakeholder Input on Criteria for Selecting Case Studies for Consideration in EPA's Hydraulic Fracturing Research Study". Considerable work is needed to turn the material in this document into a precise and understandable selection process.

First of all, EPA must clearly define what it means by a "case study". It is not possible to give meaningful input on selecting case studies unless the bounds that define a "case" and the nature of the "study" to be conducted are known. It seems likely that a case study of hydraulic fracturing would consist of documenting the geological context, environmental features, and all events in the lifecycle of a well that employed hydraulic fracturing technology. However, a detailed study methodology will have to be established that specifies type and detail of the data that will be collected for each phase of the lifecycle and the nature of any additional (post-well closure) investigations or data collection that will be undertaken. Without such a definition and study methodology, only very general criteria for selecting case studies can be suggested.

It is also hard to accept the expectation expressed in the EPA paper that case studies will adequately address the many questions that have been raised about the impacts of hydraulic fracturing. A case study, by its very nature, only provides a single data point in the universe of thousands of wells developed using hydraulic fracturing. Five or ten case studies will not provide a "systematic framework" for an investigation nor would they provide a valid scientific basis for deriving broad conclusions. Case studies are best used to examine notable successes or failures with respect to a specific outcome, and are a poor investigative tool for a problem as variable and as diffuse as the impacts of hydraulic fracturing on drinking water. We have recommended in Section 3 above that the case study approach be accompanied by broader population studies to address this flaw. One criterion for selecting case studies would therefore be the availability of suitable population, water quality, and ecosystem data to support such statistical assessments in the region surrounding the case study well.

The EPA paper lists four "research questions" as the starting point for developing case studies. None of these questions bear on selecting case studies, although they may be of broad interest to the hydraulic fracturing study. The questions relevant to selecting case studies are:

- What will be the spatial and temporal extent of a case study ?
- What are the general geological formations in which hydraulic fracturing has occurred or is being considered ?
- How many case studies will be required to characterize possible impacts to drinking water in the major formations ?
- How many case studies will be required to assess variability of impacts within a formation ?
- Should case studies focus on a) wells that operated normally ?, b) exceptionally good or bad wells or drilling operations ?, c) wells with unusual incidents or accidents ?

Similarly, Table 1 of the EPA paper is puzzling because it lists activities and criteria that are unrelated to selecting case studies. A number of potentially long-term "monitoring" field activities are suggested in this table. Case studies are not normally monitoring studies, and the selection criteria and

sampling design for monitoring studies would be inconsistent with a case study approach. While a stratified-random well monitoring component would be a useful addition to the overall hydraulic fracturing study, EPA should clearly separate this from the case study component.

Further, the "potential criteria" that are suggested in Table 1 are not selection criteria at all, but a list of the data that will have to be collected to interpret the monitoring studies. Collection of these data will be a significant undertaking in itself, and is unlikely to be completed prior to initiating case studies or a monitoring program. Realistic decision criteria for selecting wells to be used as case studies are:

- An appropriate geological formation is represented (i.e. one of those to be studied)
- Completeness of the existing data set (vs. data desired)
- Ability to collect additional data
- Number of reported impacts or incidents
- Thoroughness of incident reports and investigations

5.0 Additional Remarks

EPA has assembled a number of thoughts and ideas about studying the impacts of hydraulic fracturing on drinking water. The framework for linking these thoughts and ideas into a coherent study is missing. Such a framework must be developed before proceeding in order to avoid a rambling, drawn-out, and inconclusive study. Additional stakeholder input should be sought once there is a clearly defined framework and a draft study plan reflecting the framework.

EPA's suggestion that the study should have a narrow focus on a limited number of case studies is hard to understand. Under such an approach, it would be very difficult to apply the resulting observations in a valid way to areas in which drilling and hydraulic fracturing have not been practiced previously, such as the Upper Delaware River Basin. The potential for human health effects and ecosystem degradation in these areas makes it imperative that EPA deliver a timely and broadly applicable study that can contribute to decisions about well drilling leases in such regions by individuals, organizations, and government bodies. Investigative tools other than case studies will be required.

Finally, while we understand that drinking water is a critical first issue, it is clear that such impacts are not isolated from a broader set of human health and environmental impacts, including degraded water quality, introduction of contaminants into aquatic and terrestrial food chains, and human exposure through incidental water use or consumption of plants or animals in which contaminants have accumulated. These are all areas of concern to EPA, state and local regulatory bodies, and landowners considering gas well drilling leases. EPA should not oversimplify the hydraulic fracturing study, but should conduct it in a way that is cognizant of these collateral issues. For example, a small incremental cost in data collection may allow broader environmental impact assessments to be carried out in parallel with the drinking water study by other groups. We recommend that the study plan include procedures and data handling policies that anticipate and support such parallel studies to the maximum extent possible. To this end, early and public release of all data and information gathered or produced by EPA would be appropriate and welcome.

Respectfully Submitted,
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